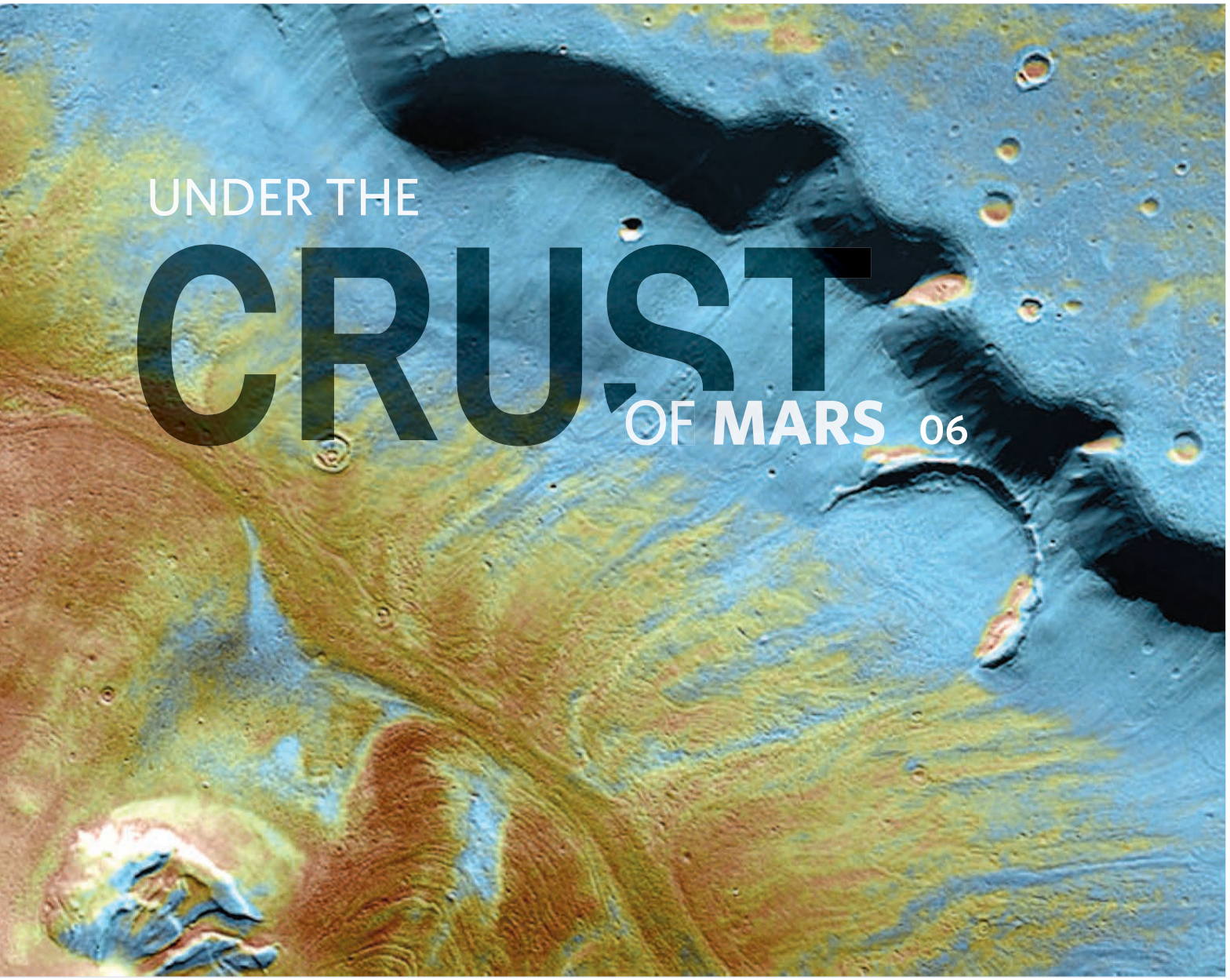
ISSUE 02/2012

SYNERGY

JOURNAL OF UBC SCIENCE

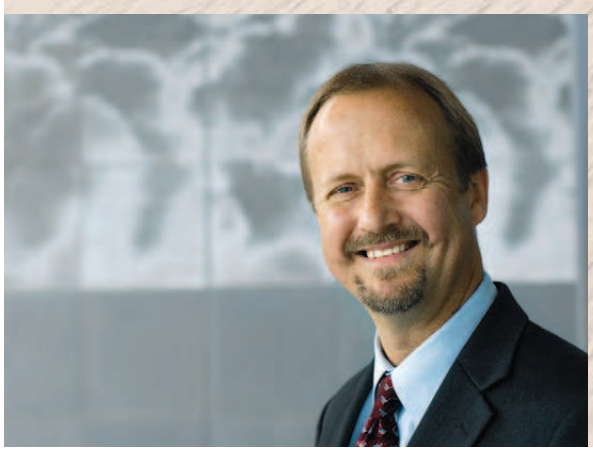


UNDER THE CRUST OF MARS 06

a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

STUDYING THE SCIENCE CLASSROOM



Do our students learn better by interacting face-to-face in our classrooms, through hands-on experiences in the lab and field, or through interacting online? What is the optimal blend of these learning environments? Does it vary by student? By discipline? These are just some of the important 'learning questions' we're seeking to answer at UBC Science.

If you were to read today's headlines, you might conclude that advances in online learning will make universities extinct within a few years. Perhaps, but I doubt it. Online technologies can work well for information transfer—we're increasingly using web resources and our own online materials to free up class time for rich interactive engagement between instructors and students, and among students themselves. But, when well designed, the classroom experience is a dynamic, real-time, synchronous conversation

NEWS

New Earth Sciences Building puts research on display on UBC's Main Mall

ESB features nine-metre-tall high-head labs with floor-to-ceiling windows, and installations from the Pacific Museum of the Earth. Photo by Michael Elkan.

Dean Simon Peacock welcomed dignitaries, alumni and industry partners to UBC's Vancouver campus on November 16 to officially open the new Earth Sciences Building. The upgraded space is a huge boost to the more than 7,000 students who take earth science classes at UBC every year, and creates a centre of gravity for an emerging science neighbourhood.

The $75-million facility features cavernous nine-metre-tall highhead labs (one open to public viewing via floor-to-ceiling windows), a state-of-the-art lecture theatre complex, and customized computer labs designed for interactive learning. It also incorporates a showcase of mineral collections, from UBC's Pacific Museum of the Earth, along the building's facade facing busy Main Mall.

"Our new Earth Sciences Building really does put science on display along UBC's Main Mall," says Peacock. "It's wonderful to be able to offer this facility to our students, and to be able to expand the Faculty's public face on campus. We're very grateful to our province, our industry partners and our alumni for helping us realize this tremendous facility."

ESB brings together many of the Faculty's industry-facing resource research groups in updated labs —and collocates researchers in the earth, ocean and atmospheric sciences with researchers in statistics.

"UBC's world-renowned reputation for excellence in earth, ocean and atmospheric sciences is enhanced with this fine new building, which I am most proud of helping establish for future generations," says UBC Science alum Ross Beaty, who chaired the UBC Earth Sciences Building campaign.

UBC's Earth Sciences Building was made possible by a $37.5-million investment from the BC Government, and to date, more than $26 million from the mineral exploration community. Lead donors include Ross Beaty, Goldcorp Inc., Teck Resources Limited, Lundin Mining Corporation and Pan American Silver Corp.

OF TOMORROW, TODAY

with rapid interactive feedback loops and a degree of creative improvisation. In contrast, online learning is largely asynchronous, and online discussions and social media interaction lack many of the positive team-building qualities and feedback loops offered by the classroom and university environments. Face-to-face learning is multi-dimensional. At present, online learning can feel flat and two-dimensional.

But, information and communication technologies and social networking are evolving rapidly, and some of the challenges currently faced by online learning will likely be overcome in the near future. So rather than ignore these advances, UBC Science recently partnered with Coursera to pilot three massive open online courses (see page 19) in computer programming, genetics and climate literacy. I see our partnership as an opportunity to take an evidence-based approach to answering critical questions about student learning.

Our best science teachers ignite a passion for learning in students and inspire creativity. It remains to be seen whether this magic can be successfully transferred to the online world.

Simon M. Peacock
Dean, UBC Science

Research into speedy DNA analysis gets funding boost

Microfluidics expert Carl Hansen is one of several UBC researchers who received a total of $4.5 million in federal support for multidisciplinary initiatives that combine science, engineering and medical expertise. An associate professor with Physics and Astronomy and member of the Centre for High-Throughput Biology, Hansen received $965,950 from NSERC's Collaborative Health Research projects program. His team is building tools that will enable the swift and accurate genomic analysis of large numbers of single cells—some of the tools and techniques are already being used to better understand the biology of stem cells and cancer cells, ultimately leading to their manipulation for improved therapies.

Statistician picks apart popular algorithm used to screen chlamydia

The US Centre for Disease Control (CDC) has recognized UBC statistician Liangliang Wang for her research questioning the accuracy of a popular algorithm used in chlamydia screening tests. Wang and her co-authors used computer-simulated scenarios to test the accuracy of the patient estimation algorithm, PISA. The PISA is widely used to produce sensitivity and specificity estimates for Chlamydia trachomatis screening results, and is included in Food and Drug Administration-approved materials. Wang's team discovered that PISA can produce inaccurate estimates because it assumes the measures it utilizes are perfect—tests designed to detect the presence of a bacterium can mistakenly detect a previous infection, and false positives may also occur due to contamination. With flawed data, the PISA can produce inaccurate estimates that are in turn employed as the basis for screening tests. The CDC awarded the Charles C Shepard Science Award to Wang and her team for the discovery.

Fruit fly's 'sweet tooth' is short-lived

Those struggling with the temptations of chocolate-bar-laden store checkouts may have something to learn from the humble fruit fly. While the flies initially prefer food with a sweet flavour, they quickly learn to opt for less sweet food sources that offer more calories and nutritional value, according to new research by UBC zoologists.

The findings—published in the Journal of Neuroscience—are the first to measure the shift in food preference over time, and the first to find that flies opt for nutritious food more quickly when they're hungry. "The taste system is important for quick, often life-and-death decisions about what to eat," says Michael Gordon, a UBC neurobiologist and senior author of the paper. "Typically the initial taste of sugar indicates a good source of carbohydrates, but longer-term feeding preferences integrate past experiences and learning. It appears that nutritional content is an important part of that."

View stunning photos of the new Earth Sciences Building and learn more about the UBC Science supporters who helped make it happen.
science.ubc.ca/about/esb

UBC chemists used air samples from Atlanta, pictured here blanketed in summer smog, to get a better idea of the life cycle of atmospheric particles.

Tiny airborne pollutants lead double life

UBC and Harvard chemists have provided the first visual evidence that atmospheric particles—which are ubiquitous in the atmosphere above densely populated areas—separate into distinct chemical compositions during their life cycle.

The observations could have important implications for modelling global climate change and predicting air quality conditions. The tiny particles, which form part of an airborne chemical mix above cities, play a role in pollution by providing a surface for chemical reactions, and in climate by reflecting and absorbing solar radiation and by acting as seed surfaces for water condensation and cloud formation.

"We've confirmed experimentally that changes in relative humidity can separate the organic and inorganic material in individual atmospheric particles into distinct liquid phases, much like oil separates from water," says Allan Bertram, director of a graduate training program on atmospheric aerosols at UBC and a principal investigator on the Proceedings of the National Academy of Sciences paper.

"Having two liquid phases rather than one can impact the rates of chemical reactions on particles, may change the amount of light the particles reflect and absorb, and impact their ability to act as seeds for clouds."

Particulate air pollution is a relatively new area of study, but one of growing concern to researchers, health officials and environmental groups. Increases in the concentration of aerosols are correlated with increased health issues, including cardiopulmonary disorders.

Fish shrink as oceans warm

Changes in ocean and climate systems could lead to smaller fish, according to a study led by UBC fisheries scientists. Published in Nature Climate Change, the modelling provides the first-ever global projection of the potential reduction in the maximum size of fish in a warmer and less-oxygenated ocean.

The researchers used computer modelling to study more than 600 species of fish from oceans around the world and found that the maximum body weight they can reach could decline by 14 to 20 per cent between 2000 and 2050, with the tropics being hardest hit.

"We were surprised to see such a large decrease in fish size," says the study's lead author William Cheung, with UBC's Fisheries Centre. "Marine fish are generally known to respond to climate change through changing distribution and seasonality. But the unexpectedly big effect that climate change could have on body size suggests that we may be missing a big piece of the puzzle of understanding climate change effects in the ocean."

This is the first global-scale application of the idea that fish growth is limited by oxygen supply, which was pioneered more than 30 years ago by Daniel Pauly, principal investigator with UBC's Sea Around Us Project and the study's co-author.

Single-cell parasites co-opt genes from host

Two species of single-cell parasites co-opted 'ready-made' genes from their hosts, which in turn help them exploit their hosts, according to new research from UBC and University of Ottawa biologists. Part of a group of parasitic microbes called microsporidia, Encephalitozoon hellem and Encephalitozoon romalea are related to fungi and are commonly found in the intestines of vertebrates. In humans, they are associated with people with immune deficiencies.

The research team identified six genes in these parasites that were not found in any other microsporidian. Rather than the slow process of inheriting individual genes, E. hellem and E. romaleae have acquired a suite of genes that produce folate, a form of folic acid that helps cell division and growth.

"With their tiny, reduced genomes, microsporidia are models for gene loss," says UBC biologist Patrick Keeling, lead author on the paper published in the Proceedings of the National Academy of Sciences. "These parasites have undergone massive genome reductions and are literally infection machines—they only kept genes that are essential for survival."

"But here we found two species have acquired new genes that work together to make an essential nutrient that the parasites would otherwise have to steal from their host," adds Keeling, director of the Centre for Microbial Diversity and Evolution.

'Outnumbering' the Canadian competition

Eleven UBC mathematicians were named to the inaugural class of American Mathematical Society fellows this November—more than any other Canadian institution. The 2012 class of 1,119 fellows represents over 600 institutions from around the world. The UBC additions are: Alejandro Adem, Martin Thomas Barlow, David William Boyd, James Carrell, William Allen Casselman, Ailana Fraser, Nassif Ghoussoub, Izabella Laba, Zinovy Reichstein, Maurice Sion and Gordon Slade.

UBC-led alliance to compare notes on science education

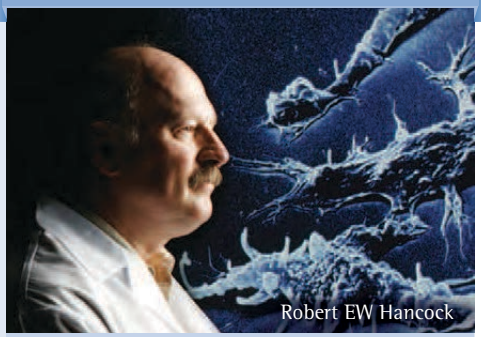
UBC is partnering with seven top North American universities to study how to speed up the adoption of improved teaching techniques in science classrooms.

"Education researchers have built up a robust body of knowledge about what works—and what doesn't—when teaching science to undergraduates," says Lorne Whitehead, a UBC physics professor and principal investigator for the newly launched Bay View Alliance (BVA). "Yet for reasons we don't completely understand, that knowledge has had trouble making its way into classrooms and curricula. We're studying what leaders at every level, including those among the faculty, can do to help fix that."

The BVA—which includes the University of California Davis, University of Kansas, Indiana University Bloomington, the University of Texas Austin and two Canadian partners—is being backed with $803,942 in start-up funds from the Alfred P. Sloan Foundation.

"The BVA is designed as a networked improvement community," says Simon Peacock, dean of the Faculty of Science at UBC. "We'll evaluate different leadership approaches that aim to accelerate the adoption of improved teaching techniques. At UBC, our Carl Wieman Science Education Initiative is an excellent example of that type of approach."

HONOUR ROLL


Robert EW Hancock

Prix Galien 2012 Research Award
Robert EW Hancock, Microbiology and Immunology

Fellows, Royal Society of Canada
Anne Condon, Computer Science
Michael Doebeli, Zoology and Mathematics

Vanier Canada Graduate Scholars
Joanna Bernhardt, Zoology
Léanne Racicot, Chemistry

2012 Gruber Cosmology Prize
Mark Halpern, Physics and Astronomy
Gary Hinshaw, Physics and Astronomy

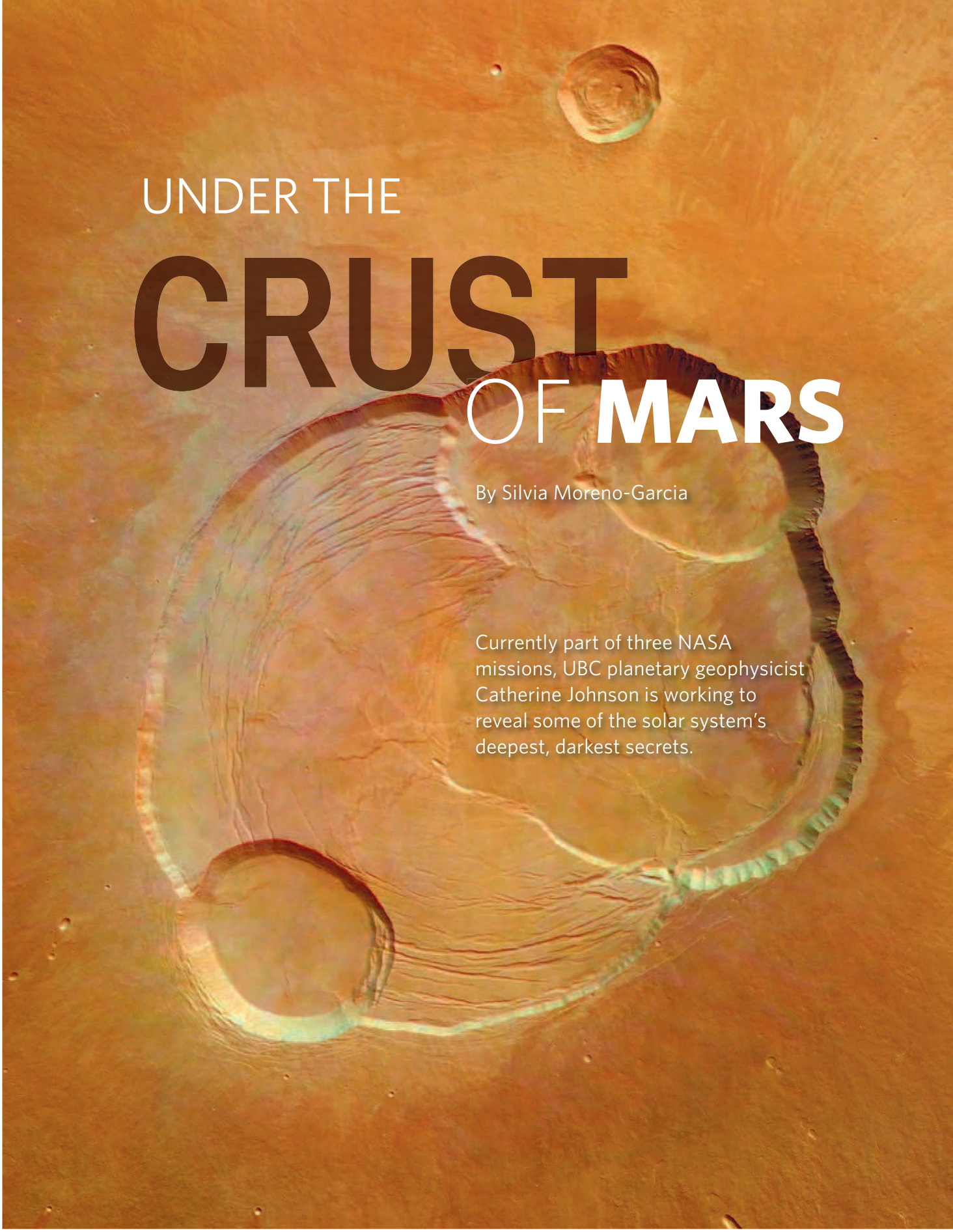
2013 Strem Chemicals Award for Inorganic Chemistry
Mark MacLachlan, Chemistry

Canada Research Chairs
Amy Angert, Botany, Zoology
Nicholas Harvey, Computer Science
Steven Martell, Zoology, Fisheries Centre

2012 Adrien Pouliot Award
Melania Alvarez, Mathematics, Pacific Institute for the Mathematical Sciences

Krieger-Nelson Prize, Canadian Math Society
Ailana Fraser, Mathematics

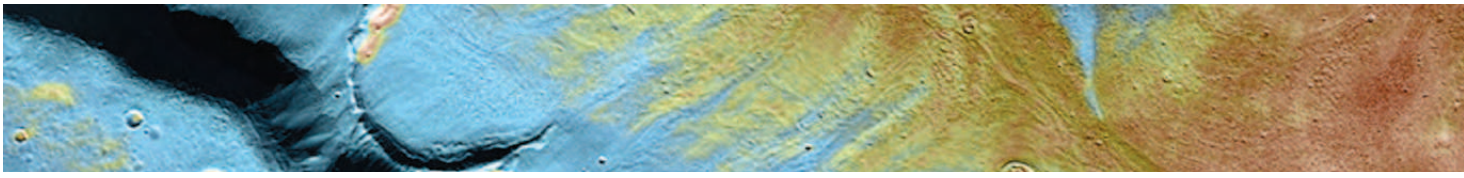
Charles E Shepard Science Award, US Centers for Disease Control and Prevention
Liangliang Wang, Statistics



UNDER THE CRUST OF MARS

By Silvia Moreno-Garcia

Currently part of three NASA missions, UBC planetary geophysicist Catherine Johnson is working to reveal some of the solar system's deepest, darkest secrets.



Johnson compares planetary geophysics not to solving a crossword puzzle, but to actually inventing the crossword puzzle itself.

HG Wells envisioned invaders descending from the Red Planet. In Total Recall, Arnold Schwarzenegger discovered ancient alien ruins on Mars. Ray Bradbury predicted a colonized planet.

For decades, Mars's massive volcanoes, craters and faux canals have stirred the imagination of people around the world. But despite the popular fascination, and despite being the most heavily studied planet, researchers are only beginning to peer beneath Mars's surface.

Catherine Johnson is helping to plumb some of our solar system's hidden depths. A professor of planetary geophysics at UBC and currently part of three NASA missions, Johnson has made a career of uncovering the secrets beneath the crust of planets millions of miles from Earth.

Johnson's interest in planetary geophysics dates to her childhood. Growing up in a small English village (which she describes as "1,200 people and about 100 ducks") in the late 1970s and early 1980s, she was fascinated by news of the eruption of Mount St. Helens and the launches of NASA's Voyager and Space Shuttle missions.

Johnson sought to combine her twin interests. She completed her PhD at the University of California's Scripps Institution of Oceanography, where she met David Sandwell, a scientist interested in remote planet research. While at Scripps, she began working with Sandwell as a participating scientist on the Magellan mission to Venus.

Mercury was the next target, with Johnson participating in NASA's MESSENGER mission—launched in 2004. She will also be the only scientist from a Canadian institution participating in NASA's Interior Exploration using Seismic Investigations, Geodesy and Heat Transport (InSight) Mars mission.

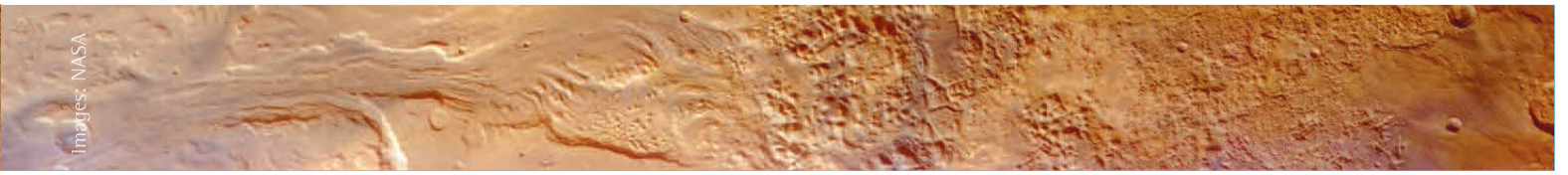
InSight will launch in 2016. Johnson is one of the scientists tasked with analyzing the gigabytes of data the lander will hopefully collect and send back to Earth. The data will constitute the first seismic information gathered from any planet other than Earth, allowing researchers to investigate a range of Mars mysteries. Are there Marsquakes? Why did Mars lose its atmosphere?

"We know that very early on Mars had an atmosphere which resulted in similar conditions to Earth," says Johnson. "There might even have been water on the planet. We also know it used to have a magnetic field."

To a geophysicist, Earth is essentially a gigantic magnet. The magnet is powered by the Earth's molten core and shields the planet from solar winds. Researchers know Mars also had a magnetic field once—ancient rocks found on its surface are magnetized. However, some 3.8 billion years ago Mars's magnetic field vanished. The big question is, did it take Mars's atmosphere with it?

"Venus has a weak magnetic field, but it has no strong atmosphere," Johnson explains. "We know it is not necessary for all planets to have strong magnetic fields in order to have an atmosphere, but what would happen if the magnetic field went away? And how did Mars's field go away? Did the core of the planet cool down?"

To help answer those questions, the InSight lander will bore a hole five metres deep into the Martian soil to deploy a heat probe under the surface, and will install a seismometer on the surface. The data collect by the instrumentation will allow Johnson and other scientists to evaluate how energy travels through the planet, from its metallic core to the crust.



Images: NASA

"Beneath the surface Mars is a slice of planetary history. It's a chance for discovery. Planetary geophysics is neat because it's easy to get excited about exploration on such a large scale to address really fundamental questions about how planets evolve."

— Catherine Johnson

"By looking at the core structure, we'll be able to know how much liquid it contains—for example, it might have just a thin layer or it might be mostly liquid," says Johnson. "An understanding of the current structure of the core and its heat flow will allow us to know what the core looked like in the past. This will help us understand the planet's history, including why its magnetic field switched off."

Understanding the processes that occur deep beneath the surface of other planets and their relation to magnetic fields could have major ramifications. On Earth, the loss of a magnetic field—and its protection from solar winds, sun storms and cosmic rays—would have enormous health and atmospheric impacts. However, we're just beginning to understand how the fields behave on other planets.

Data sent back by MESSENGER from Mercury show that the magnetic field varies in strength around the speedy little planet, becoming weaker in certain areas and allowing the solar wind to buffet the surface.

"At high latitudes, in areas where the magnetic field is weaker, the solar wind hits the planet and ejects particles like sodium and calcium from the rocks on the surface," says Johnson. "This doesn't happen on Earth because of our atmosphere. On Earth, the solar wind hits the upper atmosphere causing aurorae, the familiar Northern Lights."

Mercury's dynamic environment is very different from what scientists expected. Old textbooks often erroneously draw parallels between the moon and Mercury. In fact, the planet features faults and evidence of volcanic and tectonic activity. For example, smooth plains around Mercury's north pole show that 3.5 billion years ago gigantic lava flows filled craters more than a mile deep.

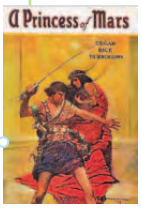
Photographs taken by MESSENGER also reveal mysterious landforms dubbed "hollows." These shallow, rimless depressions are unlike any other landform yet seen in the solar system. They are very bright, containing some type of highly reflective material.

"These are holes in the ground, but we have no idea what's inside them. Are they transient? What is the stuff in them? Is it icy material? There might be very bright volatiles, like sulfur, trapped in them, but we just don't know yet," wonders Johnson.

These kinds of questions drive Johnson's curiosity. She compares planetary geophysics not to solving a crossword puzzle, but to actually inventing the crossword puzzle.

And luckily, new mysteries emerge all the time for planetary geophysicists. Marsquakes weren't on anyone's radar until NASA's Mars Reconnaissance Orbiter analyzed tracks left by boulders that fell from a Martian cliff. The pattern of the tracks indicated the boulders had probably fallen as the result of a quake, meaning Mars could be seismically active. Marsquakes might indicate the existence of active volcanoes. They would also make the Red Planet more amenable to sustaining life—active volcanoes could melt pockets

Planets
Facts and Fiction



1912
Edgar Rice Burroughs publishes the first of the John Carter of Mars adventure series.

1918
The Dominion Astrophysical Observatory (DAO) opens near Victoria, BC. Its 1.8-metre telescope is one of the largest in the world.

1924
The first Soviet science fiction film is released. Aelita: Queen of Mars is a big budget affair.

1930
Helen Battles Sawyer begins working at the DAO. She becomes a leading expert on globular clusters.

1938
Orson Wells produces a radio adaptation of War of the Worlds. Public panic ensues.

1939
UBC graduate George Michael Volkoff, working with Robert Oppenheimer, predicts the existence of neutron stars.

of subterranean ice, perhaps forming water pools.

That is why the InSight lander will be equipped not only with a Heat Flow and Physical Properties Package (HP3) to record temperature readings, but also a Seismic Experiment for Interior Structure (SEIS) to detect tectonic and meteorite activity.

"The seismometer will measure the meteorite flux for a period of two years. But it can also detect where and how many Marsquakes take place," says Johnson. "It's a fundamental look inside the planet."

Ultimately, this underground data gathered by InSight might also allow us to better understand the evolution of a ball of space debris into a fully fledged planet.

"Planets, when they form, are rock and metal soup. Very quickly the dense part of this soup sinks to the middle of the planet, and you get a core. However, we don't know exactly how that happens," Johnson says.

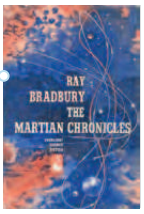
Earth, with its shifting plates and slowly migrating sea floors, has changed dramatically over the course of its history. Mars and Mercury, due to their structures, have retained much of their historic geological records, and may yield evidence of the early processes that led to their formation. Mars, in particular, is large enough to have retained fundamental information about its formation.

"Beneath the surface Mars is a slice of planetary history," says Johnson. "It's a chance for discovery. Planetary geophysics is neat because it's easy to get excited about exploration on such a large scale to address really fundamental questions about how planets evolve."

As NASA's Curiosity rover continues to beam back photos of the rocky surface of Mars, Johnson and other scientists will be conducting feasibility studies and simulations to determine the best landing sites for the InSight mission. In a few years, the robotic lander will be hurtling toward the Red Planet that has inspired dreams of canals and ancient Martian civilizations for decades.

A Game of Asteroid Catch

UBC's Catherine Johnson is also participating in the NASA OSIRIS-REx New Frontiers mission. A spacecraft will take samples from an asteroid and bring them back to Earth for analysis. Asteroids are the remnants of the building blocks of planets and could help us understand planet formation and the origin of life. Canada's contribution to the project will be the Light Detection and Ranging (LIDAR) system. OSIRIS-REx will launch in 2016. It will spend about six months mapping its destination using the LIDAR system. Scientists will then pick a landing location and the spacecraft will scoop soil samples as it does a touch-and-go with the surface. The samples will be analyzed on Earth, after the spacecraft returns in 2023.



1950

Ray Bradbury publishes the short story collection The Martian Chronicles.

1968

Geophysicist Gordon Walker joins UBC and develops techniques for modern extrasolar searches.

1994

Paul Hickson of UBC helps build the world's first liquid mirror telescope.

1996

Mars Attacks! — inspired by a series of 1960s trading cards—parodies old alien invasion flicks.

2007

UBC astro-paparazzo Jaymie Matthews observes an Earth-like planet orbiting Gliese 581.

2012

The big-budget film John Carter is released 100 years after its title character first made it to Mars.

Charging ahead

A low-frequency wireless charging technology invented by UBC physicists is already powering electric cars in a fleet of campus service vehicles.

Drivers with UBC's building operations team are enjoying a convenience that car-saddled hockey parents across Canada might just envy—safe, effortless wireless charging of their electric vehicles.

The new system, invented by Lorne Whitehead and his team at the Sustainability Solutions Applied Physics Laboratory, uses remote 'pulleys' coupled by a magnetic field to transfer power from a base station to the car. Drivers just park and go.

"Wireless charging has been a much sought-after technical solution for everything from cell phones to electric cars," says Whitehead. "A significant concern for charging cars wirelessly has been the high power and high frequency electromagnetic fields and their unknown, potential health effects on humans."

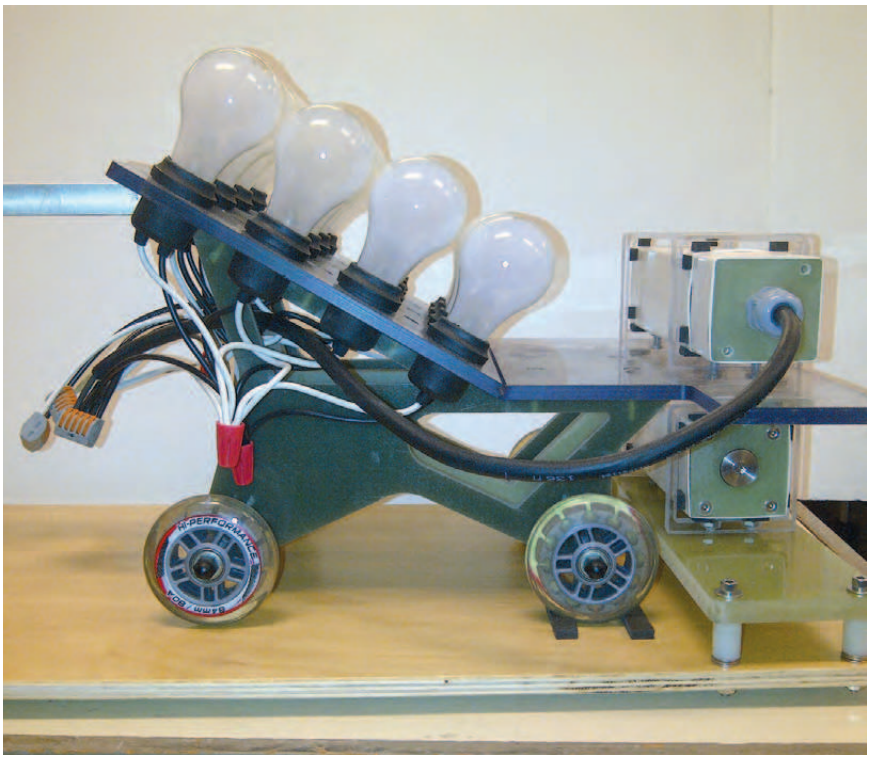
So Whitehead and his team invented a completely different system which operates at a frequency 100 times lower and with negligible exposed electric fields. Their solution uses a rotating base-station magnet driven by electricity from the grid, and a second magnet located to the rear of the front bumper on the underside of the car. The base magnet remotely spins the in-car magnet, which in turn generates power to charge the battery—without the use of radio waves. At roughly 60Hz, the power transfer is as efficient as conventional methods that push high frequency waves through the air.

"One of the major challenges of electric vehicles is the need to connect cords and sockets in often cramped conditions and in bad weather," says David Woodson, managing director of UBC Building Operations. "Since we began testing the system, the feedback from drivers has been overwhelmingly positive — all they have to do is park the car and the charging begins automatically."

The current prototypes in operation on UBC's Vancouver campus incorporate a range of additional handy features. A perfect parking job isn't required—the system can deal with a degree of misalignment between the base station on the ground and the receiver unit mounted under the front of the car. Ultimately the technology could be built into low street curbs over which the car-borne magnet could easily be positioned during parking.

The wireless system also starts and stops charging automatically, based on proximity, and an indicator on the dashboard of the vehicle let's the driver know that charging is taking place.

Able to transfer power over the broad range of milliwatts to kilowatts, the technology has many other potential applications. In fact, the team originally conceived the magnetically driven charging system for medical devices such as an implanted pacemaker.



From bright idea to solution. (L-R) Final prototype installed on UBC's Vancouver campus; magnetic component outside of its housing; and a simple demonstration implementation that powers light bulbs.

The system, supported by the Natural Sciences and Engineering Research Council Idea to Innovation Grant, was tested at UBC as part of the Campus as a Living Laboratory initiative and provides valuable data for further research and development. A patent for the technology has been filed through UBC's University Industry Liaison Office. This device is efficient and affordable, so its development has the potential to dramatically improve the rate of adoption of electric vehicles by making them more attractive to the average driver.

Able to transfer power over a broad range of frequencies, the technology has many other potential applications — the team originally conceived the magnetically driven charging system for medical devices such as implanted pacemakers.

Watch the magnet-driven wireless charger in operation at:
http://science.ubc.ca/news/662

Spiders in Borneo

By Wayne Maddison

This year UBC biologist Wayne Maddison and graduate student Edy Piascik travelled to Borneo in search of new species of jumping spiders. For five weeks their team beat bush, tree and trail—and endured wasps, toothed rattan palms and leeches—in their quest for salticids. This is an abridged version of field notes Maddison published through the Scientific American and UBC Beaty Biodiversity Museum blogs.

Prologue: My reason for coming to Borneo

Most biodiversity is local. What you find in Borneo will be different species from what you find in New Guinea, different from Africa, different from Canada. In the case of jumping spiders, not only are individual species local, but whole evolutionary groups tend to be local. In South America, species are closely related, but not closely related to species in Australia or Africa. When you go to an unexplored area, the species you find might not only be new, but very new—only distantly related to everything else ever known. And so, Borneo's forests await.

Team Salticid on the ground

Edy and I arrived in Kuching, Sarawak, a few days ago. We have experience in looking for salticids, but our local companions Ch'ien Lee and Alex Ang do not. So we've been going out on day trips from Kuching as a rehearsal for our foray deeper into Borneo. This also allows us to check our equipment and recover our field legs. Tomorrow Edy, Alex and I fly to our main field site, Mulu National Park.

Beating around the bushes

Our method for getting spiders out of vegetation is small scale and terrestrial. We take a sheet stretched by tent poles and place it beneath vegetation. Then we shake the vegetation or beat it with a stick. Spiders fall onto the sheet and are usually easy to see and catch. Our beating sheets and sticks are treasured equipment. When I find a stick of the right strength and weight, I keep it for decades.

Spiders in leaf litter

Many of the jumping spiders that live in leaf litter hop along the surface, scanning the forest floor like lions gazing across the Serengeti. The best way for us to find these is simply to look, moving slowly through the forest, bent over or crawling. When a group of us are doing this, it looks for all the world like someone has lost a contact lens.

A vertical life

Often you can find tree-trunk-dwelling spiders just by looking, but because many are coloured like bark it helps to tap the trunk to provoke them to show themselves. If you're impatient, you can brush the tree while a beating sheet is held underneath. Brushing a tree trunk yesterday, Edy found the most

Above: Agorius, a Bornean salticid whose body looks like that of an ant. Photo and copyright Ch'ien C Lee, www.wildborneo.com.my

UBC graduate student Edy Piascik brushing a tree trunk.


(L to R) Wildlife photographer Ch'ien Lee, Edy Piascik, Wayne Maddison and musician Alex Ang.


The forests of Borneo present hundreds of habitats for jumping spiders.


Team Salticid's fearless leader endures a wasp sting.

surprising spider of the trip, an adult female about 1.6 millimetres long. She has a narrow body and strangely placed eyes. We didn't even know what subfamily she belonged to, so we called her Gray Pixie.

Entangled and pierced

You're walking through a Borneo rain forest, eyes focused on shrubs and tree trunks that might be good opportunities for spider hunting, and suddenly your forward progress is halted. Three possible explanations: You're in one of those nightmares where you keep trying to get somewhere but mysteriously can't move. Or you've become entangled in vines. Or a rattan palm has you in its spiny clutches. No nightmares yet for me on this expedition. The other two possibilities occur several times a day.

First east of India

Edy found a Hispo today. This is big news. It was such an unlikely prize that I hadn't dared to dream it. Most species of Hispo are from Madagascar. There are only two species known outside Africa and the Seychelles: one is from India and the other from Sumatra. The species from Sumatra is known from only a single, immature specimen. The female Edy found is the first adult Hispo found east of India!

Wrapping up Mulu

Our 17 days at Mulu have passed. Today, we took the day off from sampling to rest and pack up for a shorter stay at Lambir Hills National Park. Each day we've sampled and processed so intensely that we fall into bed exhausted. It's only today that I found the time to review what we've found.

Replaying the tape of life

Our lives at Lambir are more or less as at Mulu—breakfast and in the field by 9 a.m. Hike, for anywhere from a few minutes to an hour. Record latitude and longitude. Sample intensely for 40 minutes—focusing on either trees, foliage or the ground—and record more data. Repeat six times a day. Add time to take notes, lunch, wipe sweat, readjust gear—and it's about 4 p.m. by the time we get back to camp. We're overheated and absolutely exhausted, with barely enough energy to take showers. Then we process specimens until after 9 p.m.

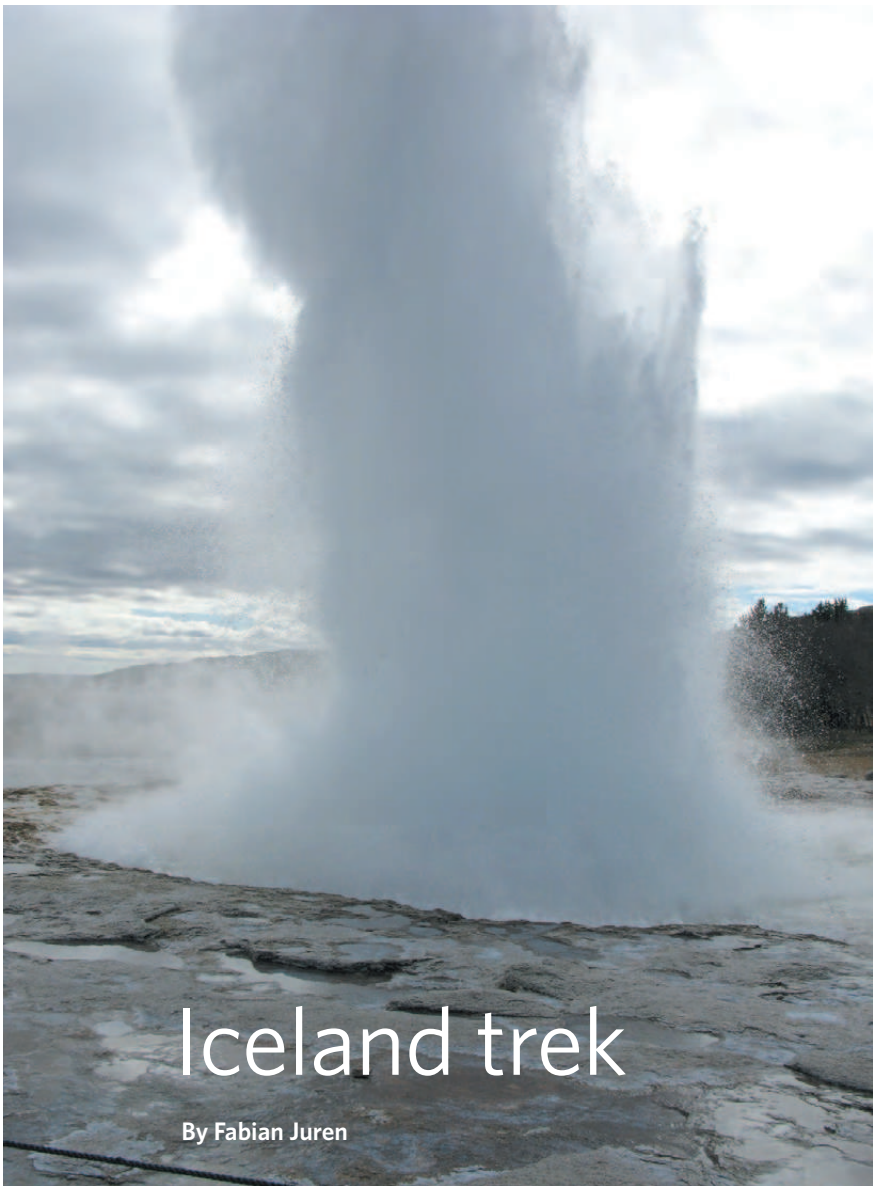
Fieldwork done

With the fieldwork done, our attention turns to handling hundreds of specimens. We've barely had time to glance at most of them. My curiosity to peruse them under a microscope is strong, but that will have to wait until we get home to the lab in Canada.

Postlogue: The music of biodiversity

On the flight home, I feel the afterglow of five weeks of walking the Bornean rain forest, of living smells and stubborn itches, of jumping spiders looking up at me. So many little faces, so many newly met. It's a wonderful feeling to have my mind full of all these spiders. In 500 years we'll wish we had time machines to come back to 2012. We will look at the early third millennium as the last days of the Garden of Eden, the last days when biodiversity was largely intact. In 500 years, we may very well find ourselves in a post-biodiverse world. Intense rain forests, vibrant deserts and bustling coral reefs will probably seem as distant to us as big dinosaurs do today.

For more Borneo expedition field notes, visit:
beatymuseum.ubc.ca/blog/5



Strokkur, a fountain Geyser east of Reykjavik in Iceland. Photo: Leah Macfadyen.

Iceland trek

By Fabian Juren

A field course launched this year at UBC Science turns Iceland into a regional-scale classroom for studying sustainability.

Iceland's geothermal hotsprings and majestic glaciers are attracting a new type of adventure seeker to the small island nation.

Science, systems and sustainability course ISCI 361—an intensive, three-week field course launched this year by UBC—takes science students to Iceland and offers them a broad view of the nordic country's sustainability issues. Iceland's dramatic geological features, geothermal and hydroelectric energy infrastructure, unique climate, and cultural and political influences serve as a rich living laboratory for the third-year class.

"When people ask me how Iceland was, I find it difficult to describe," says Erica Hunter, a third-year biology student who embarked on the trip this May with 12 other science and forestry students. "The words that come to mind are dynamic, unique and overall, epic."

"Many students don't get an opportunity to do something like this —a field course in a foreign country, an opportunity to learn about the powers of nature as they happen in situ, and to experience a new culture simultaneously."

Hunter describes how questions about various issues were answered "right then and there" with details about current development or relevant politics woven in on the spot.

Course instructor Lee Groat, professor with Earth, Ocean and Atmospheric Sciences and director of the Integrated Sciences program, says, "The wonderful thing about Iceland is that it's big enough to have a lot of complexity, but not too big, so it's an ideal learning environment."

During this first run-through of the course, the 12 students explored a wide variety of topics, including glaciology, volcanic activity, sustainable agriculture, economics, developments in sustainable energy

such as hydrogen, biofuels and geothermal energy, and more.

The students learned from residents as well as local researchers at the University of Iceland, while also observing science in action —a rare learning opportunity for undergraduate students. After touring the Svartsengi geothermal energy plant, they found themselves taking a dip in naturally heated rivers and the dreamy Blue Lagoon geothermal spa.

"When you live in the place you're studying, you gain a deeper understanding of the material and a wealth of memories," says Piper-Lynn Brady, a third-year environmental sciences student. "We were asked to have not only a deep scientific understanding of each topic and the systemic relationship between topics, but also the social systems in which they are embedded."

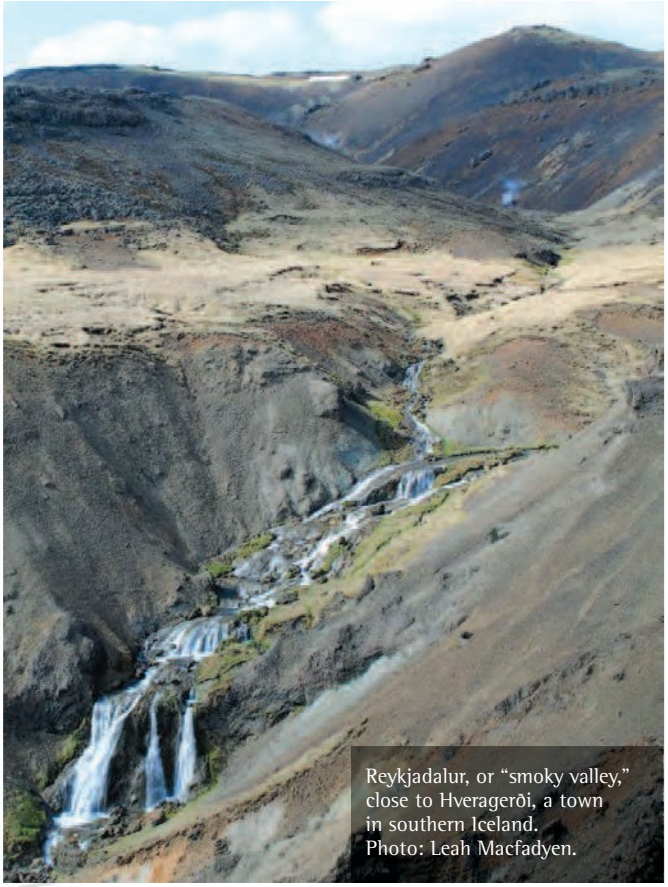
"We don't take a deep focus in any single area such as energy systems or climate change, which have much relevance in a place such as Iceland," says Leah Macfadyen, who developed the course and is also an instructor in the Integrated Sciences program. "Rather, we look at a range of topics within sustainability."

With the success of ISCI 361's inaugural trip, there are plans to continue the course. It will likely be held in Iceland again, next May, but in following years the intent is to travel to different destinations around the world.

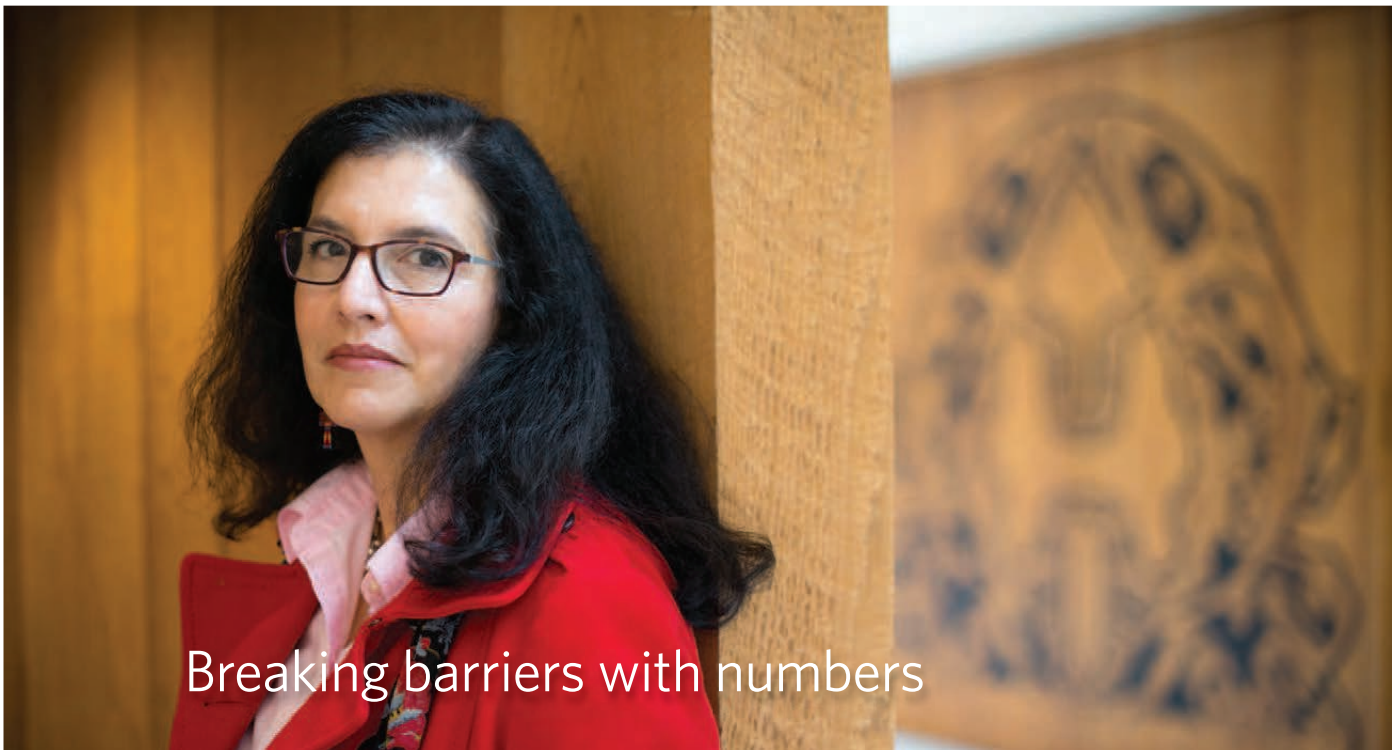
A major goal, says Groat, is to create a template that touches on themes that are relevant to a variety of locations.

"We could, for example, visit a town in Kansas to study how health is impacted by groundwater conditions in small towns. Then, once we have a good understanding, we can come back to Vancouver and try applying here what we've learned."

Students hike the Fláajökull glacier in southern Iceland. Photo: Leah Macfadyen.



Reykjadalur, or "smoky valley," close to Hveragerði, a town in southern Iceland. Photo: Leah Macfadyen.



Breaking barriers with numbers

Award-winning UBC math educator Melania Alvarez brings a deep, very personal insight to her work with BC's Aboriginal community.

By Silvia Moreno-Garcia

When Melania Alvarez's son was placed in a lower-level math class in junior high school, she was caught off guard. The Mexican-born mathematician, then working in Wisconsin, knew that Rodrigo had an aptitude for math.

Curious, she spoke to the administrators of her son's school. It turned out Rodrigo had been placed in the low-level course based on his Hispanic surname. Later in his high school career—after having been placed in appropriate classes—he scored a perfect 800 on his standardized math test for college admissions.

"Living in the United States made me empathetic to some of the issues Aboriginal students face," says Alvarez, who now works at UBC to develop programming for Aboriginal students in local high schools.

"There are certain stereotypes and patterns, even some that are meant well, which can harm Aboriginal students."

Alvarez is of Spanish and Purépecha (an indigenous people from the state of Michoacán) descent. Her interest in math led her to a bachelor's degree in actuarial science, even though her conservative family expected her to marry and follow a more traditional, and less professional, path.

Math, she says, expanded her horizons and allowed her to travel the world.

Alvarez's love of numbers and her personal insight into the barriers some communities face also made her a fierce proponent of improved math education, a passion that eventually brought her to UBC. Numbers prove that her work as coordinator for the outreach programs at UBC Mathematics and the Pacific Institute for the Mathematical Sciences (PIMS) is crucial.

Aboriginal students make up over 10 per cent of the school-age population in BC, with that percentage increasing steadily. But only two per cent of those students complete Principles of Mathematics 12, a prerequisite for many post-secondary programs in BC and a requirement for admission to UBC Science.

Particularly for Aboriginal students interested in the sciences, poor performance in math can rob them of personal potential and career options.

Alvarez is working to change this. In 2007 she helped jump-start two math summer camps hosted at UBC and at Britannia Secondary School in east Vancouver–Britannia has twice the proportion of Aboriginal students as the provincial average. She has developed training materials for Aboriginal teachers, promoted mentorship opportunities and created specialized programming, often in partnership with the First Nations Education Steering Committee, the Vancouver School Board and UBC.

Above: This winter, Melania Alvarez will be presented with the Canadian Mathematical Society's Adrien Pouliot Award in recognition of her contributions to mathematics education in Canada. Photo: Don Erhardt.

> "These are capable young people. After being told they can't do something, they start to believe it. We need to change our attitudes. When an Aboriginal child comes to us, we need to be open minded, to let her show us what they can do, and to maintain high expectations."
> — **Melania Alvarez**

While Alvarez is proud of her work, she's even prouder of the students.

"These are capable young people. Many times they are classified as learning disabled, when they are not. After being told they can't do something, they start to believe it. We need to change our attitudes. When an Aboriginal child comes to us, we need to be open minded, to let the child show us what they can do, and to maintain high expectations."

While poor Aboriginal math performance could be chalked up in part to misguided expectations and stereotypes, Alvarez believes that the problem may also lie in insufficient math training for teachers. She hopes events like the PIMS annual Changing the Culture teacher development conference will help foster a deeper understanding of mathematics and a much needed interaction between educators, teachers and mathematicians. Programs that support the expansion of pre-service training, like UBC's Native Indian Teacher Education Program (NITEP), could also improve math delivery.

In-class education is only part of the picture. In the future, Alvarez would like to provide more support for parents so they can assist their children at home. She would also like to expand the reach of the programs geographically, and in terms of the disciplines involved.

"UBC gives us access to top-tier mathematicians and teachers, but we would like to develop partnerships with other departments to make our camps a more holistic experience," she says.

But at this point the funds to achieve an expansion aren't there. The program scrambles every year to find the money to fund programs such as the Emerging Aboriginal Scholars program, mentorship programs, and the math workshops for teachers and students that take place in over 45 schools across the province.

Still, Alvarez has come a long way in the past seven years. This winter, she will be presented with the Canadian Mathematical Society's 2012 Adrien Pouliot Award in recognition of her contributions to mathematics education in Canada. And she will continue to increase awareness of the importance of mathematics and promote mathematics education in BC. Just as an interest in math changed her life, an interest in math may one day change the lives of many Aboriginal students.

Mathematics outreach programs based at UBC have been generously funded by the Vancouver Foundation, Spencer Foundation, Haig Farris, Kinder Morgan, ARC Energy, Cassel Duffy and others.
You can make a gift to the program via: http://science.ubc.ca/support/giving/math

Power trio

UBC's new professor of teaching designation offers senior lecturers a career-path alternative to the conventional professorial research stream, and increases recognition of teaching excellence. UBC Science has already appointed three professors of teaching. Synergy asked Shona Ellis, Carol Pollock and Simon Bates to reflect on the new rank and title, and on the challenges of teaching science in today's classroom.

Synergy: The professor of teaching designation is still fairly rare at universities. What does the new rank mean to you?

Shona Ellis: The rank doesn't necessarily make me change the way I work, but it's very nice to be recognized for all the hard work I do. It does put research and teaching at equivalency, which is great because it offers more choice to faculty members.

Carol Pollock: It shows that UBC has a commitment to teaching. It's also a big plus for science as it has made more funds available, much like for research. I got tenure in 1990 and thought that was the highest rank I could possibly get. But once the professor of teaching rank was introduced, it was a plus for me to pursue this as a goal before retirement. A lot of work is involved, but it helps put everything I've done in perspective, which I find very satisfying.

Simon Bates: There's a difference between universities that say things and universities that do things. This rank is UBC doing and committing to taking teaching seriously. It will attract some of the top professors to UBC, as well as keep some of the top professors here. In fact, the professor of teaching rank was one of the reasons I came to UBC from the University of Cambridge.

Synergy: Day-to-day in the classroom, what are some of the biggest challenges you face connecting with students?

Carol Pollock: The changing nature of education. Because a lot of information is available online, we're trying to teach students how to separate a good source from a bad source. For example, is the information you read true? Also, we teach students how to evaluate what they read—while textbooks are generally more factual, online material can be a bit hazy. It's all very much real-world, so you have to make up your own recipes for teaching.

Simon Bates: As you grow older, the generation gap gets larger, and of course, technology changes. When I began teaching, the only way students were able to get information was in my classroom. But now, with the Internet quickly growing, my responsibility has shifted from provider of knowledge to trying to help students make sense of the information they read.

Synergy: Can you share your best or worst experience from a lecture or lab?

Carol Pollock: I absolutely love to see a student's mind "click" when they first understand a concept. In the lab, teaching is very much shifting from students receiving

Above: (L-R) Shona Ellis, Simon Bates, Carol Pollock

"I believe this is much more powerful than students passively copying notes down in their books."

— **Simon Bates**

experimental procedures to students having some say in the procedure. This shift from passive to more active learning has created a much more enthusiastic atmosphere—I've even had a first-year biology student ask to have his work published!

Simon Bates: When teaching in a lecture hall with more than 200 students, it's important to keep them involved. I use clickers and design questions that can be answered in 20 seconds, where about 60 per cent of the students get the wrong answer. Once I have them discuss their answer with their peers, I put the same question up again, and there is a huge swing to the right answer. Then, when students go to Starbucks after class, they speak to each other the same way they did in the lecture. I believe this is much more powerful than students passively copying notes down in their books.

UBC computer scientist Gregor Kiczales will offer an introduction to systemic program design via Coursera.

UBC to offer free online science courses this spring

This spring UBC will pilot three free online courses via Coursera, a Massive Open Online Courses (MOOCs) platform founded in 2011 by Stanford University.

The course offerings are Useful Genetics with UBC zoologist Rosie Redfield, Computer Science Problem Design with Gregor Kiczales, and Climate Literacy with Sarah Burch and Tom-Pierre Frappé-Sénéclauze.

"Our partnership with Coursera will enable us to reach people around the world, and to evaluate an exciting new teaching and learning technology," says Simon Peacock, dean of the Faculty of Science, where two of the three UBC Coursera courses will be housed. "Ultimately, I believe all UBC students will benefit from our exploration of this rapidly evolving online space."

Coursera courses typically consist of videos or voice-over PowerPoint presentations, with student-led discussion forums, interactive activities, quizzes and assignments set at regular intervals.

For previews of UBC's upcoming Coursera courses, and to sign up, visit: **science.ubc.ca/support/community/coursera**

The rise of a faculty during a tumultuous year

1963 was a turbulent year in politics, the sciences and the arts. It was also a benchmark year at UBC.

WAC Bennett was midway through what would be the longest term of any Canadian premier. John F Kennedy was assassinated and Martin Luther King gave his I Have a Dream speech. The first artificial heart was implanted in a human. Soviet cosmonaut Valentina Tereshkova became the first woman in space.

We asked UBC Science alumni for memorabilia and photos to commemorate UBC Science's 50th anniversary.
You delivered.

Please keep the memories coming! Email Kim Duffell at alumni@science.ubc.ca

Science still fits! Many thanks to Allen Wood (BSc 1964 | MSc Zoology, 1966) for his contribution of a beautifully preserved UBC Science Undergraduate Society sweater.

Science alumni 'tanking' after the 1965 Teacup Games chariot race between UBC engineers and the Science Undergraduate Society. Each 35-member team pulled a chariot (seen in the background) around the track while attempting to block the other team. An added bonus—chariot stirrup pumps were filled with liquified pig excrement mixed with blue dye. Thus the tanking.

Sign of the times. Science students parade their homecoming queen nominee through campus in 1964. Mary McQueen (perched atop the crowd, wearing Science letters) ultimately did win the title. Photos and caption details courtesy Norman Gleadow (BSc Honours Chemistry, 1967) who served as Science Undergraduate Society vice-president from 1965 to 1966.

Canada began to roll out the world's first geographic information system. Beatlemania took hold. The Canadian Recording Industry Association was established. UBC's Hebb Theatre opened. The Ubyssey was named best college newspaper in Canada. And in a major administrative move, the UBC Senate approved the division of the Faculty of Arts and Science.

In honour of this milestone, from January to December 2013, we invite you to join us in celebrating a half century of UBC Science with a showcase of exciting presentations, dialogues, mentorship opportunities, departmental activities and speakers highlighting current trends, topics and developments.

I hope you enjoy the historical highlights and snapshots we've been featuring in Synergy. And while it's important to look back in order to gain perspective, we want to look forward to the exciting developments that UBC Science will offer over the next 50 years. Thank you for joining us on the journey and for all you do for your alma mater.

Kim Duffell
Alumni Relations Manager
UBC Science

Special thanks to Ian Harris (BA Chemistry, 1947) for his donation of this pristine edition of the 1945 UBC TOTEM yearbook.

Green architect, friend of frogs, awarded Queen's Diamond Jubilee Medal

Architect and urban ecologist David Wong (BSc Biology, 1981 | BArch 1985) was awarded a Queen Elizabeth II Diamond Jubilee Medal this summer in recognition of his professional and community service. Wong was cited for his work organizing Canadian architectural and design delegations to Asia, and for sharing his knowledge on environmental issues, design and history with students

CLASS NOTES

Stay connected with 32,000 UBC Science alumni. Drop us a line about recent accolades, professional successes, family developments or interesting world travel. Contact Kim Duffell, Alumni Relations Manager, at alumni@science.ubc.ca

1940s

A totem of lifelong love

Special thanks to Ian Harris (BA Chemistry, 1947) for his donation of a pristine edition of the 1945 UBC TOTEM yearbook, which originally belonged to Harris's late wife Pamela (Biddy) White (BA Bacteriology, 1946) and her sister Leslie.

Harris warmly recalls how he and his wife met at a tea dance held in the old Brock Hall on East Mall. They discovered that they both worked on the top floor of UBC's Science Building (now the Chemistry Building) across from what was once the main bus stop on Centre Mall (now Main Mall). Their relationship flourished and the couple was married after graduation in 1947. A move to Sarnia, Ontario, soon followed. While Biddy passed away in 2001, Harris continues to call Sarnia home and is "chugging along."

1960s

Science alum takes new VP post at Princeton Plasma Physics

This January, AJ Stewart (Stew) Smith (BA Mathematics-Physics, 1959 | MSc Physics, 1961) assumes the newly created position of vice-president of the US Department of Energy's Princeton Plasma Physics Laboratory. Smith earned his PhD in physics from Princeton in 1966 and joined its faculty in 1967 after a post-doctoral fellowship in Germany. He chaired Princeton's physics department from 1990 to 1998 and served as Princeton's first Dean for Research.

Smith has worked at several US and European national laboratories over his career, collaborating for many years with UBC's Douglas Bryman and Christopher Hearty. From 1998 to 2002, Smith led a 600-member international team—including UBC, TRIUMF and University of Victoria researchers—at Stanford University, measuring the imbalance between matter and antimatter. Smith and Bryman shared the 2011 WHK Panofsky Prize in Experimental Particle Physics for work conducted at Brookhaven National Laboratory.

Smith and his wife Norma take every opportunity to have fun in New York City, just an hour away from Princeton. They also return frequently to the Pacific Northwest to hike and ski cross-country with their son Ian and his family in Seattle, and to visit their son Peter and his three little children in Florida.

across British Columbia.

Wong has applied his expertise in biology to his designs for 30 years, incorporating natural colours, climate-friendly features, natural ventilation and urban habitats for amphibians, birds and insects. A particular fondness for frogs prompted him to work with organizations around the world to communicate the value of amphibians to humanity—culminating in having the City of Vancouver declare the world's first Save the Frogs Day in 2009. He continues to share his love for all things amphibian by bringing his own pet frogs into schools for show and tell.

Now semi-retired, Wong has just completed his first book, a 240-page graphic novel on the history of Chinese immigration to North America. "The story is based loosely on my own family, which by the way has seen its fourth generation graduate from UBC," says Wong, whose son Cameron graduated from UBC Science last year. Escape to Gold Mountain was officially launched at the Vancouver International Writers' Festival this October.

Science still fits

Many thanks to Allen Wood (BSc 1964 | MSc Zoology, 1966) for his contribution of a beautifully preserved UBC Science Undergrad Society sweater. Wood is now enjoying his retirement by travelling, gardening and woodworking.

1970s

Renaissance man returns to UBC Science

Congratulations to Anton Kuipers (BSc Biology, 1977) on his appointment as associate director with the UBC Science development and alumni engagement team. Kuipers returns to UBC after holding a number of senior business development positions in industry and government, including with Leading Edge BC and BC Trade and Investment. Much of his work has focused on structuring business and trade development, and on investments in support of BC's energy, environmental, technology and engineering industries. "UBC and the Faculty of Science have been good to me," says Kuipers. "It's thanks to UBC that I reached many of my professional goals. My foundation in science was critical to my career successes." An avid jazz and Latin music fan, Kuipers is also a keen painter (oils and acrylics). He has travelled extensively to over 20 countries for work and pleasure (counting Japan, Mexico, Chile and France among his favourites). He also volunteers as a board member for an extended care and social housing facility that looks after 257 residents, many living with advanced dementia.

Dart games in the Chemistry Building

Dan Davies (BSc Chemistry, 1977) is an industrial chemist with the active oxygens group at Evonik Degussa Canada. He provides training, lab tests and onsite services for the company's clients in Canada and the western US, and also provides consulting services around the world, including New Zealand, Vietnam and Scandinavia. Davies often visits campus for events and works with UBC's Pulp and Paper Centre and the UBC forest industry partner FPInnovations.

Some of Davies' more memorable moments at UBC include dart games in the Chemistry Building B-Block basement and beer floats at The Pit in the Student Union Building. He credits much of his success to the pragmatic thinking skills that he developed while at UBC, which continue to assist him in both his work and personal lives.

1980s

Science alum takes helm at Advanced Ed

This September John Yap (BSc Biology, 1980 | MBA, 1983), who represents the provincial riding of Richmond-Steveston, was appointed Minister of Advanced Education, Innovation and Technology and the Minister Responsible for Multiculturalism. Yap, first elected in 2005, has previously served as the Minister of State for Multiculturalism, the Minister of State for Climate Action and as chair of the government caucus. When not performing his official duties, Yap enjoys spending time with family, travelling, reading and playing the occasional game of golf.

Powerful environmental consulting

Beth Power (BSc Zoology, 1984 | MSc Zoology, 1987) is a partner with the niche environmental consulting firm Azimuth Consulting Group, which specializes in risk assessment of contaminants. After almost 25 years in consulting, Power has conducted field work in Aruba, Bali, the United Kingdom and across British Columbia. She and her husband Mark (also a UBC alum) live in Vancouver and enjoy a hectic family life with their two teenage children.

Illustration by Keith Leinweber

Passion for nutrition earns alum achievement award

Alia Dharamsi (BSc Integrated Sciences, 2010) has earned a 2012 UBC Alumni Achievement Award for Outstanding Future Alumnus. Dharamsi (see Synergy 1 | 2010) was cited for her leadership and commitment to serving vulnerable and marginalized populations.

As an undergraduate in Science, Dharamsi studied the interplay between nutrition and disease, with a focus on international

CLASS NOTES

cont.

1990s

Alum nabs Steacie Fellowship

Alisdair Boraston (BSc Microbiology, 1993 | PhD Microbiology, 2000) is one of six scientists awarded a prestigious 2012 EWR Steacie Memorial Fellowship by the Natural Sciences and Engineering Research Council of Canada. Boraston will continue his research at the University of Victoria on Streptococcus pneumoniae, one of the world's leading causes of death from infectious disease. He will also investigate how marine microbes break down seaweed cell walls, with an eye to applications in biofuel production. "The research process is a highly creative one that requires freedom of time and freedom to think. I'm really excited about being able to devote all of my time and attention to thinking about science again."

Biology alum volunteer takes centre stage at convocation

Now associate director, inside sales, at STEMCELL Technologies, Kim Lucas (BSc Biology, 1999) develops high-level sales and customer retention strategies. Off the clock, Lucas stays physically active by running, cycling, doing yoga or hitting the slopes with her two boys. Despite her busy schedule, she served as the UBC Science alumni representative at November's convocation ceremonies and is eager to expand on her involvement with her alma mater.

2000s

Driving next-generation leadership

Juanita Lohmeyer (BSc Computer Science, 2000) has been named an honouree by the 2012 Distinction Awards program at GTEC, Canada's Government Technology Event and Conference. The Distinction Awards celebrate individuals who have demonstrated leadership and excellence in the management and application of information technologies. Lohmeyer is the director of enterprise services at the Insurance Corporation of British Columbia.

2010s

Dog lover takes up post-doc at University of Illinois

Alyssa Shiel (PhD Oceanography, 2010) has taken up a post-doctoral fellowship at the University of Illinois at Urbana-Champaign. Shiel will be developing tools to assess the effectiveness of remediation strategies for uranium groundwater contamination—building on work she began during her PhD. When she isn't busy in the lab or writing up academic manuscripts, Shiel loves to spend time with her spouse and four dogs.

development. In her final year she travelled to rural Guatemala, where she led a team of student volunteers on construction projects in collaboration with local communities, and taught oral hygiene, English, science and math to children. Now with UBC Medicine, Dharamsi is studying pediatrics and hopes to eventually work with the World Health Organization or Doctors Without Borders.

Dharamsi created the We Are 2015 educational initiative, designed to inspire a new generation of global citizens to make personal contributions towards the United Nation's 2015 Millennium Development Goals. She also founded the UBC chapter of the Meal Exchange, and developed instruction modules to bring international health issues into the high school classroom. Dharamsi has been recognized with the BC Community Achievement Medallion and the YWCA Vancouver's Young Women of Distinction Award.

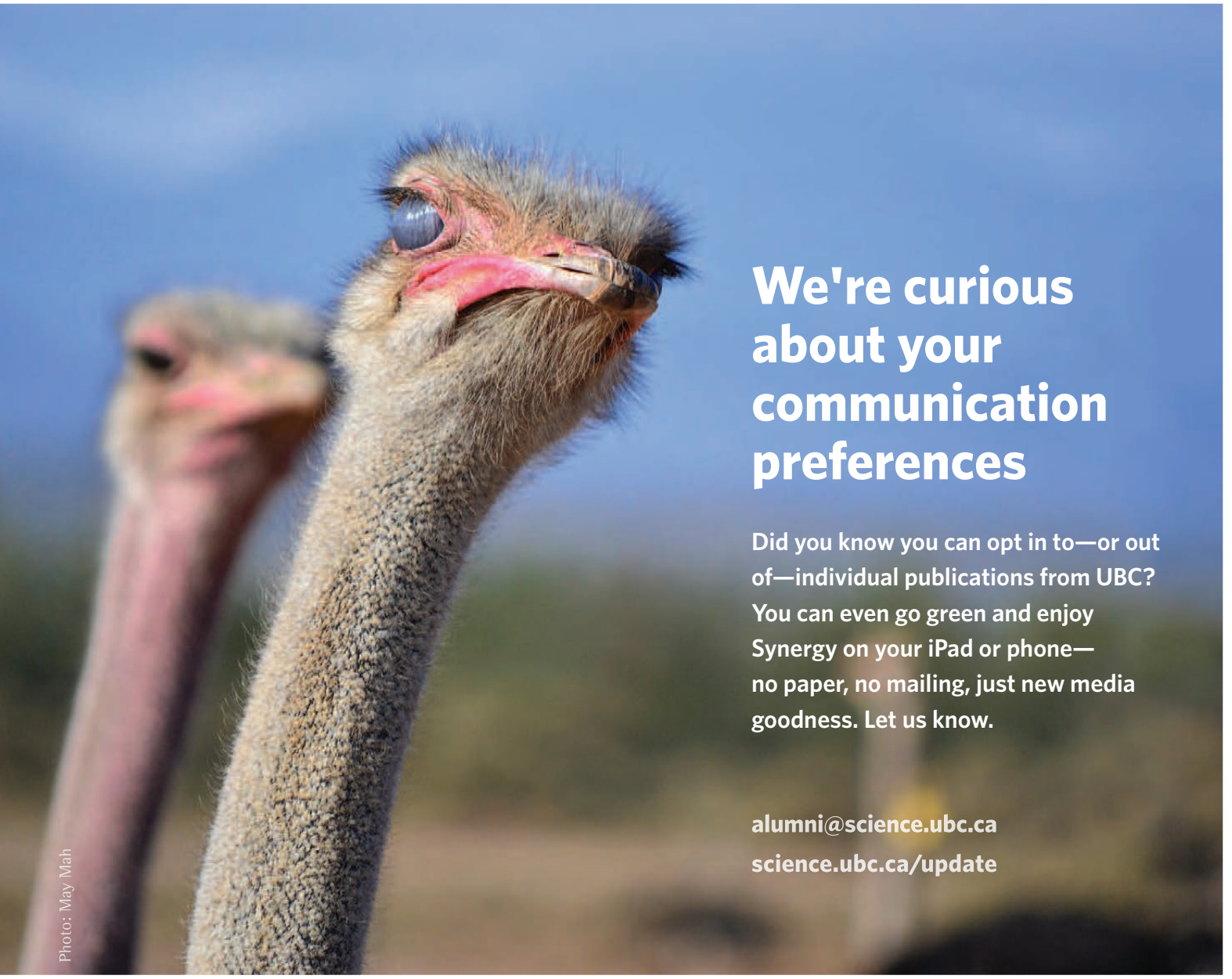


Photo: May Mah

We're curious about your communication preferences

Did you know you can opt in to—or out of—individual publications from UBC? You can even go green and enjoy Synergy on your iPad or phone—no paper, no mailing, just new media goodness. Let us know.

alumni@science.ubc.ca
science.ubc.ca/update

Rock talk and cocktails:
This spring, UBC Science's PDAC and Roundup alumni events are coming to a city near you.

UPCOMING EVENTS

Have a suggestion for an alumni event? Want to help get a reunion off the ground?
Contact Kim Duffell, Alumni Relations Manager, at alumni@science.ubc.ca

Roundup 2013: UBC Science Alumni and Friends Appreciation Reception

Tuesday, January 29, 2013
5:30 pm – 8 pm
Westin Bayshore, Currents Restaurant, Vancouver

Reconnect and network at our dedicated UBC Science reception at Vancouver Roundup this spring. Rock talk not to be missed. Drop Kim Duffell a line at alumni@science.ubc.ca or call 604-822-1864 if you plan to attend.

▸ science.ubc.ca/support/alumni

PDAC 2013: UBC Science Alumni and Friends Appreciation Reception

Monday, March 4, 2013
5:30 pm – 8 pm
The Fairmont Royal York, Toronto

If you're gearing up for the Prospectors and Developers Association of Canada conference in chilly Toronto this winter, make time to visit UBC Science's annual reception. Drop Kim Duffell a line at alumni@science.ubc.ca or call 604-822-1864 if you plan to attend.

▸ science.ubc.ca/support/alumni

Science Undergraduate Society 2nd Annual Alumni Reunion

Save the date:
Monday, January 21, 2013
Abdul Ladha Science Student Centre

Building on last year's 51st anniversary triumph, SUS continues to celebrate its rich history of school spirit and general science undergraduate supremacy. Whether you were involved with SUS on the executive, on a committee, as a volunteer for Science Week or in some other way, we would like you to join us.

If you haven't already received your exclusive invitation, email alumni@science.ubc.ca with your SUS title or involvement, which years you were involved and an RSVP.

RSVP deadline:
Monday, January 7, 2013

▸ www.sus.ubc.ca

Climate change
Whose battle is it?

It's like a game of chicken where everybody loses. Every government in the world wants to be seen as doing something to combat climate change, but nobody wants to be the first to do it. After all, serious economic implications await any country that makes it more costly for industry to pollute. So what can we, as global citizens, do? Accept the spin that says buying hybrid cars and locally sourced products are the best ways to reduce our carbon footprint? Or stand up, be heard and force our governments to make bold choices for the future of our planet? Join us as we discuss how to avoid becoming stuck between a rock and a hot place.

UBC*dialogues*: Vancouver
Tuesday, February 5, 2013
Museum of Vancouver
6:30 – 9:00 pm

Physics Undergraduate Society 50th Anniversary Reunion

Save the date:
Saturday, April 6, 2013

Physsoc has grown considerably over the last half century—increasing its role as a social incubator and stellar academic resource. It's time to celebrate. If you've been involved with the society as an executive, volunteer or member, RSVP by January 6 to be part of the fun.

- surveymonkey.com/s/physsoc50
- 50PhysSoc@phas.ubc.ca

Combining Computing, Design and Health Care

Thursday, January 17, 2013
3:30 pm – 5 pm
110 Hugh Dempster Pavilion,
UBC Vancouver

The Department of Computer Science Distinguished Lecture Series presents Elizabeth Mynatt, Georgia Institute of Technology, speaking about combining computing research, human-centred design and health management theory to promote wellness and improve health outcomes.

- cs.ubc.ca/news-events

Western Inter-University Geoscience Conference

January 3 to 5, 2013
Holiday Inn Vancouver Centre

The GM Dawson Club, UBC's Geology Student Committee, is pleased to be hosting the Western Inter-University Geoscience Conference (WIUGC). WIUGC brings undergraduate and graduate students together to present research, network with industry, and connect with fellow students from across Canada and the US. The conference's industry fair gives sponsor companies and organizations the opportunity to set up booths—an excellent recruitment tool for companies in the geosciences community looking to hire new staff for their team.

- www.wiugc2013.com

Biology Career Night

Wednesday, March 6, 2013
UBC Vancouver Campus

Remember when you were in third or fourth at UBC Science and had career questions? Was there someone around to answer them? Join us back on UBC's Vancouver campus and share your career and life experiences with current students. It's a great way to connect with your alma mater and most importantly, help shape a student's career. If you're interested in participating please email alumni@science.ubc.ca. We're adding career nights to the calendar all the time, including Beyond the BSc and events for women in science. Visit our website to find out how you can career mentor a science student.

- alumni@science.ubc.ca
- science.ubc.ca

EDITOR Chris Balma CONTRIBUTORS Silvia Moreno-Garcia, Chris Balma, Fabian Juren, Brian Lin, Kim Duffell, Wayne Maddison
STYLISTIC/COPY EDITING Vicki McCullough DESIGN/LAYOUT Claire Roan PHOTOS Provided by UBC Science or as indicated, all rights reserved. COVER IMAGE NASA CIRCULATION 32,000 (twice a year) PUBLISHED BY The Faculty of Science, University of British Columbia, www.science.ubc.ca, synergy@science.ubc.ca

Environmental Benefits Statement

By using paper made with 100% post-consumer recycled content, the following resources have been saved.

trees	water	energy	solid waste	greenhouse gases
148	262,648	66	2,111	5,815
fully grown	litres	million BTU	kilograms	kilograms

Environmental impact estimates were made using the Environmental Paper Network Calculator. For more information visit http://calculator.environmentalpaper.org

zero 100% carbon neutral by Hemlock Printers www.hemlock.com/zero

RECYCLED Paper made from recycled material FSC® C014956

UBC Alumni Weekend 2013

SAVE THE DATE, BRING SAFETY GEAR

Saturday May 25th 2013

Photo: UBC Alumni Affairs

Alumni Weekend 2013 has science on tap for all ages: Tours of UBC's new rock-crushing Earth Sciences Building, science magic shows, Canada's largest blue whale skeleton, and more.

science.ubc.ca

Return undeliverable Canadian addresses to: UBC Science (Synergy)
1505 – 6270 University Boulevard, Vancouver, BC Canada V6T 1Z4

www.science.ubc.ca