



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

UBC REPORT

the next big thing 2011

UBC EXPERTS describe nine advances that may transform your world, from shapeshifting architecture to the ability to predict the diseases you may experience. Plus, two professors revisit their forecasts from our first annual poll in 2006.

2010 highlights

UBC REPORTS

VOLUME FIFTY SEVEN : NUMBER ONE
WWW.PUBLICAFFAIRS.UBC.CA/UBC-REPORTS

Executive Director

SCOTT MACRAE scott.macrae@ubc.ca

Editor

RANDY SCHMIDT randy.schmidt@ubc.ca

Design Manager

ARLENE COTTER arlene.cotter@ubc.ca

Public Affairs Studio

PING KI CHAN ping.chan@ubc.ca

Photographer

MARTIN DEE martin.dee@ubc.ca

Web Designer

TONY CHU tony.chu@ubc.ca

Communications Coordinators

HEATHER AMOS heather.amos@ubc.ca

LORRAINE CHAN lorraine.chan@ubc.ca

JODY JACOB jody.jacob@ubc.ca

BRIAN LIM brian.lin@ubc.ca

BUD MORTENSON bud.mortenson@ubc.ca

BASIL WAUGH basil.waugh@ubc.ca

Advertising

PEARLIE DAVISON pearlief.davison@ubc.ca

Distribution

EMMY BUCCAT emmy.buccat@ubc.ca

Printer

TELDON PRINT MEDIA

Publisher

UBC Reports is published monthly by:
The University of British Columbia
Public Affairs Office
310 - 6251 Cecil Green Park Road
Vancouver BC Canada V6T 1Z1

Next issue: 3 February 2011

Submissions

UBC Reports welcomes submissions. For upcoming UBC Reports submission guidelines: www.publicaffairs.ubc.ca/ubcreports/about.html. Opinions and advertising published in UBC Reports do not necessarily reflect official university policy. Material may be reprinted in whole or in part with appropriate credit to UBC Reports. Letters (300 words or less) must be signed and include an address and phone number for verification.

Submit letters to:
The Editor, UBC Reports
E-mail to publicaffairs@ubc.ca or
Mail to UBC Public Affairs Office (address above)

UBC News Room

WWW.PUBLICAFFAIRS.UBC.CA/NEWS
Visit our online UBC News Room for the latest updates on research and learning. On this site you'll find our news releases, advisories, news extras, as well as a daily media summary and a real-time UBCNEWS twitter feed. You can also find resources including access to more than 500 faculty experts and information about UBC's radio and TV studios.

Website: www.ubc.ca/news

Tel: 604.822.NEWS (6397)

E-mail: publicaffairs@ubc.ca

Twitter: @ubcnews

Publication mail agreement no. 40775044.
Return undeliverable Canadian addresses to circulation department.
310 - 6251 Cecil Green Park Road, Vancouver, BC Canada V6T 1Z1
Email: publicaffairs@ubc.ca

In 2010 UBC faculty researchers and students helped make remarkable global advances in many fields of study. Their initiatives, innovations and insights made international news headlines, some of which are captured here and in our annual publication *A Year in Headlines*. For more UBC stories, visit www.ubc.ca/yih

2010 GAMES The legacy of the Games

UBC welcomed media as a host hockey and sledge hockey venue of the 2010 Vancouver Olympic and Paralympic Games. UBC's Robson Square campus in downtown Vancouver was also home to the unaccredited international media centre.

The *New York Times*, *USA Today*, *Le Monde*, *NBC Today*, the *Sydney Morning Herald* and many others reported on the UBC professors who studied the impact of the Games, performed scientific research for the Games and provided analysis of everything from security measures to weather and national pride.

"It seems as if our identity has always been that we're not American," UBC researcher **Rob VanWynsberghe**, who is leading a study of the Games' impact for the International Olympic Committee, told *USA Today*. "I think we'll have a full-blown Canadian identity and that will be one of the legacies of these games."

RESEARCH IN THE NEWS A weird academic bias

The *New York Times*, *Newsweek*, *Scientific American*, *Science* and others described how UBC professors were pointing out the flaws of the scientific practices of many psychology researchers.

A group from UBC published a meta-analysis indicating that between 2003 and 2007 undergrads made up 80 per cent of study subjects in six top psychology journals. They call this the WEIRD population—Western Educated Industrialized Rich Democratic.

"While students from Western nations are a convenient, low cost data pool, our findings suggest that they are also among the least representative populations one could find for generalizing about humans," said **Joseph Henrich**, a UBC professor of psychology and economics, who worked on the study with colleagues **Steven Heine** and **Ara Norenzayan**.

UBC EXPERTS War on drugs

Evan Wood, founder of the International Centre for Science in Drug Policy, director of the Urban Health Program at the British Columbia Centre for Excellence in HIV/AIDS and associate professor in the Department of Medicine at UBC, was published in a *CNN* online opinion column and the *Los Angeles Times*. He also provided expert commentary for the *New York Times*, *Time* and the *Globe and Mail*.

"From a scientific perspective, we must accept that law enforcement will never meaningfully reduce the flow of drugs. Economists know that the drug seizures we see over and over again as part of police photo ops have the perverse effect of making it that much more profitable for someone else to sell drugs," he wrote for *CNN*.

TEACHING AND LEARNING Museum riches

The *Seattle Times*, the *Telegraph*, the *Globe and Mail*, and others reported on UBC's Museum of Anthropology, which underwent a renewal and launched its new facilities at the beginning of 2010.

"Anyone interested in First Nations art, both traditional and contemporary, won't want to miss this impressive museum overlooking the Strait of Georgia, on the fringes of the University of British Columbia campus. Historic carvings, totem poles and artifacts from Coast Salish, Haida, Tlingit and other tribes can be found here, along with Bill Reid's mighty 'The Raven and the First Men' (1980) carved from a block of yellow cedar," wrote the *Seattle Times*.

UBC STUDENTS AND ALUMNI Emmy win

Ghana: Digital Dumping Ground, which aired on PBS's Frontline in June, 2009, won an Emmy for Outstanding Investigative Journalism in a News Magazine. The documentary was created by UBC students and professor **Peter Klein** from the UBC Graduate School of Journalism.

The win marked the first time Canadian students have won such an award and the *Globe and Mail*, *CBC*, *The National*, *CTV* and others reported on the event.



Martin Dee Photograph

Masters of Architecture student **Jordan Beggs** and Prof. **AnnaLisa Meyboom** contemplate a model of a user responsive boundary. The model activates when motion is sensed. See page 5.

This edition of UBC Reports is about the excitement of discovery and the possibilities that arise when we challenge the frontiers of knowledge. At UBC, we encourage our researchers to pursue the ideas that captivate them. When groups of talented researchers collaborate, ideas ignite to help foster naturally occurring areas of excellence in any discipline. The Next Big Thing edition isn't about patentable devices or commercial products. It's about the delight our faculty members and students find in pursuing new knowledge. In fact, much of our important research can't be patented or licensed. Our challenge is to find ways to mobilize all streams of research beyond the campus. UBC's "next big thing" could in fact be myriad small things, each making its own powerful contribution to our social, economic and environmental well-being.

—John Hepburn, Vice President, Research and International

The **next** big thing

Municipal service robots

In the next 15 years, Canada will spend \$12 billion to upgrade water main systems. A UBC professor is building a pipe inspection robot that will save money by entering subterranean waterways to find the weak spots.

By Jody Jacob

UBC robotics professor Homayoun Najjaran is working on a robot that has the ability to travel through water mains and sewer pipes, identify defects and send back information that can be used by municipal engineers to determine how and where money should be invested in repair and renewal of piping infrastructure.

The project is a collaborative effort with fellow UBC engineering professors Solomon Tesfamariam and Rehan Sadiq, as well as a company called Inukturn in Nanaimo, B.C. The robot could save municipalities millions of dollars by helping them determine which infrastructure systems are in the most critical condition, and which are highest priority for costly upgrades.

"It is estimated that Canada will need to spend \$12 billion in the next 15 years to upgrade water main systems," says Najjaran, who works at UBC's Okanagan campus. "Only about 0.5 per cent of those systems are replaced annually, which means the life expectancy of a piping system is 200 years. With limited repair and renewal resources, you can see why it is important for municipalities to know what pipes are priority upgrades."

Najjaran adds that it's not just a matter of replacing the older pipes first. Environmental factors contribute to deterioration, meaning some 100-year-old pipes could be fine, while much newer pipes could have serious defects.

The piping inspection robots are one example of Najjaran's work, which

focuses on robotics and automation. He works with industry and academia to build robots with autonomous capabilities to address real-world problems. This is the notion of "service robots."

"If you have an operational system, and you would then like it to operate with less human intervention, you probably have an automation problem," explains Najjaran. "What we do in our lab is make machines and robots smarter by adding sensors like cameras, rangefinders, and haptic sensors, so they can relate to and interact with the environment they are working in."

"Imagine you would like to inspect a pipe, a bridge, or even the surface of the Mars—somewhere where you have limited or no access," he says. "We will build an autonomous robot to travel through the environment by itself, do inspection or repair, and communicate a wealth of useful information back to you."

Collaboration is a key factor in Najjaran's work. He continuously forms new partnerships with colleagues, industry, and businesses. His team consists of eight graduate students and four to six undergrads.

"The pipe inspection robot is one example of a number of automation projects and partnerships currently underway," he says. "I'm also working on a project in partnership with Accuas Inc., a company based in Salmon Arm, BC, to automate the take-off and landing capabilities of Unmanned Aerial Vehicles, which are used to provide geographical information." ●



Assistant Prof. **Homayoun Najjaran's** service robots could save municipalities millions of dollars.

"What we do in our lab is make machines and robots smarter by adding sensors like cameras, rangefinders, and haptic sensors, so they can relate to and interact with the environment they are working in."

The **next** big thing

Intelligent space

Shapeshifting spaces offer amazing new possibilities for individuals in public and private environments.

By Professors **AnnaLisa Meyboom** and **Jerzy Wojtowicz**,
School of Architecture and Landscape Architecture

The School of Architecture, in collaboration with departments in Applied Science and Engineering Physics, is leading the way in investigating changeable architecture and making possible spaces which completely adapt and respond in real time to occupants and the environment.

Using current technology in computing, electrical and mechanical engineering, buildings and streetscapes can change according to stimuli such as movement, a change in external environment, a change in light condition, more people, time of day or a combination of all of these factors. Digital video scanning, light sensors, motion sensors, rain sensors, pressure sensors, weight sensors, proximity sensors, clocks, and even facial, retinal and fingerprint recognition software allow spaces to be configured and adjusted. The programming behind the intelligent spaces can itself 'learn' patterns or preferences of occupants as they repeat the same patterns.

The question being asked is: how can our environments benefit from using movable and adjustable elements controlled by sensors? One answer to this question is to help those who have difficulty helping themselves: there are many applications for responsive environments in extended care facilities for clients who have difficulty with mobility. Mechatronic applications to these facilities can give these clients a degree of autonomy that might not otherwise be possible, and improve the quality of life of both the clients and the caregivers.

Residents can have their surroundings configured on a control system to their preferences as the day changes so that care givers are not required to make adjustments for them: these systems could even be set up to recognize

hand or head movements for those occupants who have limited ability to communicate with a system. Systems can know who is allowed where and control access automatically or track locations of residents who have Alzheimer's disease. As well, interactive communications and digital technology can transform spaces providing immersive stimulation, relaxation or a simulation of nature or a childhood scene that they enjoy. These systems have the potential to act on a facial recognition system, allowing a customized response for each resident.

Further investigation will apply this technology to private homes where intelligent environments may allow people to live in their own homes for longer and facilitate daily tasks.

Other uses which have been investigated are responsive building skins. Buildings which have poor conditions for the occupants such as inadequate solar control, uncomfortable interior temperatures or problematic lighting conditions can be retrofit with external facade systems which respond both to internal and external conditions. The robotic skin can adjust to people's desires within the space or to the sun path or light conditions outside. The adjustment takes place in real time as conditions change. The skin can take many forms: but it is basically providing shading, insulation or sun blockage to the glass or external wall. The skin elements change configuration based on input from people in the building who want to adjust the conditions or sun angle or light sensors outside.

A robotic and intelligent environment is completely possible with current technology and the potential uses for us are only beginning to be understood. ●



a place of mind

Q.

HOW WILL YOUR WORK CHANGE THE WORLD?

UBC students, staff, faculty, and alumni answer this question and more in the 2009 - 2010 UBC Annual Review.

annualreview.ubc.ca



a place of mind

The University of British Columbia
The Media Group

Large Format
Poster Printing
Guaranteed
Next Day Service*
*extra day for lamination

Drop off your file in person
Email slides@interchange.ubc.ca
Upload www.mediagroup.ubc.ca/mg_upload_form.php
Questions? Call 604 822 5769



Woodward IRC Building - Lower Level
Room B32, 2194 Health Sciences Mall
Located north of UBC Hospital

The next big thing

Low-cost personal genome analysis

There is an explosion in the use of techniques to find the gene variations that influence our lives. We are on the verge of a genetic revolution that will be exciting, and scary.

By Drs. Peter Pare, Denise Daley and Andrew Sandford

Drs. Peter Pare, Denise Daley and Andrew Sandford are professors in the Department of Medicine and investigators in the James Hogg iCAPTURE Centre.

The Human Genome Project (HGP) began in 1990 with the aim of determining the entire genetic code of one individual. It took 10 years to get the complete sequence at a cost of more than \$3 billion. Today the entire genetic code of an individual can be determined in a matter of days for less than \$50,000 and the cost is rapidly approaching the \$1,000 goal. There is a \$10 million prize called the X prize (<http://genomics.xprize.org/>) for the first group to develop the \$1,000 genome.

One consequence of the completion of the HGP has been an explosion in the use of techniques to find the variation in genes that influence our health, including alcohol and nicotine dependence, as well as susceptibility to diseases including heart attacks, Alzheimer's disease, osteoporosis and asthma, to name a few. These techniques are also being used to find the gene variations that influence traits such as height, eye color, skin pigmentation. The up-sides and potential down-sides of this genetic revolution are exciting and scary.



Imagine a father brings his toddler to their family physician because of recurrent croup and asks, "Does my child have asthma and is there anything I can do to prevent it?" The family physician swabs the child's cheek and sends the tiny sample to the lab to check the entire genome. Within days the physician can give the parents a probability that the child will develop persistent severe asthma. The physician can also predict, with modest certainty, which asthma drugs the child is most likely to respond to.

Or, consider the scenario of a 54-year-old business man who comes across the web site, 23 and Me (www.23andme.com) and finds that they have a holiday special: \$99 to have your entire genome scanned for all known gene variants proven to be associated with disease. He sends in his mouthwash and within days his genetic risk profile is delivered to him online. He discovers he has a relatively rare mutation in the LRRK2 gene that raises your lifetime Parkinson's risk to more than 50 per cent. Later that week he is completing an application for health insurance and reads, "do you have any known risk for a chronic disease such a kidney failure, emphysema, or Parkinson's disease?"

The possibilities of genetic advances include designer babies, not only screened to exclude mutations for devastating diseases such as cystic fibrosis, but also selected for sex, hair and eye color.



Drs. Peter Pare, Denise Daley and Andrew Sandford foresee a new ability to identify gene variations that will influence our health.

The possibilities of genetic advances include designer babies, not only screened to exclude mutations for devastating diseases such as cystic fibrosis, but also selected for sex, hair and eye color. DNA samples left at a crime scene may be able to create a physical description providing information about age, gender, ethnicity, hair, eye and skin colour. Pharmacogenetics will aid in determining the patients who will respond to steroids and the best choices for chemotherapy.

The ethical, legal and social impacts are broad and encompassing. One clear example is how U.S. Health Maintenance Organizations (HMOs) are now using left over blood from clinical tests to get DNA. These DNA samples are being linked to the patients' hospital and pharmacy records to create immense bio-banks. The Bio-banks are selling access to patient samples for medical research. Ethics boards have approved this practice without patient consent provided the data is not linked to the patient name or other personal identifiers.

It is clear that genetic advances will soon give us access to large amounts of data about the possibilities in our lives. What is less clear is whether we are prepared for it. ●

The next big thing

Restorative Buildings

The old paradigm aimed to reduce environmental impact. The future is about buildings that actually improve our environment.

By John Robinson

John Robinson is a professor with the Centre for Interactive Research on Sustainability and executive director of the UBC Sustainability Initiative.

Can we build cities with buildings that reduce a community's energy consumption and carbon emissions, that improve the quality of water flowing through their sites, that restore their environments...and that make people happy?

Yes we can, and we are, right here at UBC.

The old environmental agenda focused on reducing emissions and making things "less bad." In this way of thinking, urban development was about reducing impacts and mitigating damage. To my mind, the new sustainability agenda is to design and construct buildings that improve things—that actually make both the physical and human environment better because they exist.

At UBC we are researching how buildings can live within a site's natural flows—using the rain as a water source, wind for ventilation, and the sun for light; gathering heat from the ground and from neighbouring buildings; purifying wastewater; generating heat and electricity; and using wood as a building material. We're looking at how a building can restore the environment by being net-positive, meaning it reduces a community's energy use and emissions, improves the quality of water flowing through the site, and sequesters more carbon than the carbon emitted in constructing the building and decommissioning it at the end of its life.

Adding a restorative building to a city should not only improve environmental quality, but also improve human quality of life. We want to investigate how providing natural light, very high air quality, individual control over ventilation at

the workstation level, real-time feedback on building performance, and the ability to influence the operating conditions within the building may make people healthier, happier and more productive.

The Centre for Interactive Research on Sustainability (CIRS), a 60,000 square foot regenerative building currently under construction at the Vancouver campus, is serving as our living lab. When it opens in the summer of 2011, we will test new technologies and explore the building's impact on the environment and the health, happiness and productivity of its inhabitants.

We are aiming to create a model that can be replicated in cities around the world. UBC is a micro-city of 45,000 students and 19,000 staff and faculty, all learning, working and living on 402 hectares. Our goal is to apply across our campus what we learn in CIRS and, with the help of our partners, in the marketplace. We know there is a misconception that green buildings are prohibitively expensive; in fact, we expect CIRS, with innovative, green features that will allow it to perform well beyond LEED Gold standards, will cost only eight per cent more than a similarly sized building constructed to LEED Gold, the minimum standard for all new public sector buildings in B.C.

It's going to take effort, vision, and ambition to enhance the environmental and social conditions in cities. The biggest challenges will be around changing the way we think about buildings and cities, and having the courage to aim at targets and practices that are transformative, not just incremental. I think universities have a critical role to play in supporting such a transition. I believe a sustainable world, and sustainable cities, really are within our reach. ●



Martin Dee Photograph

Prof. John Robinson sees a future where buildings have a "net-positive" impact

The next big thing

Imaging Genetics—the ability to foresee brain disease?

"It's not that you can't find your keys, it's that you don't know what do to with them once you have them."

(Author's mother, age 89)

By Judy Illes

Judy Illes is a professor of Neurology, Canada Research Chair in Neuroethics and Director of the National Core for Neuroethics.

As the old saying goes, there are only two things in life that are truly predictable: taxes and death. Also predictable, albeit with less certainty, is that as we age over time, we are likely to experience memory loss. Some of us will have no more than benign age-related "senior moments" when we simply forget things that we were once able to keep in mind with no problem at all. Others will suffer a more profound loss of an entire system of cognitive abilities: memories, decision-making, and personality.

Advances in the brain sciences with genetics and brain scanning today are allowing us to identify associations for the more serious form, which is often related to Alzheimer's Disease, and support a potentially evolving ability to foresee it. With growing predictive capabilities on the one hand but cure still an elusive goal, the ethical challenges for people and society are enormous.

Today, testing for susceptibility genes such as the apolipoprotein E (APOE) 4 allele for Alzheimer's, and powerful brain scanning techniques that can show variations in how different regions of the human brain are functioning in rest and in response to signals from the environment, have been joined to form a new research approach called imaging genetics. The power of this combined neurotechnology lies in its potential to

reduce the statistical uncertainty about future disease states, even before the behavioral symptoms of Alzheimer's for example, and the plaques and tangles in the brain are evident. In parallel, therefore, it also has the powerful potential to reveal previously undifferentiated subtypes of disease, and guide strategies for tracking and early, and perhaps even tailored intervention. Overall, the sum of the parts with imaging genetics will likely be greater than the whole.

While there still remains much to be learned, one point seems certain: like other successful innovations in genetics and neuroscience, there will be an increased use of imaging genetics in the years to come. The anticipated surge in scientific activity will be accompanied by a similar surge in ethics-based challenges related to personal privacy, autonomy and life planning.

Our culture and values define the nature of the benefits and risks that science and medicine bring forward, dictate methods that must be in place to assure the maximum safety, comfort, and protection of participants and patients in research and clinical care, and inform society's responses through policies for the allocation of health care resources, education, and outreach. With advances in imaging genetics, the big questions will only get bigger: Do you want to know? How would you use the information? Who else would you want to know? Now is the time to anticipate these questions and address them. ●

With advances in imaging genetics, the big questions will only get bigger: Do you want to know?



**Berkowitz & Associates
Consulting Inc.**

Statistical Consulting

Research Design • Data Analysis • Survey Sampling • Statistical Education

Jonathan Berkowitz, Ph.D. 4160 Staulo Crescent, Vancouver, B.C. V6N 3S2
Office: 604-263-1508 • Fax: 604-263-1708
Email: witz1@interchange.ubc.ca

Copies Plus
COPY • IMAGING • CENTRE

DISCOVER THE FRIENDLY COMPETITION
QUALITY • SERVICE • VALUE

Quality Digital Printing and Copying Service

Scientific Posters • Architectural & Engineering drawings • Reports • Newsletters
• Powerpoint Handouts • Flyers • Booklets • Training Manuals • Resumes
• Sell Sheets • Overhead Transparencies • Presentation Folders • Plus more
• Email your files or ftp your large files to us

Over 22 years of Excellence www.copiesplus.ca
1950 West Broadway 604-731-7868
Open 7 Days Mon-Fri 8am-9pm Sat-Sun 10am-6pm

WEST COAST SUITES
Deluxe Hotel Suites, West Coast Style



EVERYONE CAN STAY WITH US
Contemporary, beautifully appointed, limited service deluxe hotel suite for visitors and business travelers to Vancouver.

- Centrally located on campus
- Fully-equipped kitchen and complimentary wireless internet
- Ideal for short or long term stays
- Available year round

 **Conferences & Accommodation**
T 604 822 1000
E reservations@housing.ubc.ca
www.ubconferences.com

**Your Conference
Planning Partner at UBC**



Hosting a conference at UBC? We can make it easy. We offer full management and registration services and have experienced and knowledgeable staff. Let us help you customize a program to suit your needs and budget.

With UBC's unique venues and state-of-the-art facilities, your meeting at UBC will no doubt be a memorable success!

 **VANCOUVER**
T 604 822 1060
E conferences@housing.ubc.ca
ubconferences.com

OKANAGAN
T 250 807 8050
E conferences.ubco@ubc.ca
okanagan.ubconferences.com

The next big thing The medical “tricorder”

With recent advances in DNA sequencing, finding the DNA of a virus or bacteria is literally a day’s work. Doctors may soon have a device that can quickly analyze and identify the common bugs that ail us.

By David Broemeling

David Broemeling is director of operations for UBC spinoff company Boreal Genomics.

In 2003, when the SARS virus was threatening Canada, it took B.C. researchers only a few days to fully map its DNA. Why is it then, that when we visit our doctor with flu-like symptoms, the diagnostic process is the same as it was twenty years ago? Based on experience with our medical system, one would wonder whether the genome revolution has had any effect. After all, in the lab we can easily determine the sequence of any bug we happen to come down with. Why can’t our doctors just sequence its DNA to figure out what it is?

The reality is that DNA sequencing is having an immense impact in medical research, and in treatment of severe diseases such as cancer, but for now it is still too slow and expensive to be used routinely to figure out whether we have the flu, a common cold, or strep throat. While we know the DNA sequence of organisms that cause flu and colds, we don’t have a simple device that allows doctors to take a throat swab and determine what bug’s DNA is there. One problem is that any throat swab contains only a little bit of bug DNA, and lot of normal human DNA. Finding the bug DNA is like looking for a

needle in a haystack.

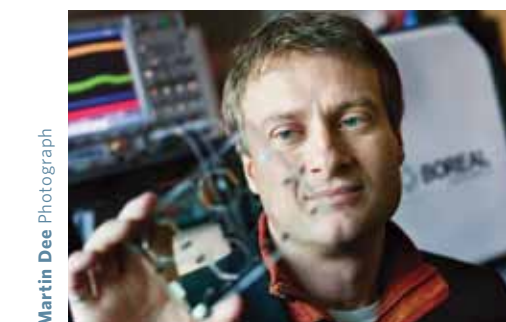
This is where UBC and Boreal Genomics are hoping to change things. A spinoff from Prof. Andre Marziali’s laboratory at UBC, Boreal is developing tools to extract DNA from complicated samples. Developed from an invention by Marziali and UBC Physics professor Lorne Whitehead, Boreal’s technology can extract DNA from the dirtiest of samples, including dirt and tar.

Marziali’s team has developed the technology in multiple directions. While Boreal is already selling an instrument for researchers and

forensics scientists to help clean up dirty DNA, his team of physicists and engineers are finding a way to separate bug DNA from human DNA. Coupled with a new DNA analysis technology they are developing, the team is hoping to build a device that could ultimately allow you to walk into a doctor’s office and get a quick diagnosis on whether you should be on antibiotics, or simply home in bed with a hot drink.

If these UBC scientists have their way, the day of a handheld device that can scan and analyze data—a Star Trek-like medical “Tricorder”—is not far off. ●

While we know the DNA sequence of organisms that cause flu and colds, we don’t have a simple device that allows doctors to take a throat swab and determine what bug’s DNA is there.



Prof. Andre Marziali thinks the genome revolution will change the way doctors can diagnose the bugs that ail us.



Learn...

- Español 中文
- Français 日本語
- Deutsch 한국어
- Italiano plus more



Non-credit conversational courses in 21 languages are held at UBC Point Grey and UBC Robson Square.

Courses start week of January 17.

Register now!
languages.ubc.ca/ur or 604-822-0800



Accommodations & Conferences @ Vancouver School of Theology offers:

- Stunning Meeting Spaces
- Comfortable Guest Rooms
- Ideal Setting for Retreats and Workshops

Please contact us at 604-827-4748 or email: vstconf@vst.edu

VST www.vst.edu

UBC a place of mind

- av system design & integration
- digital signage
- presentation webcast & capture
- av equipment rentals & repair
- audio-visual services
- av supplies & equipment sales

Create. Communicate. Educate.

creative services

- photography
- video & media production
- medical illustration/animation
- graphic design
- large-format printing
- lamination

Media Group

Woodward IRC Building, Room B32 • 2194 Health Sciences Mall
mediagr@interchange.ubc.ca • T: (604) 822-5561

7 8

The next big thing Powerful “rare-earth” dental magnets

New magnets developed for the Japanese auto industry hold promise for struggling denture wearers.

By Drs. Ross Bryant and Michael MacEntee

Dr. Ross Bryant is an assistant professor in Oral Health Sciences and the principal investigator of this research, and Dr. Michael MacEntee is a professor in Oral Health Sciences. Both work in UBC's Faculty of Dentistry in the Division of Prosthodontics and Dental Geriatrics.

The scourge of tooth loss is decreasing, but it's not gone yet. There are still many people who have lost their natural teeth and live to struggle with dentures. Some manage well but others suffer with little relief. The first relief came from Sweden about 25 years ago with the discovery of titanium-metal implants embedded with reasonable predictability into the jaws. The future seemed much brighter for denture-wearers, although the mechanism of attaching the dentures to the implants for maximum comfort remained a challenge. Small metal screws were the obvious solution to try, but only if there were enough implants to support the denture completely. Besides, implants are expensive, which limits the number to one or two for many people.

The magnets connect with a strong magnetic force to a small metal “keeper” attached to each implant.

And how could a denture be attached to one or two implants? With difficulty. Metal and plastic clips are available to clip the denture onto a bar that runs between two implants. However, the bars and clips are expensive, bulky and difficult to clean. The denture can be made with a small rubber or plastic ring that clips onto a metal or plastic stud in the implant, although studs wear out and the denture loosens, or they protrude annoyingly into the mouth when the denture is not worn.

So what about magnets? Indeed, dental magnets have been tried with dentures, but they corrode in the mouth and gradually break apart. This was until recently when, as an off-shoot from the automobile industry in Japan, tiny, powerful “rare-earth” magnets protected within small metal containers from corrosion were adapted to fit into dentures. The magnets connect with a strong magnetic force to a small metal “keeper” attached to each implant.

The benefits for denture-wearers are very encouraging to researchers in the faculty of Dentistry at UBC who are testing the magnets in a clinical trial approved by Health Canada. The results since December 2006 look very good. None of the magnets have corroded. Most of the denture-wearers in the trial are satisfied with the results because the magnets have not lost their magnetism, while the “keepers” on the implants are easy to clean, and comfortably smooth against the tongue and cheeks when the denture is out of the mouth.

It is still too soon to say how long the magnets will function comfortably and securely, or resist corrosion. Nonetheless, the progress is promising, and the struggle with dentures may be on the wane. ●

The next big thing Magic Biomarkers

New ways of using biomarkers open new horizons in defining risk, illness, and therapies for vital organ failure.

By Dr. Bruce McManus

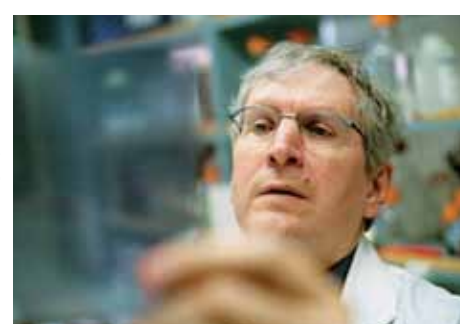
Dr. Bruce McManus is a professor in the Department of Pathology and Laboratory Medicine and director of the James Hogg iCAPTURE Centre and PROOF Centre of Excellence.

Organ failure is now epidemic across the world—heart, lung and kidney failure together take the greatest toll in terms of human suffering and healthcare spending.

But one of the biggest challenges in predicting and diagnosing organ failure is also one that shows great promise, and it acknowledges that we're each uniquely different—right down to the molecular level.

Early warning signs of heart, lung and kidney disease can be detected in minute changes in genes, proteins and metabolites. These changes “mark” the presence and severity of risks or diseases that could ultimately lead to organ failure. By clinical laboratory tradition, such measures as elevated blood sugar and blood cholesterol could indicate risks for hardening of the arteries and eventual heart attack. More recently called biomarkers, these tell-tale signs are potentially powerful tools that could revolutionize population surveillance, patient care and the development of new therapeutics and technologies.

Researchers at the Centre of Excellence for Prevention Of Organ Failure (PROOF) at UBC and St. Paul's Hospital, and the Institute for Heart + Lung Health, are taking this new horizon of medicine one step further by assembling “sets” or “panels” of novel individual



Dr. Bruce McManus says “panels” of novel biomarkers may soon help predict heart, lung and kidney diseases.

biomarkers that can then be used to create blood or urine tests to help diagnose, predict or guide the treatment of heart, lung and kidney disease in a cost-effective manner.

While individual biomarkers tell us part of the story about diseases and risks, panels or sets of biomarkers paint a clearer picture of biological processes like immune rejection, organ damage, altered repair, and organ failure. But they are challenging to discover and even more difficult

While individual biomarkers tell us part of the story about diseases and risks, panels or sets of biomarkers paint a clearer picture of biological processes.

to translate into practical clinical tools.

As a Network Centre of Excellence (NCE) for Commercialization and Research, the PROOF Centre has brought together a broad spectrum of experts and partners to meet this challenge. This collision of high performance technologies with sophisticated statistical and bioinformatical analysis and well-defined clinical needs is informing our ever-deepening knowledge of biological processes that can lead to personal devastation and suffering.

Biomarkers remind us how truly unique we each are as individuals, as “systems” operating in health or illness, and as such— and beyond their promise in helping people at risk of or suffering from organ failure in our community, biomarkers hold truly magical value for people in all societies of our global village. ●

Writing Centre

Academic Development

- grammar and writing with style
- preparation for university writing and the LPI
- writing for graduate students

Professional and Creative Writing

- report and business writing
- freelance article writing
- short fiction, novel and screenwriting
- journal writing and autobiography

USED BOOK SALE
January 13 and 14

Ponderosa Annex C, 2021 West Mall

Courses start in January and February.

Register now!

writingcentre.ubc.ca/ur or 604-822-9564



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA



Book your holiday event now!

Save the HST, pay with a JV or UBC Department Card.



www.sage.ubc.ca
ph: 604.822.0429



www.food.ubc.ca
ph: 604.822.0160



www.food.ubc.ca
ph: 604.822.9503

Swirls Christmas Bakeshop
November 17 - December 23
Take home a UBC Tradition this holiday season.

www.food.ubc.ca or 604.822.3649



CATERING BY
wescadia
superior servings. superior service.

Catering to the UBC Campus and Point Grey community.
Full service & casual catering, custom menu planning
and event coordinating.

**Celebrate on campus
this holiday season!**

Introducing the new Cecil Green Holiday Menu Packages.

Drop Delivery and Full Service.
Save the HST and gratuity on your catering cost,
pay with a JV or UBC Department Card.

Visit www.catering.ubc.ca for the new Festive Holiday menu packages.



A division of UBC Food Services

The next big thing

Telling stories together, one tweet at a time

We can expect a raft of new tools to make sense of social media for a new age of collective journalism.

By Alfred Hermida

Alfred Hermida is an assistant professor who leads the Integrated Journalism program in the UBC Graduate School of Journalism.

Sci-fi films often show a future where streams of information flow across screens, with intelligent agents sorting and filtering the digital deluge. The truth may not be that far removed from the fiction.

Social media services such as Twitter provide a platform for these streams of information, from the mundane to the vital. Missing, though, are media systems to help us manage and navigate the data flow.

We have rushed to embrace social media. By the end of 2010, Facebook alone had more than 575 million members, 17 million of them in Canada. Every minute, 24 hours of video is uploaded to YouTube. On Twitter, 55 million messages are sent a day—more than 38,000 tweets every minute.

Through all of these interactions and contributions, we are, collectively, creating a vast digital archive of human history and experience. The former *Washington Post* publisher, Philip Graham, once described journalism as the first draft of history. Now journalists share this role with people formerly known as the audience.

Journalism surrounds us. Much of it is, literally, ambient, and being produced by professionals and citizens alike. Citizens—the former audience - are committing acts of journalism as they share experiences, photos, videos and links on social media services like Facebook and Twitter.

The challenge with ambient journalism is that so much of it is coming at us in real-time, from multiple directions. Fears about information overload are nothing new. The same concerns were raised after Gutenberg's printing press, when thousands of books became widely available. In response, printers and scholars came up with novel ways to sort, filter and summarize the wealth of text.

We are at a similar stage with social media. Traditionally the journalist has been the mechanism to filter, organize and interpret information and deliver the news in ready-made packages. But the thousands of acts of journalism on social media make it impossible for an individual to identify the collective sum of knowledge contained in the micro-fragments. Instead, researchers are working to develop media systems that can process, analyze and contextualize the data.

For example, while messages on Twitter are atomic in nature, they are part of a distributed conversation. In aggregate, these streams of connected data contain the potential for real-time, collaborative and distributed storytelling. Inherent in social media are structures for people to act together as if in an organized way. One current way to do this is through the use of hashtags—the # symbol—on tweets to signpost topics and issues.

The digital tools available to aggregate and analyze tweets and updates are in their infancy. It is similar to the early days of the web in the late 1990s, when it was hard to find relevant information online until Google launched its search engine in 1998. Looking forward, we can expect a raft of new tools and services vying to be the best in negotiating and deriving meaning from social media streams. ●



Assistant Prof. **Alfred Hermida** says journalism is now being produced by professionals and citizens alike through social media.

**Citizens—the former audience—
are committing acts of journalism
as they share experiences, photos, videos
and links on social media services
like Facebook and Twitter.**

2010 Update Discovering Terra Nova

Discovering Terra Nova in 10 Years

By Prof. Jaymie Matthews, Dept. of Physics and Astronomy

Five years ago, I predicted in *UBC Reports* that, within 10 years, astronomers would find a habitable Earth-sized planet around another star (if they are out there to find). Halfway into my claimed Decade of Discovery, are exoplanet hunters on—or even ahead of—schedule?

To answer that question, we need to answer this one: Will Gliese 581g become a milestone in the story of the search for life beyond Earth, or an embarrassing footnote?

The recent announcement of a sixth planet orbiting the dim red dwarf star Gliese 581a made astronomers and astrobiologists almost as excited as if someone had found Pandora or Tatooine. Why? Because it would be the first planet known, other than Earth, to orbit in the Habitable Zone, at a distance from its star that permits liquid water oceans on its surface. Gliese 581g

would be the first Goldilocks World, where the temperature is “just right” for life.

Within a week of that announcement by U.S. astronomers was a rebuttal by the Swiss exoplanet hunters who had found the first four planets known in that star system. They suggest that Gliese 581g is a figment, not of the imagination, but of the noise in the measurements. Now you see it; now you don't. Did Goldilocks turn into the Cheshire Cat? And did astronomers fall down the rabbit hole?

The Gliese 581g result is based on data using Doppler wobble technique, and in my 2006 article I stated that this wasn't sensitive enough to find an Earth-mass planet around a star. That's still true. To settle the issue, we must await new data to be collected next year.

In the meantime, everything is on track for the discovery of an exoEarth

within the next five years. The NASA Kepler mission was launched in March 2009. That space telescope is staring at about 100,000 stars to look for transits—dips in brightness when a planet passes in front of its parent star. So far, Kepler has already identified about 700 exoplanet candidates. After three and a half years, if there are Earth-sized planets in Earth-sized orbits around Sun-like stars, Kepler should reveal some of them.

Today, we know of just over 500 alien worlds, and we are on the verge of finding alien Earths. If we are still waiting five years from now for that first discovery, it will be only because (a) astronomers exercise more extreme caution with their data, after the Gliese 581g experience, or (b) exoEarths are not as common as we expect. Only time will tell, and I still say that five more years will be enough time. ●

Looking back

Were we right? The inaugural 2006 *UBC Reports* Next Big Thing edition included nine predictions such as new gene therapies, conscious cars and artificial blood platelets. We asked two of our original contributors for an update.

2010 Update Prescription Pets

Dogs as Prozac

By Prof. Stanley Coren, Dept. of Psychology



©istockphoto Jonathan Downey

Back in 2006, I looked at the nature of the bond that people have with dogs and some of the research that seemed to show that dog ownership has advantages that affect the physical and psychological well-being of people.

It was already well established that petting a familiar and friendly dog lowered blood pressure, slowed breathing, and reduced muscle tension. These are all signs of reduced stress. I cited reports that showed that men who had their first heart attacks were more likely to be alive four years later if they owned a dog, and others that demonstrated that elderly people, who are otherwise alone seem to require less medical attention and are less likely to become clinically depressed if they live with a dog. It was my belief that we would soon see a major breakthrough where physicians might end up “prescribing” pet dogs to improve the physical and psychological health of people.

It seems that my predictions are beginning to come true in part due to the effects of war. The veterans of recent conflicts in the Middle East have been showing symptoms of post-traumatic stress disorder (PTSD) in the form of depression and other stress related problems, including increased rates of suicide. In many interviews, veterans and their therapists reported drastic reductions in PTSD symptoms and in reliance on medication after receiving a specially trained psychological service dog. Because of such data, the U.S. federal government, not usually at the forefront of alternative medical treatments, has passed a bill which gives veterans with PTSD a service dog. This is part of a study to determine if scientific research supports the anecdotal reports that the dogs might speed recovery from the psychological wounds of wars. Preliminary data already shows that dogs may work better and more quickly than antidepressants, such as Prozac. ●

The U.S. federal government, not usually at the forefront of alternative medical treatments, has passed a bill which gives veterans with post-traumatic stress disorder a service dog.