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CERC Newsletter for University Communicators

This bimonthly newsletter for university communicators allows us to better promote your Canada Excellence Research Chairs (CERCs), and to share communications successes and best practices at your respective institutions. If your CERC is being featured in the media, publishing new findings or participating in an event, we encourage you to send details to michael.adams@sshrc-crsh.gc.ca.

Babin and Messaddeq host fourth annual meeting of CERCs at Université Laval

In April, Marcel Babin, CERC in Remote Sensing of Canada's New Arctic Frontier, and Younès Messaddeq, CERC in Photonics, co-hosted all 19 chairholders at the fourth annual meeting of CERCs, at Université Laval. Marie-Hélène Forget and Debra Christiansen-Stowe provided exceptional organization and support for the event. The meeting format was expanded to two days, and featured lectures and presentations, meetings, and networking opportunities. The 2015 annual meeting is to be held at the University of Waterloo.

Houghton publication shows how HCV antiviral binds to protein

In April, Michael Houghton, CERC in Virology at the University of Alberta, co-authored a publication describing how the most potent HCV antiviral ever developed—daclatasvir—binds to its target HCV protein, NS5a. While it had long been known that the drug's target was the protein NS5am, no one had known the detailed binding mode. Houghton's computational binding model has explained the known variation in activity against different HCV genotypes, enabling the researchers to rationally design new drugs that are active against daclatasvir-resistant HCV strains, and to file a patent application.

Gardner's team maps shellfish, for safer seafood

More than 70 per cent of the mussels eaten in North America come from Prince Edward Island. If infectious disease broke out, any investigation would have to trace the infected product's movements, as well as find the source of the infection—a difficult thing to do after the fact. Ian Gardner, CERC in Aquatic Epidemiology at the University of Prince Edward Island, and his team have worked with



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shellfish harvesters and industry groups to create a “network analysis– a map plotting the movement of shellfish from producer to market. They have also identified hotspots of high movement to target for future surveillance. The project is in partnership with Fisheries and Oceans Canada; the Canadian Food Inspection Agency; PEI’s Department of Fisheries, Aquaculture, and Rural Development; and PEI shellfish industry groups.

Diatchenko’s book provides guide to the art and science of studying pain

Luda Diatchenko, CERC in Human Pain Genetics at McGill University, has co-edited a new book providing readers with an overview of the current state of pain research. *Pain Genetics: Basic to Translational Science* explains the patterns and thresholds of pain for different people, and why pain– in small measures–can be a valuable tool that communicates information about injuries, illness and danger.

Rysgaard launches 2014 Arctic Science Partnership field campaigns

Researcher teams from the Centre for Earth Observation Science at the University of Manitoba have headed north to join collaborators in two major Arctic Science Partnership research initiatives. Under the leadership of Søren Rysgaard, CERC in Arctic Geomicrobiology and Climate Change, the Young Sound campaign started operating from Daneborg and the Zackenberg Research Station, on Greenland’s northeast coast (74°N). See Rysgaard’s campaign [blog for more information](#). The [Ice Covered Ecosystems–Cambridge Bay Process Study](#), meanwhile, will be run from Nunavut’s Dease Strait. The interdisciplinary campaigns will provide new insights into the regulation of atmosphere-snow-ice-land-ocean processes, their seasonal and geographical distribution, and how they vary over geological time.

Wheater releases key Saskatchewan groundwater report

Howard Wheeler, CERC in Water Security at the University of Saskatchewan, recently released *Groundwater, Hydrogeology and Sustainability in Saskatchewan*, a Global Institute for Water Security-commissioned report based on extensive consultations with government, industry and academic sectors in Saskatchewan. The report was written by Denis Peach, retired chief scientist of the British Geological Survey. Its specific recommendations include auditing and co-ordinating the currently fragmented groundwater science base, developing new research and assessment guidelines to ensure sustainable development practices, and creating training opportunities to meet the growing need for expertise in groundwater management.



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Boyd organizes “Ultrafast Lasers and Applications” summer school

Robert Boyd, CERC in Quantum Nonlinear Optics at the University of Ottawa, has continued his annual tradition of organizing a week-long summer school for graduate students and postdoctoral fellows in the photonics community. The theme for the 2014 summer school was “ultrafast lasers and applications.” Numerous international leaders in fundamental and applied aspects of the field acted as special guest lecturers. Each day included four to five 90-minute talks on selected themes, which were developed from basic principles to advanced research topics, and a public lecture from an internationally renowned keynote speaker.

Wallace leads Canadian push to join research consortium

Canada has been invited to join AtlantOS, a large European consortium bidding for up to €20 million from the European Union’s (EU) Horizon 2020 program to establish the Atlantic Ocean’s first integrated ocean observation system. The bid for Canadian participation in the Integrated Atlantic Ocean Observing System was led by the Marine Environmental, Observation, Prediction and Response Network (MEOPAR), under the directorship of Douglas Wallace, CERC in Ocean Science and Technology at Dalhousie University. “It’s a great opportunity and, for MEOPAR, a great challenge. There’s potentially high benefit to accessing EU expertise and equipment, as this information is highly relevant to Canada,” said Wallace.

Reulet tours Europe with quantum light bulb

Bertrand Reulet, CERC in Quantum Signal Processing at the Université de Sherbrooke, undertook a three-stop tour of the European lecture circuit to talk about his research into quantum electromagnetic fields. In May, Reulet spoke at the Universität Konstanz in Switzerland, the Swiss Federal Institute of Technology Zürich, and the Polish Academy of Science. Reulet’s lecture was “The quantum light bulb—how to generate quantum electromagnetic fields with a normal conductor.” In it, he demonstrated the existence of “squeezing” (the ability to shrink fluctuations below that of vacuum) and the emission of pairs of entangled photons—a key property for using light for quantum information science.

Messaddeq gives keynote at Smart Cities conference

Younès Messaddeq, CERC in Photonic Innovations at the Université Laval, gave a keynote speech at the 1st International Summit for Smart Cities in North-Africa 2014. Held at the Al-Akawayn University in Ifrane, Morocco, the summit provided a unique opportunity to exchange ideas on improving urban life



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in an era where technological innovation is changing the ways in which cities are governed and citizens, businesses, and public institutions interact. Messaddeq provided an overview of his research as a CERC, and explained how communication technologies and optical fibres are needed to meet the growing economic and business needs of smart cities everywhere in the world.

Wallace awarded Hutchison Medal

This spring, Douglas Wallace was awarded the Institution of Chemical Engineers Hutchison Medal, for his collaboration with academics from the United Kingdom, Japan, Germany, France, Ireland, Canada, New Zealand and Australia, on a paper published in the journal *Process Safety and Environmental Protection*. The paper, "Ocean Fertilisation for Geoengineering: A Review of Effectiveness, Environmental Impacts and Emerging Governance" shows that ocean fertilization using iron can increase the uptake of carbon dioxide across the sea surface, and could be one of a suite of tools to combat climate change.

Gardner's research contributes to salmon debate

Ian Gardner's research was featured in a May 2014 segment on CNN's *60 Minutes*, which highlighted the ongoing debate about potential detrimental effects of farmed Atlantic salmon on the health of British Columbian Pacific salmon populations. Gardner said that, while evidence indicates that pathogenic microbes pass both ways between these salmon in the marine environment, how greatly microbes affect the health of wild salmon is poorly understood. Gardner's team is collaborating with the Department of Fisheries and Oceans in Nanaimo to detect 45 potentially pathogenic microbes, and to evaluate data over time and space, based on pathogen surveillance studies of farmed and wild salmon in B.C.

Roth explains how baker's yeast helps us understand drugs

Frederick Roth, CERC in Integrative Biology at the University of Toronto, has recently demonstrated how baker's yeast provides scientists with a better understanding of drug interactions in humans. Roth and his colleagues have been testing drugs on the simple yeast *Saccharomyces cerevisiae* (also known as "baker's yeast"), since there is a common genomic ancestry between humans and yeast. "Many aspects of yeast and human genomes have remained the same since they diverged from a common ancestor around one billion years ago," he said. "When a specific combination of drugs has a surprising effect on yeast growth, there is no guarantee that it will do the same thing to human cells. But, it does give us a general idea of how often drugs are able to enhance or suppress each other's effectiveness."



Owen ponders ethics of neuroimaging after serious brain injury

Adrian Owen, CERC in Cognitive Neuroscience and Imaging at Western University, has co-authored a publication investigating ethical issues in using neuroimaging in behaviorally nonresponsive patients who have suffered serious brain injury. Following a coma, some patients recover well, while others progress into a vegetative or minimally conscious state. Assessing coma patients is difficult, and depends on subjective interpretations of observed behaviour. Neuroimaging may improve diagnosis and prognostication in these patients, and has been used to communicate with vegetative and minimally conscious patients, raising the prospect of involving them in decisions regarding their care. These techniques are beginning to be applied to comatose patients soon after serious brain injury. Evidence of preserved cognitive function may predict recovery, and could be valuable to families weighing the continuation of life-sustaining therapy. This raises complex ethical issues relating to the vulnerability of patients and families, difficulties in interpreting negative results, restrictions in communicating through “yes/no” answers, and costs.

Van Cappellen delivers keynote at Canadian Science Writers' conference

Philippe Van Cappellen, CERC in Ecohydrology at the University of Waterloo, was invited to give the keynote presentation this June at the Canadian Science Writers' Association annual conference in Toronto. Van Cappellen's lecture, “A Hitchhiker's Guide to Global Water Issues,” provided a broad overview of current and emerging global water issues, stressing the central importance of water not only for human well-being and prosperity, but also for maintaining healthy ecosystems.

Boyd's CERC group sends eight speakers to Photonics North

Robert Boyd's CERC group had a large presence at the 2014 [Photonics North](#) conference in Montréal. The conference focused on the latest scientific developments in photonics. Seven graduate students gave well-attended presentations in quantum photonics and nanophotonics. In addition, group member Ksenia Dolgaleva chaired a session on opto-electronics and integrated optics, and gave a talk on hunting down microscopic, cascaded nonlinearity.





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Diatchenko in demand on the lecture circuit

Luda Diatchenko has given a number of international lectures over the past couple of months, including at the World Forum for Spine Research in Xi'an, China; the American Pain Society in Florida; the SIMPAR (Study in Multidisciplinary Pain Research) conference in Rome, Italy; and the Canadian Pain Society annual meeting in Quebec City. In addition, Diatchenko was invited to give a presentation to Clontech Inc. on "Translational Studies in the Genomic Era: Persistent Pain Conditions." She will also be attending the 15th World Congress on Pain, in Buenos Aires, Argentina: and the International Narcotics Research Conference 2014, in Montréal.

Diatchenko approved for Center for Inherited Disease Research study

The American National Institutes of Health has approved Luda Diatchenko for a Center for Inherited Disease Research genome-wide association study of chronic temporomandibular joint dysfunction (TMD). TMD is a jaw and muscle dysfunction that causes severe pain. The study will enable Diatchenko to uncover greater insights into the causes of TMD, and, potentially, to develop new pain alleviation methods.

Houghton leads Alberta virology group to New York

This summer, Michael Houghton, CERC in Virology at the University of Alberta, led a group of delegates from the University of Alberta to New York. The group visited IBM Corporation to discuss ongoing collaborations on computational virology and drug discovery. The delegates hope to secure use of IBM's high-powered computers to run computational models for the Li Ka Shing Institute of Virology, where Houghton conducts his research.

Improving tools and overcoming challenges in searching oceans

Media coverage about the missing Malaysian Airlines flight has highlighted some of the reasons for the creation of the MEOPAR network. The search for MH-370 demonstrated the relevance of the network's role in improving and linking ocean observation and prediction tools, co-ordinating national and international, ocean-related efforts across many disciplines, and addressing effective response strategies. As scientific director of MEOPAR, Douglas Wallace, CERC in Ocean Science and Technology at Dalhousie University, was interviewed by CBC NewsNet. Other MEOPAR researchers have also been featured.



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Wheater presents at Dooge-Nash International Symposium

In April, Howard Wheeler, CERC in Water Security at the University of Saskatchewan, presented a paper at the inaugural Dooge-Nash International Symposium in Dublin, Ireland. The paper, co-authored with Patricia Gober, was titled “Meeting the Science Challenges of Water Security in the Saskatchewan River Basin: a Regional Hydroclimate Project from Western Canada.” The symposium’s theme was grand challenges facing hydrology in the 21st century. It was attended by national and international delegates from government, research and education, whose interests span the broad range of disciplines within hydrological science.

British High Commission hosts Graham Pearson ringwoodite discovery lecture

Graham Pearson, CERC in Arctic Resources at the University of Alberta, was invited to speak about his team’s recent discovery of ringwoodite at the British High Commission’s Science Salon series. Pearson, one of the world’s leading scientists in diamond studies, made the discovery inside a tiny, brown diamond. It allowed Pearson to confirm a long-held scientific theory: that there are enormous volumes of water trapped 410 to 660 kilometres beneath the Earth’s surface, between the upper and lower mantles, in the transition zone. Pearson explained how the discovery had transformed his research, and was the second-most covered news story in the world during the week of its publication in *Nature* magazine.

Van Cappellen leads study on plastics in the Great Lakes

Philippe Van Cappellen, CERC in Ecohydrology at the University of Waterloo, is leading a team studying the accumulation and consequences of plastics in the Great Lakes. His research is identifying which types of plastic are found, and where plastics are found in high concentrations of plastics. His work could in turn, lead to prevention strategies. Preliminary research has found plastic everywhere in the Great Lakes, with the highest densities in Lake Erie. Van Cappellen is particularly concerned about microplastics—tiny fragments and fibres of plastic being found even within the muscle tissues of fish and other wildlife. Even more concerning is that plastic has been found to act like a sponge, concentrating toxic chemicals—including DDT and PCBs—which have severe environmental effects and are known to cause cancer and birth defects. These toxins are ingested into the food web by animals, which can spread the contaminants to humans.





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Owen featured in *Mosaic*, *Maclean's*, and *Scientific American*

Adrian Owen, CERC in Cognitive Neuroscience and Imaging at Western University, was the subject of a prominent *Mosaic* article, authored by Roger Highfield and subsequently reprinted in an abridged format by the BBC. Titled "[The mind readers](#)," the piece examined Owen's research and efforts to give a voice to those in a vegetative state. Owen also penned "[How Doctors Peer into the Minds of Vegetative Patients](#)" in *Scientific American* (paywall), and was featured in a Kate Lunau *Maclean's* article, "[One-third of vegetative patients may be conscious: study](#)."

Babin's team on American icebreaker in the Chukchi Sea

Nine members of the CERC in Remote Sensing of Canada's New Arctic Frontier team are onboard the US Coast Guard Cutter icebreaker as part of a research collaboration with a team from Stanford University. The general goal of the mission is to understand the how phytoplankton are distributed across space and over time under sea ice, in the face of factors such as light penetration, nutrient salts and algae concentrations.

Farrer delivers University of Guam's Presidential Lecture

In May 2014, Matthew Farrer, CERC in Neurogenetics and Translational Neuroscience at The University of British Columbia, delivered the prestigious University of Guam Presidential Lecture. His presentation, "Parkinson's Disease: Ontology and Etiology," provided an overview of current understandings in his field, and the latest genetic discoveries providing hope for future treatments.

Wallace leads MEOPAR data management and glider workshop

This spring, the MEOPAR Data Management and Glider Workshop brought together Canadian and select international ocean observers from a variety of projects and organizations. Led by Douglas Wallace, CERC in Ocean Science and Technology at Dalhousie University, workshop participants met and are planning a Canadian community of practice for ocean data management. Their goals include exploring how to inventory current ocean data holdings; identifying, sharing and making use of code and expertise; and co-ordinating links to international data infrastructure, such as IOOS and Copernicus. At the workshop, participants planned to create Ocean Gliders Canada, a voluntary consortium, to develop shared operational support; inventory Canadian capabilities and activities; share information and activities; and co-ordinate training opportunities and emergency response capabilities.



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Global Institute for Water Security to host Distinguished Lecture series

In September 2014, the Global Institute for Water Security will host “Breakthroughs in Water Security Research,” the second annual Distinguished Lecture series. The series spans 12 weeks and features a different world-renowned researcher every week. Lectures are free, open to the public, and simulcast to the web. Among confirmed speakers are Sampurno Bruijnzeel (Free University of Amsterdam), Christina Tague (University of California at Santa Barbara) and Jim Kirchner (ETH Zürich).



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