EUREKA!

NEWSLETTER OF THE FACULTY OF SCIENCE

Spring 2010

Learning in Paradise

- Icelandic volcanoes
- Mathematical vineyard
- Chemistry magic

Carleton UNIVERSITY | Faculty of Science

World-wide Science

Carleton University has many connections to the wider world of science and is an increasingly important voice in global enterprise. Last year, President Roseann O'Reilly Runte published 'Defining Dreams', a strategic plan for the University, which identified four focal themes—Sustainability and the Environment, Health, New Digital Media and Global Identities. Science is involved in all four of these themes and in this edition of *EUREKA!* we emphasize the fourth: Global Identities. This, we take to mean how Carleton interacts with the world around us; how Science influences world-wide issues; how Carleton is viewed from abroad; how we increase our global profile, and increase our support for world communities; how, Science at Carleton, is a good global citizen.

In this issue, you will read about our Earth Sciences professor Brian Cousens leading an expedition to Iceland to study the Hekla volcano. As I write, another volcano in Iceland has just erupted, throwing ash over a vast area and disrupting flights in Europe. You will also read about a Computer Science professor, John Oommen, who is working to improve the Chilean wine industry and many others beside. Given the earthquake disaster that occurred there earlier this year, it is important that world trade with Chile recovers rapidly so that the profits can be used to address the many problems they face. You will read about retired faculty member Al Donaldson and his proposal for a World Geopark in Canada and you will also read about the Department of Physics' involvement with the Large Hadron Collider in Geneva. This involvement provides an opportunity for our graduate students to visit the international lab at CERN and to work with other students from many European, American, Indian, Far Eastern and African countries. Additionally, our front page features an article about Biology Instructor Nigel Waltho, who regularly takes a class down to the Caribbean, and to Cuba, to research the unique coral found there.

These, and many other examples, illustrate how the Faculty of Science at Carleton University interacts with the world around us and how the projects our students and faculty members undertake have implications and benefits world-wide. *EUREKA!* magazine will soon be transitioning into a dynamic new media. Please let us know if you would prefer to continue receiving the regular paper copy or would be interested in only receiving the online version by contacting http://eureka.carleton.ca/startstop_options.htm

John Armitage
Interim Dean
Faculty of Science

EUREKA!
NEWSLETTER OF THE FACULTY OF SCIENCE

carleton.ca/science/

Editor: Kristelle Lapointe
Design: Richard Bootsma

Newsletter Mission Statement
EUREKA! is published for the alumni, faculty, staff, friends and partners of the Faculty of Science. The newsletter is intended to communicate the faculty's goals, strategic direction and activities in order to connect alumni with each other and the university. It is distributed in collaboration with the Department of University Advancement.

The department of university advancement protects your personal information. It is used by the university to inform you about programming, events and offers from our affinity partners, to communicate Carleton news, and for fundraising purposes. To update your name or address, or stop mail, please contact advancement services at 1-800-461-8972 or email http://eureka.carleton.ca/startstop_options.htm

Your input is important!

Please send your feedback, letter to the editor or story ideas to odscience@carleton.ca

On the cover
A Carleton biology student collects samples during a diving excursion in the Caribbean. Read more about biology Professor Nigel Waltho's field courses on page 8.

Photo: taken by N. Waltho

Photo taken by Caroline Choquette

Brian Cousens stands by a fumarole—or gas vent—near Krafla volcano in northern Iceland.

Fire on Ice

Volcano virtuoso checks out a country's maker and destroyer

By Daniel Reid

In southern Iceland, a huge hunk of metal juts out awkwardly over an otherwise flat landscape; scraped and half crumpled like a piece of old paper. It was once part of a well-travelled bridge over the river Gigjukvisl before it was swept away by a volcano-induced flood. Fourteen years have now passed since the disaster but the ruin remains a constant reminder of Iceland's precarious existence in one of the most volcanically active regions in the world. Iceland is home to some 130 volcanic mountains which have, over the course of the past 500 years, spewed out a third of the world's total lava. Dangerous? Maybe. But this land of ice and fire is true paradise for Brian Cousens, associate professor of Earth Sciences at Carleton University.

"You are in some ways putting yourself into a dangerous spot ... but the students learn 10,000 times more than they would in a classroom", he said of visiting Hekla, the most destructive volcano in Iceland, with 19 students from Carleton and the University of Ottawa during a two-week field course to Iceland in search of geysers, boiling mud pots, geothermal vents and, of course, volcanoes.

Since the 1950s, Hekla erupts about every 10 years—with the last eruption occurring in 2000—blowing ash and small particles into the air. "The most recent eruptions haven't been really explosive or dangerous . . . but it's still an absolute fact of life."

"Iceland is unique," explains Cousens. "It's what we call an intraplate volcano, like Hawaii, that just happens to sit on a mid-ocean ridge," said Cousens. "This is the only place in the world where you can walk on a mid-ocean ridge."Over time, as the plates slowly move apart, fissures form in the crust allowing molten rock to surface as lava—which explains the frequent eruptions.

Volcanoes play a vital role in understanding the history of our 4.5 billion-year-old planet explains Cousens, who studies how volcanic rocks make up the Earth's mantle and crust."The Earth's interior has different chemical fingerprints depending on where you are on the planet," he said, adding that these variations are recorded in lava. Around 15 million years ago, long after all the other continents had already formed, lava from volcanic eruptions along the mid-ocean ridge cooled to form Iceland's first land surface. The island has been growing ever since. Cousens and company visited some of these ancient lava flows, slowed in their tracks only by glaciers and very steep topography. "It really cools quickly," said Cousens of lava that makes up mountains, deep valleys and former "waterfalls of lava carving out a path to the ocean". "In Iceland," he adds, "these kinds of features are everywhere."

Canada has much to learn from this volcano-studded island, said Cousens. Though Canada has several potentially active volcanoes on the west coast—including at least three that have been active in the last few thousand years—Iceland actually makes use of theirs, using the naturally existing geothermal warmth to heat water. "It makes sense, the whole island is hot," said Cousens, adding that there are several spots in the country where exposed ground water bubbles and boils at the surface.

Global warming has implications in Iceland too. Cousens predicts that as ice melts—in addition to more widespread flooding—eruptions may also become slightly more frequent. And that's saying something. "(Global warming) seems to encourage volcanic activity," he said, adding that as heavy ice deposits melt, it removes an enormous amount of weight from the earth's surface, causing it to ever so slightly spring upwards. Eruptions might be dangerous but, contrary to their fiery nature, they actually contribute to global cooling, said Cousens. When a volcano erupts, it launches a cloud of ash and dust into the atmosphere, essentially blocking out sunlight. That combined with the release of sulphur dioxide—which reacts with moisture in the air to reflect sunlight—makes for one big cooling system, and with the planet's temperature on the rise, maybe it isn't a bad thing.

The sweet taste of...science

By Kristelle Lapointe

Brett Stevens, Associate Professor with the School of Mathematics and Statistics, captivated onlookers in the spring 2009 with his presentation on *Games from the Math Classroom.*

In the past two years, the Science Café has become a mainstay on the Faculty of Science events calendar. Carleton's Science Café is a series of bi-weekly talks organized by the Faculty of Science that provide opportunities for researchers to discuss with the Ottawa community relevant issues facing our society. Dean George Iwama introduced the outreach initiative during the 2007-2008 academic year and the accessible format has proven to be very popular.

"What is great about the concept of the science cafés", explains Root Gorelick, Assistant Professor in the Department of Biology and co-organizer, "is that they are completely decentralized. They can spring up anywhere, even without the sponsoring of academia."

The first science cafés started in France in the mid-nineteen nineties and quickly caught in England and North America. While audiences have been known to enjoy a glass of wine in France, or a pint of beer in England, in Ottawa they enjoy a piping hot cup of fair-trade coffee at the Wild Oat Café on Bank Street. The Science Café's lectures and discussions are accessible to everyone and because of their wide variety of topics, ranging from the reasons we age, to the size of the universe, to the mating habits of the moose, they attract audiences of all ages.

Ottawa residents have been very receptive to the initiative. As word of mouth travels, people are turning up in increasing numbers for a chance to ask questions of the researchers in an intimate setting, Gorelick says. "The positive interaction with the researchers," adds Sue Bertram, Assistant Dean (Recruitment and Retention) and Science Café co-organizer "makes the audience members more comfortable with science." The venue plays a big role in the Science Café's success, explains Bertram. The Wild Oat was selected by Dean George Iwama because of its feel and location—its warm atmosphere creates a unique connection between the audience and the speakers. And while many onlookers first come in for the delicious vegan dishes and pastries offered at the Wild Oat, they walk away with a true appreciation of science, and will often come back for more.

The Science Café schedule runs until the end of May 2010. It will be back in its bi-weekly format, in the fall 2010.

For more information, or to watch vodcasts of previous presentations, please visit http://www.carleton.ca/science/cafe/index.html.

Former Carleton University Professor continues to teach in retirement.

By Kristelle Lapointe

Through geological excursions and public lectures, geoheritage expert Allan Donaldson continues to spread the word that geology is an extremely important science. Donaldson, who started leading geological field trips for the general public in the Ottawa and Gatineau area in 1998 after retiring from his teaching position in the Department of Earth Sciences at Carleton University, believes that "people should know more about the origin and history of their planet". He seems to be successful in this endeavour, as Almonte's 2009 local Geoheritage Day, organized by volunteers and advertized only locally, attracted over a hundred people who came to find out about plans for Metcalfe Geoheritage Park, an outdoor display of rocks to be officially opened later this year.

What better way is there, for this passionate teacher of all things geological, to be spending his retirement? In the past few years, his interest in geoheritage has taken him all-over the world on cruise ships, giving sea-day lectures about the geology of places to be subsequently visited. As he explains it, there really isn't anything to match the feeling of wonderment experienced when approaching a coastal zone and observing the age relationships shown by a complex succession of rocks for the first time.

Allan Donaldson identifies rock specimens for onlookers during Almonte's local Geoheritage Day in the fall of 2009.

As a member of the Canadian National Committee for Geoparks, Donaldson hopes that the Committee's recently submitted Saint John geopark proposal, presently being considered by the World Geoparks Committee in Malaysia, will be accepted as the first World Geopark in North America. Such designation would identify this section of land as an internationally recognized geological heritage site. This would greatly enhance Canadian geocultural tourism. Soon after the meeting in Malaysia, Donaldson will present a paper at the Annual Meeting of the Geological Association of Canada in Calgary, promoting the creation of more modest outdoor geological displays across Canada, on the scale of the Metcalfe Geoheritage Park, in Almonte.

The mathematical VINEYARD

By Susan Hickman

John Oommen enjoys a glass of wine with his dinner as much as the next person. But now that he has met with representatives of the Chilean Wine Industry (CWI), what swirls in his glass has taken on new meaning.

Mathematically minded for as long as he can remember, and the first person ever to attain the rank of Fellow of the International Association of Pattern Recognition (IAPR) in Ontario, Oommen is confident that he and his Chilean graduate student César Astudillo can automate some wine production processes, and assist in many wine- and grape-related decision processes for the wine industry in Chile. His toolkit includes techniques he has learned and developed for other applications.

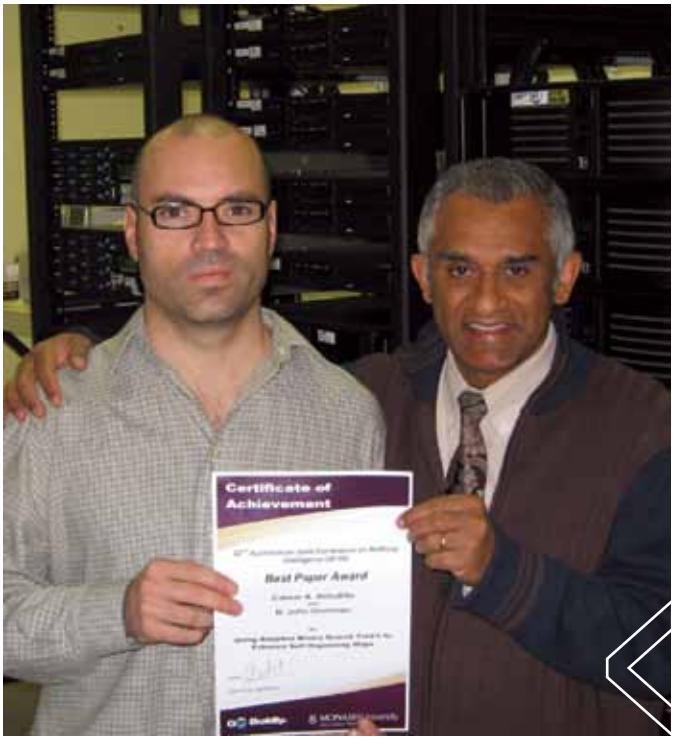
"Pattern recognition principles," explains Oommen of Carleton University's School of Computer Science, "have been applied to such issues as breast cancer tumours, the classification of species, speech recognition and spam determination, but have rarely been used for wine-related problems."

Thus, when the CWI delegation came to Canada last November to look for solutions to having to move their grape plantations further south due to global warming, Oommen, with seed money from Interim Dean of Science John Armitage, stepped in to help.

Along with his student, Astudillo, originally from the University of Talca in Chile, he presented to the Chilean team, which included the ambassador of Chile, the Chilean scientific attaché and a chief scientist from Agriculture Canada, some potential solutions and ideas for future collaborative efforts to improve wine production in the South American country.

Oommen's research has been extremely productive in academia and in industry collaborations for more than 30 years. He has reaped some of the highest awards in his field of artificial intelligence and pattern recognition since he joined Carleton University's School of Computer Science in 1981. He is also one of only a handful of scholars to attain the rank of Fellow of the Institute of Electrical and Electronic Engineers (IEEE)—for his work in artificial intelligence and pattern recognition—and, since 2006, he has been one of Carleton's select Chancellor's professors.

The foundations of a paper he co-authored with Astudillo, which won the Best Paper Award at last year's annual conference on Artificial Intelligence in Melbourne, Australia, will enable future work with the CWI.



Oommen (right) and his graduate student, César Astudillo (left), with their Best Paper Award won at last year's annual conference on Artificial Intelligence in Melbourne, Australia.

"The idea is very simple," he explains. "Pattern recognition can be used for numerous problems. It essentially involves making well-founded inferences based on measurements called *features*. The inferences are based on formal mathematical principles, which involve numbers, symbols or the structure of the patterns being recognized."

Oommen became fascinated by the field of pattern recognition while studying electrical engineering in India in the 1970s. After obtaining his master's of engineering in India, he pursued a master's in science and a doctorate in electrical engineering at Purdue University in Indiana.

Initially, Oommen and Astudillo intend to apply pattern recognition strategies to determine the type of grape best suited for a specific location, based on characteristics of the soil and the types of grapes grown in neighbouring vineyards. Their project will also help the wine producer decide whether a wooden barrel or a stainless steel container, for example, is optimal for a specific grape and wine.

Oommen and Astudillo's project will also provide the CWI with a system that can *simulate* the art of wine tasting.

"The system will make decisions about the quality of the wine, just as an experienced winemaker would," Oommen explains, "thus augmenting the decision of the wine taster, helping streamline and automate the wine tasting process, and hopefully assisting in training the next generation of wine tasters."

As Astudillo completes his doctoral studies this year and returns to Chile as a professor instructor in Talca's computer science department, Oommen foresees an ongoing collaboration.

"We can go on to look at market-related problems," suggests Oommen, "and develop a system that can advise how best to combine grapes and wines into a blend that satisfies customers from specific locations. There is a huge market for wine in China and India and I am quite confident that in the future, we can develop a system for the CWI that can advise on the optimal combination of grapes and wines to best satisfy the good taste of customers."

Nutty About Details

By Kristelle Lapointe

John Acorn speaks to the Carleton community about the parallels between entomology and day-to-day life

In a day and age where biologists spend more time interfacing with computers than doing field research and where children are more likely to spend their time studying the ins and outs of their video game consoles than playing outdoors, John Acorn is leading a naturalistic revival that would make E.O. Wilson proud. Dr. Wilson's biophilia hypothesis proposes that as humans we subconsciously seek connections with the natural world around us. Acorn's lecture, entitled *Birders, Bugsters, Gricers and Pokémon: Inside the Mind of a Naturalist*, and which was presented to a near-capacity crowd at the Kailash Mital Theatre, left little question that "the Nature Nut," as he's known, is driven by an unending desire to further connect himself and others to nature.

In February 2010, Carleton University's Faculty of Science had the pleasure of hosting John Acorn, an internationally-recognized and award-winning entomologist as one of the speakers at the 2010 Discovery Lecture. The Discovery Lecture is an annual event jointly hosted by the Faculty of Science and the School of Journalism and sponsored by NSERC that showcases and promotes excellence in science journalism. Acorn, who shares his passion for nature with students as an Instructor at the University of Alberta, is perhaps best known for having starred in the long-running television show entitled *Acorn, the Nature Nut*. Acorn says that through his work he aims to transform his audience. The goal is to alter people's perspectives so that they will pay more attention to their surroundings. In the process he hopes to encourage a new generation of "bugsters," a term he coined to describe amateur entomologists.

Acorn maintains that anyone can develop a passion for natural history regardless of the amount of time previously spent in nature. He believes that the most crucial skill associated with entomology is attention to detail and that this can be honed in many disciplines and areas of life. Acorn provides vivid descriptions of his sons' hobbies that support his belief in our innate love of life and living systems. He speaks of his eldest son's passion for trains and his practice of spending hours indentifying, photographing and cataloguing them, just as Acorn does with the insects he studies. Acorn also speaks about marveling at his youngest son's minutia in collecting pieces from the children's trading card game Pokémon, and cannot help but enjoy the coincidence that this game was inspired by inventor Satoshi Tajiri's childhood study of beetles.

The take-away message of Acorn's lecture is quite simple. Regardless of your motivations or specific interests, the most important step is to just get out into nature, observe and enjoy.

Jeffrey Manthorpe, Assistant Professor of Chemistry, looks on as Carleton students work in the Superlab.

High School Outreach spreads like wildfire

The Chemistry Department has had a very active high school outreach program for many years. In the 1980s, Ron Shigeishi, then chair of the department, made contact with local high school chemistry teachers and invited them to bring their classes to the campus for a half-day of activities. Since then, the program has grown to the point where this year we hosted 54 classes of 24 students each.

Two types of visits are available. The first consists of having the students do a first-year laboratory experiment in the Superlab and attend a regularly scheduled first year chemistry lecture. In between these two activities, students eat lunch in the food court, or if their teacher has arranged a campus tour, students are given a free lunch in the residence cafeteria. The second consists of the same laboratory and lunch, but the lecture is given by one of our faculty members on a more advanced topic. Teachers who choose the regular lecture option often do so because the topic reinforces something they are teaching in their classrooms, at that time. The teachers who opt for the more advanced lecture often do so because they want to expand their students' horizons.

Students appear divided on what is the highlight of their visit, but certainly the feedback is overwhelmingly positive! As news of this program, and of the Superlab, spreads across Ottawa we have arrived at the point where we cannot schedule any more visits during the academic year; definitely a nice problem to have!

Robert Burk
Chair, Department of Chemistry

Photo: Wade Hong

Tong Xu, Assistant Professor of Physics, in his state-of-the-art laboratory.

Physics showcases the spectrum of science

By Susan Hickman

This spring, physics researchers and students at Carleton are joining hundreds of others from around the globe at the European Organization for Nuclear Research (CERN), one of the world's largest scientific research laboratories, as its Large Hadron Collider (LHC) particle accelerator re-opens.

Carleton has been involved with the ATLAS experiment, which employs a 6000-ton detector 100 metres underground in the LHC tunnel, since 1998. Today, 14 faculty members, research associates and graduate students from the Physics Department are part of the ATLAS collaboration.

The project is one of a spectrum of scientific endeavours engaging Carleton's Physics Department, a department its chair, Pat Kalyniak, says is barely recognizable from several years ago.

Notes Kalyniak about the ATLAS research, "This is not just playing on the fringes. This experiment and the supporting theoretical work address questions identified by the global particle physics community as fundamentally important, such as understanding the origin of mass."

The Carleton ATLAS team was responsible for constructing components of the detector and now the group is perfecting its operation. Some team members are exploring ways to look for the Higgs boson particle, required for the study of the origin of mass; others are upgrading detectors for future LHC operation. For more on their work, see *www.physics.carleton.ca/research/atlas/*

"In November 2008," says Kalyniak, "we hosted Rolf-Dieter Heuer, now the director general of CERN, for the Herzberg lecture. Also, our PhD student Louise Heelan delivered a wonderful public lecture in May to coincide with the release of the film, *Angels and Demons*. With all this positive publicity about Carleton's researchers at the LHC, first-year enrolment in Carleton's Physics Department doubled this year over last."

About half of the department's faculty have joined since 2003.

Prof. Tong Xu's innovative work in medical physics is being advanced by the establishment of his research facility on image guided therapy and surgery techniques. The laboratory, renovated in January, includes a state-of-the-art X-ray imaging system and a 3-D real-time tracking system based on the novel positron emission-based tracking (PeTrack) technology.

Says Kalyniak, "Our medical physics group is an important component of Carleton's goal of establishing 'health' as a pillar of strength. This is physics applied to issues of human health and, through our Ottawa Medical Physics Institute, the group engages with the community."

Earlier this year, the department's medical physics doctorate program was the first in Ontario to be formally accredited by the Commission on the Accreditation of Medical Physics Educational Programs.

"Our Physics Department is at the forefront of innovation and engages students in research at the graduate and the undergraduate levels. We span the full range," Kalyniak says, "contributing to fundamental science projects and to issues of profound importance to human health."

For more on the Physics Department, visit www.physics.carleton.ca.

Chemistry professors don't believe in magic

By Daniel Reid

Science and magic are contrary subjects by their very nature. One's principal aim is to explain the nature of the world through experiments. The other relies on tricks and deception.

But a handful of Carleton professors are exploiting the unusual intersection between the two disciplines. They call it Chemistry Magic.

"These aren't research level experiments but they serve to demonstrate basic chemical principles," says Jeffrey Manthorpe, assistant professor of synthetic organic chemistry.

From making a small candy spontaneously combust to liquefying iron with a mixture of aluminum powder and iron oxide, the scientific stunts are aimed at igniting scientific curiosity in young minds.

"It's educational but it also has that wow factor," says Manthorpe of the annual show on Feb. 20. "We think it's important to have people excited about studying science."

Audience reactions say it all. From the opening moment, when a nitrocellulose stage curtain explodes in a giant fireball, people are in complete awe, says Manthorpe.

"At the end of the show we're just swarmed by kids and parents too. We've had kids actually come up and ask for our autographs."

The show of flames, explosions and colour changes will be back next year in mid-February. For more information, please visit *http://http-server.carleton.ca/~jmanthor/Magic_Show/Chemistry_Magic_Show.html*

A passion for the aquatic life

Photo: Dr Nigel Waltho

By Susan Hickman

Students analyze underwater data during a field trip course given by Nigel Waltho, Department of Biology.

It was surely inevitable that biology professor Nigel Waltho should end up running field trips to the coral reefs of the Caribbean Sea. On the one hand he has a passion for scuba diving, having grown up swimming competitively and earning his diving instructor license during his master's studies. On the other hand, he has an innate understanding of statistical ecology.

Waltho believes the combination of his experience as a scientific diver and his capabilities as a scuba instructor gave him the competitive edge he needed for the position. "I'm a natural to supervise students in a scuba diving environment," Waltho notes. "My passion is teaching and I enjoy taking students on these field trips."

Waltho, who teaches ecology and conservation biology, takes up to three dozen biology students from various Ontario universities, including Carleton, to the Bahamas and Cuba every year. The co-operative program involves biology faculty from 13 universities across the province. Students have a plethora of choices, from the study of wetland and waterbird ecology at Long Point, Ontario to the exploration of human effects on aquatic environments in China.

For two weeks every May, Waltho's tropical research program lands students of zoology, ecology, botany, limnology or marine biology at the University of Havana Field Station on Cuba's south coast, where they get up close and personal with crabs, corals, coral diseases, coral reef fish, sea urchins or brittle stars, depending on the project proposals they submit to Waltho.

"For the first few days, students are concentrating on learning the species and how to collect the data. It's a huge learning curve," Waltho explains. "Once they settle down, they focus on collecting the data for their particular project."

The students dive or snorkel mornings and afternoons, and participate in statistical workshops and presentations during the evenings. Once they return to Canada, they have a month to analyze their data and write a final paper.

At the end of December, Waltho takes another group of students to the Cape Eleuthera Institute in the Bahamas to study sustainable aquaculture on the shoreline, the mangrove habitats and the coral reefs.

"The prerequisites for my field courses are tough," notes Waltho, "because of the research angle I require. Students must have some statistical background and be able to think ecologically."

Waltho began his career as a statistical ecologist after completing his doctorate in marine biology at McMaster University in 1998. While he was studying freshwater fish for his thesis, he worked as an assistant teacher in Jamaica. During his last year of studies, he switched his focus to his Jamaican work on coral reefs.

"My original PhD work is still sitting in the computer," Waltho laughs. "It was too complex to do the data analysis without the software capabilities we have today. Now I'm involved in coral bleaching events due to global warming."

As he tallies the data collected by his students during their field trips, Waltho is comparing information about coral, algae and fish in Cuba and the Bahamas. In Cuba, for example, hurricanes have swept right over his research site, leaving behind valuable data for his examination of the effects of storms and bleaching on the reefs.

While Waltho says he still needs several years' worth of data before he can report substantial findings, he is already making some hypotheses.

"In Cuba, the algae have been set back by the hurricanes. In the Bahamas, where it is more stable and the system is more mature, the coral reefs are more algae covered. We are also seeing an invasion of the venomous lionfish, which are impacting the fish assemblages. The lionfish is endemic to the western Pacific, but we think they escaped from the aquarium tanks at the Atlantis Resort, and now they are expanding rapidly across the Bahamas into Jamaica and Cuba.

"We expect to see consequences of these lionfish in the Caribbean," Waltho says. "Having long-term data over 20 to 30 years will provide a better grasp of how these ecosystems respond to new species of fish, bleaching, hurricanes and global warming, and perhaps lead to better management."

Passion, High Expectations and Math Phobia

An insight into the mind of mathematic mentors

By Kristelle Lapointe

About 20 years after the creation of the Math Tutorial Centre (MTC) I sat down with David Thomson, Lidia Nikitina and Huda Masoud, three of the many mentors involved with the Centre. David, Lidia and Huda are all graduate students with the School of Mathematics and Statistics and jointly, they have about nine years of experience tutoring students in mathematics.

When tutoring, it is important to be passionate about the subject matter and these three students are certainly passionate. According to Lidia, while their involvement with the MTC is considered a part of their TA charge, it certainly isn't a chore. "Through tutoring with the MTC, it is easier to form a close knit relationship with students," Lidia says. "Really, the biggest challenge" interjects Huda, "is motivating the students to come to the Centre and get the help they need! "" Once they are here", adds David, "the key element resides in breaking down their *math-phobia*, since the majority of students are often especially afraid of starting the resolution of a problem." Lidia agrees: "We say, just start the problem, you'll see, you already have all of the tools to solve it."

Another challenge the mentors face in the variety of topics students inquire about. "As they say, *you never really learn something until you teach it*" says David. Huda quickly explains that "because each TA has a different field of expertise, it sometimes makes it harder to help a student. However, we can always refer the student to another TA in the MTC, if we feel that our explanation was incomplete". She adds that the students are rarely the ones who have the highest expectations since the mentors are often their own worst critics: "No one likes to not know the answer. When you are mentoring, you feel like it's your job to know and to explain it to the students". "Another important part of mentoring students", says David, "is to know when you just don't know the answer; it's to have the confidence to say: I don't know, let me ask another tutor."

When asked about their future projects, the three mentors' faces light up. While Huda would love to analyze health data for industry, she definitely isn't counting out teaching of the equation. David and Lidia would both love a career doing research and teaching in academia. Lidia adds excitedly that "while teaching is different than tutoring, what I am doing now helps me put some perspective into what students have difficulty grasping during lectures, and which concepts are easier to understand. I really feel that I will be able to use this experience when preparing lectures".

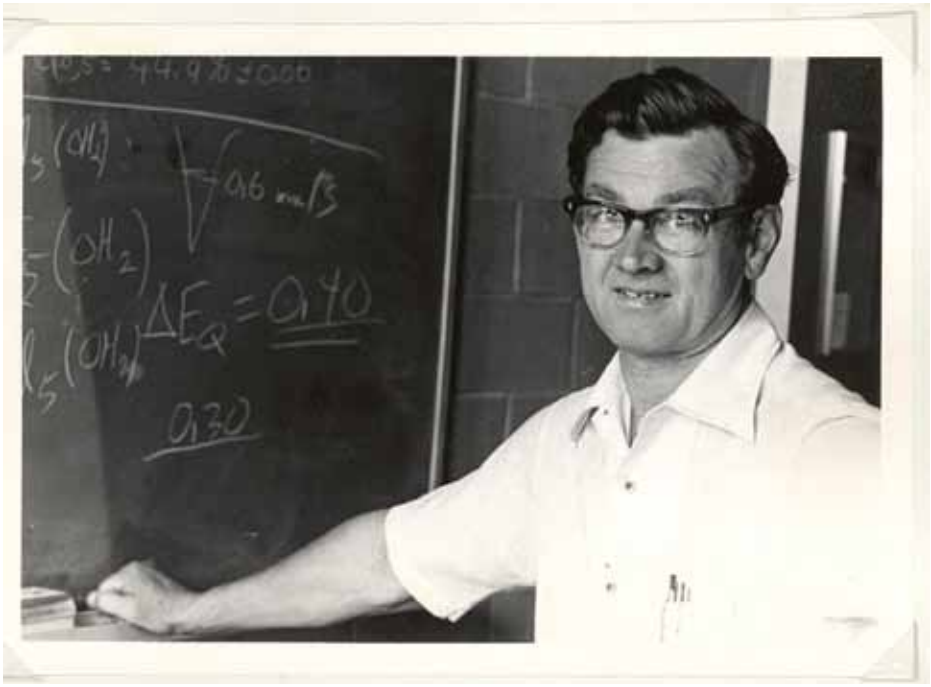
Dr Fong Retires

By Kristelle Lapointe

Dr Che-Kao Fong retired from the School of Mathematics and Statistics in July 2009. Dr Fong received his Ph.D. in 1976 from the University of Toronto and joined Carleton's School of Mathematics in 1987. Dr Fong was always a very dedicated researcher, his main area of expertise being Mathematical Analysis and specifically Functional Analysis and Operator Theory, and he has made significant contributions to the Faculty of Science during his career.

A vast number of School committees benefited immensely from his expertise and wisdom. Dr Fong was also very involved in curriculum development and played an integral role in the creation of popular new courses such as MATH 3002. Thanks to his broad expertise, spanning across many mathematical disciplines, he has taught a wide range of courses at all levels, and has been a tremendous graduate mentor during his industrious career.

Written with contribution from Dr Dave Amundsen, School of Mathematics and Statistics



Don Wiles teaches in Steacie Building in September 1968.

Connected

By Steve Trites

Since joining the Faculty of Science in September of last year, I've had the pleasure of meeting a number of people who are amazingly dedicated to the success of our programs and students. The pages of *EUREKA!* are full of stories of faculty members and students who fall into this category. I'm particularly inspired by people I've met who have made our Faculty one of their philanthropic priorities. These are alumni, retirees and other friends who are passionate about the work being carried out by our researchers and students who choose to donate time, professional expertise, advice, mentoring, funds and other resources to enable the Faculty and the University to reach its goals.

I met Dr Don Wiles and his wife Billy at a lecture on campus one night in the fall of 2008. I had no idea at the time that this man was about to celebrate his 50th anniversary at Carleton, or that he was such an institution on campus. We were too busy discussing our shared Nova Scotian heritage to get into much else. As I've gotten to know Don, I've since learned that he has served Carleton in many important ways over the years. He has done everything from chairing the Department of Chemistry to being a member of the University Senate to being the inaugural President of the Carleton University Retirees' Association. In his retirement, Don has also continued to teach undergraduate chemistry courses and has worked hard to connect Carleton to the community through his weekly "Almonte Lectures." This lecture series is open to the public and presents a variety of academic lectures, often by Carleton professors, near Don's home in the town of Almonte.

Don, along with friends and colleagues, has also endowed three separate student awards in his name that benefit students in Chemistry, Biology, Earth Sciences, Physics and Environmental Science. A fourth prize to reward excellent student demonstrators and teaching assistants in the first year Science laboratories was also endowed in his honour in 2006, on the occasion of his 80th birthday. A few years ago, Don even wrote a *History of the Department of Chemistry* to ensure that the wisdom gained during the University's formative years would not be lost.

I'm not sure that I'll ever get a full sense of Don's innumerable contributions to the development of the Department of Chemistry, the Faculty of Science or the University, but knowing that he arrived as an Assistant Professor of Chemistry in the fall of 1959—before we even had a campus!—and continues to teach, mentor and encourage students 20 years into his role as Professor Emeritus speaks of his enormous lifelong commitment to our institution. There is no question that we are all much richer as a result of his contributions.

Steve Trites is the Senior Development Officer for the Faculty of Science. He matches the philanthropic interests of alumni and friends to the Faculty's advancement priorities. To connect with the Faculty and explore ways to contribute to its development, contact Steve at 613-520-2600 x 1052 or Stephen_Trites@carleton.ca.

Moving on

A wind of change is sweeping through the Office of the Dean of Science.

Former Dean of Science, George Iwama, announced his departure in the spring of 2009, in order to accept the position of President at the University of Northern British Columbia. Associate Dean (Undergraduate Affairs) John Armitage graciously agreed to serve the Faculty as Interim Dean during this time of transition. The search for a new Dean of Science is currently underway.

More recently, Dr Naomi Cappuccino, Assistant Professor in the Department of Biology, joined the Office of the Dean of Science in the position of Associate Dean (Undergraduate Affairs) as Dr Armitage's replacement.

Dr Mark Forbes, the Associate Dean (Research), accepted the position of Carleton University's Associate Vice President (Research). Dr. Forbes, who is a professor in the Department of Biology, and Canada Research Chair of Ecological Parasitology and Wildlife Health is being replaced by Dr Prosenjit (Jit) Bose, Full Professor in the School of Computer Science, and Dr Patrick Morin, Associate Professor in the School of computer Science, who stepped in to the position as (Acting) Associate Dean (Research).

Faculty "frosh"

By Kristelle Lapointe

A leader in discovery and innovation, the Faculty of Science is committed to ensuring an outstanding learning experience for its students. Here's what the newest tenure-track teachers and researchers in our dynamic faculty are working on.

Wayne Horn joined the School of Mathematics and Statistics as a Term I Instructor in September 2006 and was confirmed in January 2010. As the Math Tutorial Centre director, which he has been since 2007, he is responsible for the scheduling and monitoring of 30 to 40 TAs each semester. In 2007, he was awarded a Faculty of Science Teaching Award for the 2007-2008 school year. As the Chair of the Recruitment Committee since 2008, Wayne Horn is proud of the committee's accomplishments and of the steady increase in enrollment.

Farah Hosseinian joined the Department of Chemistry in July 2009 as an Assistant Professor. Her research discipline is Food Chemistry and Food Functionality; she employs many aspects of food chemistry principles to understand the relationships between chemical structure and function in living organisms. Her laboratory is focused on extraction and characterizing the mechanisms of antioxidant activity of two major bioactives, alkylresorcinols (ARs) in cereal bran and melatonin in sour cherries, in food and biological membranes in vitro. She is also interested in prebiotics activity of cereal bran, berries and sour cherries.

Photos: GradTrak

Christine Laurendeau completed her PhD in Computer Science at Carleton University in 2009 and subsequently, joined the School of Computer Science in July of that year, as an Instructor I. Between 1989 and 1997, she worked as a software researcher and designer in the high tech industry, for Bell Canada, SHL Systemhouse and Nortel Networks. She has also created an assignment series entitled *The Tortoise Chronicles* in a way to engage students in the task of implementing C++ programming for a purpose. Her research interests include Wireless Security, Vehicular Communications, Wireless Access Networks, and Wireless Communication.

Gabriel O. Sawakuchi joined the Department of Physics as an Assistant Professor in April 2010. He heads the Radiation Dosimetry Laboratory, which he created and brought over to Carleton University. His research in medical physics focuses on radiation measurements of therapeutic x-ray, electron, proton and heavy-ion beams, aiming on developing and establishing new, reliable and cost-effective dosimeters in the clinic and Monte Carlo simulations of proton and heavy-ion therapeutic beams (hadron therapy), aiming on determining current limitations and uncertainties, and further developing the field of hadron therapy.

Kudos from Carleton

By Kristelle Lapointe

It is with pride that the Faculty of Science presents its 2009 recipients of Carleton's annual Teaching and Research Achievement Awards and of the Faculty of Science's own Teaching Awards.

Ashkan Golshani, Associate Professor in the Department of Biology; Nicola Santoro, Professor in the School of Computer Science and Brett Stevens, Associate Professor in the School of Mathematics and Statistics were each awarded the Carleton University Research Achievement Award.

Dwight Deugo, Associate Professor in the School of Computer Science was awarded the Carleton University Teaching Achievement Award for his teaching development project proposal titled *iPhone development camp*. Eric Hua, from the School of Mathematics and Statistics, was awarded the Excellence in Teaching Sessional Lecturer Awards on the basis of his methodological teaching strategies and his dedication to education and to his students.

The Faculty of Science Teaching Awards were awarded to the four following faculty members: Jeff Dawson, Assistant Professor in the Department of Biology; Maria DeRosa, Assistant Professor in the Department of Chemistry; Manuella Vincter, Associate Professor in the Department of Physics; and Nigel Waltho, Instructor II in the Department of Biology

Congratulation to all recipients!

Science hosts the best and brightest

By Kristelle Lapointe

The Faculty of Science had the pleasure of hosting a variety of events and lectures during the academic year 2009-2010.

Dr Alfred Bader, internationally acclaimed research chemist, art collector and philanthropist, gave a public lecture entitled "Richard Anschütz, Archibald Scott Couper and Josef Loschmidt: A Detective at Work", on August 18th. This lecture examined how scientific contributions of Couper and Loschmidt might have disappeared into obscurity without the help of Richard Anschütz. For more information on Dr Bader, please visit *http://www.alfred-bader.cz/index.html*

The inaugural Sir William Osler lecture was held on September 23, 2009. Guest lecturer, Dr Michael Bliss, University Professor Emeritus at the University of Toronto and one of Canada's most distinguished medical historians gave a compelling lecture, "William Osler: Disease, medicine and the human condition". This lecture series draws public attention to historical and continuing problems of prejudice and ignorance that often accompany social attitudes towards different kinds of illness and disease. For details on the 2011 lecture event, please visit the following link in late August, *http://www.carleton.ca/science/*

At the Herzberg Lecture, which emphasizes the relationship between science and society, Dr Andrew Pullin, from the University of Bangor, discussed the importance of building an evidence-base for environmental policy and procedures. The Herzberg Lecture is held every fall. For the 2010 speaker and event details, please visit the following link in October, *http://www.carleton.ca/science/*

At the Discovery Lecture, annually held in February, members of the audience were transported into the world of natural history. University of Alberta's John Acorn and Carleton's own Mike Runtz enthralled audiences with an intimate lecture. For the 2011 speaker and event details, please visit the following link in January 2011, *http://www.carleton.ca/science/*

In February 2010, the Faculty of Science had the pleasure of hosting Dr. Ciprian Buzna, of "Vasile Goldis" University of Western Romania, for an interesting talk on the Productivity of Grasslands in Central Europe and more precisely on Romania's Banat Plain, The Faculty of Science is looking forward to a continuing partnership with "Vasile Goldis" University of Western Romania.

Photo taken by John W. MacDonald

Interim Dean John Armitage presented Dr Goodall with a marmite hors d'oeuvre, at a pre-lecture reception hosted by the Faculty of Science.

Dr Jane Goodall visits Ottawa

By Kristelle Lapointe

Many events were held in the Faculty of Science during the 2009-2010 academic year, as you can see below. It is part of the faculty's mandate to host renowned specialists in varied fields, and to give our students the best exposure possible to world-renowned researchers.

In April 2010, the faculty co-sponsored, along with the Faculty of Arts and Social Sciences and Ottawa's International Writer's festival, a lecture given by Dr Jane Goodall, "Hope for Animals and Their World " at which nearly 1000 members of the Ottawa community were present for the sold out event. In the 50th anniversary year of her research into the behaviour of chimpanzees, Dr Goodall reflected on the meaning of the past five decades from the incredible insights her research has offered into our closest animal relatives to the extraordinary changes the world has seen since 1960, for people, for animals and for the environment.

What a great way to conclude the academic year!

Written with contribution from the Jane Goodall Institute of Canada

Want more news?

The latest news and events can be found at *carleton.ca/science/*. For news that comes to you, subscribe to Explore Science @ Carleton University, our weekly newsletter. To do so, simply email *odscience@carleton.ca* with "Subscribe to Explore Science" in the subject line and your name and preferred email address in the text.

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