



*Dr. Juan Ausio and Dr. Chris Nelson inspecting an autoradiograph of acetylated chromosomal proteins (histones). Histone acetylation is an important part of the epigenetic code.*

*Photo: K. Hollefreund*

The Department of Biochemistry and Microbiology has a growing nucleus of epigenetics researchers. **Dr. Juan Ausio** studies the histone proteins that assemble DNA into chromatin, seeking to understand how modification to these proteins regulates gene expression. Ausio was among the first to realize that modifications to histones constitute an epigenetic code that helps to turn genes on and off. This year the department welcomed **Dr. Chris Nelson**. Nelson is interested in how a simple structural modification to the amino acid proline alters the function of DNA binding proteins. Their research is aided by the work of a third member of the department, **Dr. Christoph Borchers**, Director of the University of Victoria – Genome BC Proteomics Centre. Borchers has developed novel methods to study epigenetic modification of chromatin using mass spectrometers.

In January, Nelson and Ausio will start to offer a new undergraduate course in epigenetics (BIOC 408). This is one of the first such courses in Canada, and will provide undergraduates with an excellent foundation in this important field, taught by faculty who are passionate about the subject.

## What is Epigenetics?

If you think identical twins are identical, think again. They may have the same genes, but they don't have the same epigenetics. The fundamental concepts of molecular biology are well known to the public and most people can explain what genetics is, however few could readily explain what is studied in the field of epigenetics.

Epigenetics is the study of heritable traits that do not involve changes to the DNA sequence. Cells precisely regulate which of the thousands of genes in the genome are expressed at any time and often it is chemical modifications to DNA or the proteins that make DNA into chromosomes that are critical to this process.

From the time we are born, the food we eat and the emotions we feel start to change our DNA. Methyl groups are added and subtracted and the composition of the histone proteins which blanket the DNA changes, modifying the way our genes, and thus our bodies, function.

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## MESSAGE FROM THE ACTING DEAN



Claire Cupples, Ph. D.

### Herding Cats

As UVic alumni, you know all about our excellent degree programs, dynamic lab courses, great co-op jobs, modern facilities and world-class research. What you may not appreciate is the amount of hard work that takes place behind the scenes to attain and maintain this excellence and to build for the future. The degree to which this happens depends in large part on the management and leadership skills of department Chairs.

The job of Chair is commonly considered the hardest job on campus. On top of the day-to-day management details - just making sure the paperwork gets done - he or she is also the front line responder for all the problems that plague students, faculty and staff.

Plus, a good Chair must be a good leader, with a clear vision for the future of the department. That's where the real test lies. Getting independent-minded faculty and staff to buy into a common vision has often been referred to as "herding cats". Gone are the days when a curmudgeonly Chair could bristle and lay down the law. UVic, like most universities today, practices collegial governance: decisions are made as much as possible in a democratic manner. Therefore today's Chairs need lots of people skills; they must be positive, upbeat and inspiring. Oh, and they have to have stamina if they are to do all this and keep their own research and teaching going.

Fortunately, Chairs in the Faculty of Science, former, ongoing and new, are up to the challenge. Importantly, they also have first-rate staff to keep their heads above water and their feet on the ground. If you are on campus, take a moment to thank the outgoing Chairs for their service, congratulate our new Chairs - and wish them luck in their cat herding.

### Summer at Bamfield

More students than ever attended Bamfield this summer. We've made big changes to our web presence at [www.bms.bc.ca](http://www.bms.bc.ca), where you can catch up with all the class experiences of the summer and fall.

For the first time we had a *Scientific Filmmaking* course taught by Dr. Colin Bates, a perennial instructor, and Jeff Morales, who has several National Geographic credits. Screening of the class projects at the *Bammies* award ceremony was great fun. Next year, we will combine *Scientific Filmmaking* with a course in Science Journalism taught by Bob Holmes of New Scientist Magazine.

*Models in Ecology* is the first math course to be taught at BMSC. Dr. Mark Lewis and Dr. Marty Krkosek from the University of Alberta are introducing students from undergraduate to postdoc to these invaluable tools. Ecologists from Europe and as far as New Zealand clamoured for access to this course. The dining hall conversations are a little different, but the excitement is the same.

If you are unable to visit us in Bamfield, visit our website. We invite alumni to contact us. Share your memories at [www.bms.bc.ca/alumni/index.html](http://www.bms.bc.ca/alumni/index.html)

### Tom Pederson leaves Dean's job for PICS

As Dean of Science, Tom Pedersen has led the Faculty of Science with energy, skill, dedication and vision for the last five years. On September 1, he became the first permanent Director of the Pacific Institute for Climate Solutions here at UVic. The Faculty will miss him, but at the same time looks forward immensely to working with him in his new role. Good luck, Tom!



Photo: Cathy Reepinski

Dr. Alexandre Brolo, Dr. Robin Hicks, and Dr. Scott McIndoe.

### Chemists Stage NSERC Coup

Three faculty members in the Chemistry Department - Dr. Alexandre Brolo, Dr. Robin Hicks, and Dr. Scott McIndoe - have each been awarded an NSERC Discovery Accelerator Supplement (DAS). The DAS Program provides substantial and timely resources to outstanding researchers who have star potential in their respective area of research. Valued at \$120,000 over three years the supplement allows recipients to compete with the best in the world.

Out of over 2,200 eligible researchers across Canada, only 100 received DAS awards this year. Only seven of these were given to Chemistry faculty across the country, so three in one department is a major coup! Congratulations to Drs. Brolo, Hicks and McIndoe and their research teams for this fantastic recognition of their potential!



## Geoscientist recognized for bringing Earth Science to schools

If you are interested in sharing your passion for science with school children, UVic geoscientist Dr. Eileen Van der Flier-Keller is your role model. Van der Flier-Keller was drawn to science outreach while her children were young, and she noticed many elementary school teachers were hesitant to teach science. "I think they are scared of all the names. In all sciences, the amount of vocabulary is daunting," she says. She wrote "The Pebble Guide" so that students could lay it out on a beach or near a stream and discover the vocabulary for themselves.

The Pebble Guide is part of *A Field Guide to the Identification of Pebbles*, published in 2006. A regular on the Canadian Best Sellers list in the Paperback Non-Fiction category and in Canadiana, it has topped the Children's Best Seller List in B.C. since 2007. This summer, the Geological Association of Canada awarded her the E.R. Ward Neale Award for outstanding efforts in sharing Earth Sciences with Canadians, truly a remarkable achievement for a geologic text.

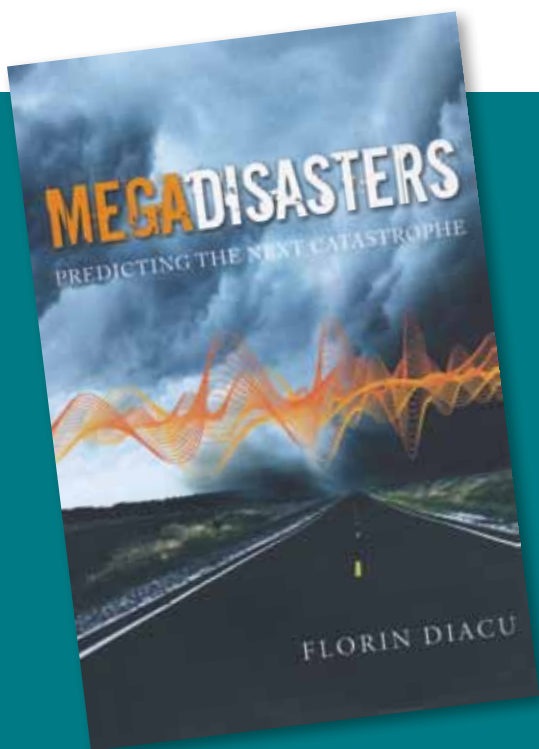
"The Pebble Guide" is just one example of the type of learning resources Van der Flier-Keller has developed for schools over the last twenty years. She also published the popular South Vancouver Island Earth Science Fun Guide in 1997, and from 2002 to 2008 she led EdGEO, the National Earth Science Teacher Workshop Program and teaching arm of the Canadian Geoscience Education Network. Under her direction, EdGEO developed interactive Earth Sciences exercises, which members presented to over 1,500 teachers in workshops, benefiting over 750,000 students across Canada. They also created posters and teachers' guides.

Now, Van der Flier-Keller has joined Dr. Larry Yore from UVic's Faculty of Education to co-direct Pacific CRYSTAL, an NSERC project that brings together teachers and community educators, education researchers and scientists from all disciplines to promote science literacy in B.C.



Photo: Geraldine Cavallin

Dr. Eileen Van der Flier Keller shares Geoscience with elementary schoolchildren.



## Megadisasters

The Indian Ocean tsunami of 2004 claimed 240,000 lives, Hurricane Katrina killed more than 1,800 people and the recent global financial crisis has cost billions in losses for corporations and ordinary citizens around the world. Throw in earthquakes, volcanic eruptions, sudden climate changes, impacts with comets or asteroids, and deadly pandemics and there is a lot to worry about. Will we ever be able to predict catastrophes such as these? If you want to know the answer, ask UVic Mathematics professor Dr. Florin Diacu. His book, "Megadisasters: The Science of Predicting the Next Catastrophe," will be published this fall by Princeton University Press in North America and Oxford University Press in the rest of the English-speaking world. Its narration traces the history of scientific prediction and shows how the experts struggle to foresee approaching catastrophes, dodge them if possible, or minimize the damage they produce.

*Megadisasters* by Dr. Florin Diacu



Orion Nebula

## Searching the Skies

One of the easiest constellations to spot in the night sky of the northern hemisphere is Orion, the hunter. UVic alumna Rita Mann (B.Sc. 2004) has been hunting around in Orion using a high-powered telescope facility on Mauna Kea, Hawaii, as part of her Ph.D. research at the University of Hawaii. What she has found is massive circumstellar disks associated with two stars which are gravitationally locked in a binary system.

The disks are flattened distributions of gas and dust particles that surround the young stars. It was the faint glow from dust particles in the disks heated by the host stars that revealed the disks' presence to her high-frequency radio observations. Mann was able to use the brightnesses of the disks to estimate their masses, and to demonstrate that they have not been disrupted by winds and radiation from the nearby, extremely bright young stars in the Orion Nebula. These disks in fact may be massive enough to form planetary systems similar to our own. Since such systems make up about half the stars in our Galaxy, this discovery also potentially increases the possible number of planets in our Galaxy. Mann has recently returned home to Victoria and expects to defend her Ph.D. dissertation in early 2010.

- Dr. James Di Francesco  
Herzberg Institute of Astrophysics

## FACULTY NEWS

The Faculty of Science will welcome new Department Chairs in Biology, Chemistry, Mathematics & Statistics, and Physics & Astronomy during this academic year. Profiles on our new Chairs will be featured in the spring edition of Science Matters.

### Congratulations to:

Dr. Penny Coddling of Chemistry, the 2008/2009 recipient of the Faculty of Science Award for Excellence in Teaching and to Dr. Sara Ellison, recipient of the Award for Excellence in Research for 2008/2009.

Assistant Professor, Dr. Geoff Steeves, Physics & Astronomy for making it to the top 16 candidates in the Canada Space Agency's National Astronaut Recruitment Campaign.

Dr. Eileen van der Flier-Keller of the School of Earth & Ocean Sciences received the E.R. Ward Neale Award from the Geological Association of Canada for her work in sharing Earth Sciences with Canadians.



Were you or someone you know involved in Science Venture?

In 2010, Science Venture turns 20! Please contact [sciealum@uvic.ca](mailto:sciealum@uvic.ca) with your stories and photos as a camper, instructor or parent.



University  
of Victoria

FACULTY OF SCIENCE  
Elliott Building, Room 166  
University of Victoria  
PO Box 1700 STN CSC  
Victoria, BC, Canada V8W 2Y2

Telephone 250-472-4210  
Fax 250-721-8676  
Email: [sciealum@uvic.ca](mailto:sciealum@uvic.ca)  
Web: <http://science.uvic.ca>

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