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January 2015

CERC Newsletter for University Communicators

This quarterly newsletter aims to share recent developments, successes and best practices from the [Canada Excellence Research Chairs](#) (CERC) Program. To find out more about the program, or to share information for this newsletter, contact Michael Adams at michael.adams@chairs-chaieres.gc.ca.

CERC program recognized at Canada First Research Excellence Fund launch

Prime Minister Stephen Harper made special mention of the CERC program at the launch of the [Canada First Research Excellence Fund](#) on December 4 in Markham, Ontario. The prime minister said the CERC program enabled some of the world's best researchers to “undertake the long-term, world-class research that will ultimately be the foundation for Canada’s evolving economy.” The fund aims to position Canada’s postsecondary institutions among the best in the world for talent and breakthrough discoveries, and to help them excel globally in research areas that create long-term economic benefits for Canada.



The Prime Minister highlighted in particular the potential contributions of new chair [Steven Bryant](#), CERC in Materials Engineering for Unconventional Oil Reservoirs at the University of Calgary. In addition, Oliver Ernst, CERC in Structural Neurobiology at the University of Toronto, and his lab members took part in the official CFREF announcement itself.

New CERC Steven Bryant joins University of Calgary to engineer oil sands improvements



[Steven Bryant](#) has been appointed CERC in Materials Engineering for Unconventional Oil Reservoirs at the University of Calgary. Michelle Rempel, the federal minister responsible for western economic diversification, made the official announcement on October 16. She said bringing Bryant to Calgary is a coup for the university, as well as for Canada’s oil industry. Find out how Bryant aims to [use nanotechnology to reduce the environmental impact](#) of extracting oil from oil sands.



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[Bryant hit the ground running](#), joining the university's delegation at the opening of the site in Beijing, China, of the Global Research Initiative for Unconventional Oil and Gas. He also participated at the Subsurface Carbon Storage Symposium convened by Carbon Management Canada in Calgary, and served on the external advisory committee to the Center for Nanoscale Control of Geologic CO₂ at the Lawrence Berkeley National Laboratory. Bryant has also organized roundtables to communicate the chair structure, philosophy and research goals of his CERC, and has been soliciting researchers interested in collaborating on CERC-driven, solution-centric teams.

Largest map of the human “interactome” predicts new cancer genes

[Frederick \(Fritz\) Roth](#), CERC in Integrative Biology at the University of Toronto, has co-led the development of a new map that describes the complex network of interactions between human proteins. Published in *Cell*, the systemic map of some 14,000 high-quality, human binary protein-protein interactions provides proteome-wide coverage of the human “interactome” (the whole set of molecular interactions in a given cell) network. The groundbreaking map shows there are significant connections between known and candidate cancer gene products. It provides unbiased evidence for researchers to use in developing an expanded, functional human disease landscape. [Read more](#).



Gardner's team helps crack plan to fend off Prince Edward Island's green crab invasion



The European green crab first appeared more than a century ago in the waters of New England and has the potential to do millions of dollars in damage to Prince Edward Island's shellfish industry, which currently harvests more than 70 per cent of the mussels and oysters consumed in North America. The green crab is considered a delicacy in Italy, where its meat can sell for as much as \$30 a pound. In North America, fishing them hasn't been an option because of the crab's tough shell and unpredictable moulting schedule. Now, a team working under [Ian Gardner](#), CERC in Aquatic Epidemiology at the University of Prince Edward Island, believes it has “cracked” the crab's moulting code to discover a three-week window in the summer when the majority of the crabs moult their shells. The team is working with local fishermen, fish processors, and chefs to develop a management plan that includes harvesting green crabs and finding a market for green crab products.



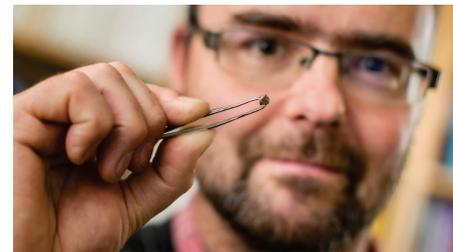
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Gardner and members of his research team also recently presented to the Standing Senate Committee on Fisheries and Oceans at the University of Prince Edward Island's Atlantic Veterinary College and answered questions on epidemiological research on fin-fish and shellfish in aquaculture settings. The committee is examining aquaculture regulation, current challenges, and future prospects for the industry in Canada. It plans to table a report on its findings in June 2015.

Pearson's ringwoodite discovery named among Top 25 scientific discoveries of the year

The discovery of the first terrestrial sample of ringwoodite, by [Graham Pearson](#), CERC in Arctic Resources at the University of Alberta, provided the scientific world with evidence that vast quantities of water lie trapped 410 to 660 kilometres beneath the Earth's surface, between the planet's upper and lower mantles. This discovery has been named among *Discover* magazine's Top 100 Stories of 2014, coming in at number 25.



Since the discovery, Pearson has lectured at numerous venues, including the Deep Earth conference of the Geological Society of London, the International Mineralogical Association meeting in Johannesburg, South Africa, and the Mantle Transition Zone session at the fall 2014 meeting of the American Geophysical Union, held in San Francisco.

Read the full story: [CERC-led discovery points to vast "oceans" beneath the Earth.](#)

Pearson has also recently been quoted in articles related to the discovery of another major Earth-forming mineral, bridgmanite, recently discovered in a meteorite.

Philippe Van Cappellen wins 2015 Science Innovation Award



The European Association of Geochemistry (EAG) has announced that [Philippe Van Cappellen](#), CERC in Ecohydrology at the University of Waterloo, is the recipient of the 2015 Science Innovation Award. He will receive the award at the Goldschmidt meeting in Prague in August 2015. Van Cappellen has also been elected a Geochemical Fellow by the EAG and Geochemical Society, for his excellence in geochemistry.



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Houghton celebrates Hepatitis C cure at symposium marking anniversary of his discovery of the disease

[Michael Houghton](#), CERC in Virology at the University of Alberta, co-chaired the 21st International Symposium on Hepatitis C Virus and Related Viruses. The conference was held in Banff, Alberta, on the 25th anniversary of the discovery of the Hepatitis C virus by Houghton and his colleagues. The symposium celebrated the abilities of recently approved HCV drugs to cure most patients, making Hepatitis C the first chronic viral disease to become curable. More than 350 researchers from 26 countries attended the symposium.



University of Ottawa opens Advanced Research Complex



In September, only two years after breaking ground, the University of Ottawa officially inaugurated its [Advanced Research Complex](#). The complex will be home to the university's photonics researchers, including [Robert Boyd](#), CERC in Quantum Nonlinear Optics. The facility will provide Boyd and his team with new state-of-the-art labs designed to push the limits of photonics research. The complex also received an official visit from President of Germany Joachim Gauck. Germany is a leader in photonics, and Boyd's CERC group has a research partnership with the Max Planck Institute for the Science of Light. The successful collaboration was highlighted during President Gauck's visit.

French presidential delegation visits Takuvik

[Marcel Babin](#), CERC in Remote Sensing of Canada's New Arctic Frontier at Université Laval, welcomed French President François Hollande to the Takuvik Joint International Laboratory. President Hollande was accompanied by Laurent Fabius, French minister of Foreign Affairs and International Development, Najat Vallaud-Belkacem, French minister of Education, Higher Education and Research, and Philippe Couillard, premier of Quebec. The event showcased joint research by Canada and France in northern Quebec. Babin, who is also the Takuvik lab's director, explained that the collaboration aims to improve



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understanding about the consequences that climatic and anthropogenic disturbances have on marine and terrestrial ecosystems and geosystems in the Arctic. President Hollande was also able to see new observation technologies, such as an underwater glider, an autonomous platform that collects data from the Arctic Ocean.

Diatchenko writings highlight pain risk factors and research advancements



[Luda Diatchenko](#), CERC in Human Pain Genetics at McGill University, has co-contributed a number of chapters to publications in recent months, including “Genetic Risk Factors for Orofacial Pain: Insights from Human Experimental Studies,” in *Orofacial Pain, Recent Advances in Assessment, Management, and Understanding of Mechanisms*, and “An Introduction to Pain,” in *Pain 2014—An Updated Review: Refresher Course Syllabus*. She also published two peer-reviewed editorials: “OPRM1 receptor as new biomarker to help the prediction of post mastectomy pain and recurrence in breast cancer” and “Letting the Gene Out of the Bottle: OPRM1 Interaction.”

Wallace uses mine detectors to fight climate change

A team led by Douglas Wallace, CERC in Ocean Science and Technology at Dalhousie University, has been putting old submarines to new use. Wallace’s team [retrofitted an unmanned submersible mine detector](#) to measure how much carbon dioxide the sea is absorbing from the atmosphere. Much of the exchange between air and water happens in ocean eddies—large whirlpools up to 60 miles across—far from shore. Until now, no underwater research vehicles were powerful enough to hurtle through the swirling waters.





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Thundat joins Ingenuity Lab's strategic research partnership



[Thomas Thundat](#), CERC in Oil Sands Molecular Engineering, has joined a strategic research partnership at Ingenuity Lab, Alberta's first accelerator laboratory. He joins fellow University of Alberta researchers Carlo Montemagno, a world-leading expert in nanotechnology; and Gane Wong, a specialist in genomics and bioinformatics. According to lab director Montemagno, "The path to discovery lies beyond conventional thinking and the siloed approaches By acknowledging the interconnectedness of our

systems and facilitating better research integration and the cross pollination of ideas, we give ourselves, and society as a whole, a much better chance of success."

The trio will collaborate on single-cell genomics research in breast and prostate cancer, as well as new physical, chemical and biological detection methods using micro- and nanomechanical sensors.

Owen's Brain, Mind & Consciousness program gets go-ahead



Following an extensive competition through the Canadian Institute for Advanced Research (CIFAR)'s Global Call for Ideas, the Brain, Mind & Consciousness program has been approved as one of four programs to move to the start-up phase. Co-led by [Adrian Owen](#), CERC in Cognitive Neuroscience and Imaging at Western University, and fellow researcher Mel Goodale, the network of neuroscientists, philosophers, ethicists and clinicians will attempt to understand the mystery of human consciousness, which is the key to understanding the root of many neurological diseases and disabilities. Owen and Goodale gave a presentation of their new CIFAR program at a dinner with the Governor General.

Farrer hosts prestigious Parkinson's conference at Centre for Brain Health

[Matthew Farrer](#), CERC in Neurogenetics and Translational Neuroscience at The University of British Columbia, hosted the ninth International Genetic Epidemiology of Parkinson's Disease (GEOPD) Annual Meeting at the Djavad Mowafaghian Centre for Brain Health. Founded by the Michael J. Fox Foundation, GEOPD is an international consortium of investigators whose focus includes Parkinson's and related neurologic and neurodegenerative diseases. GEOPD shares clinical data and DNA samples for nearly



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42,000 Parkinson's patients and over 41,000 healthy subjects between 60 different research institutes and centres around the globe. Over 100 of the brightest minds in neuroscience attended the conference. The event's theme was "alpha-synuclein, cognition and therapeutic possibilities."

Ernst hosts Tanenbaum Symposium



[Oliver Ernst](#), CERC in Structural Neurobiology at the University of Toronto, hosted the 2014 Anne and Max Tanenbaum Symposium on the Frontiers of Science, Molecular Building Blocks of Living Systems. Speakers included Krzysztof Palczewski, from Case Western Reserve University, and Dwayne Miller, from Germany's Max Planck Institute.

Babin chairs steering committee for NetCOLOR remote sensing network

[Marcel Babin](#), CERC in Remote Sensing of Canada's New Arctic Frontier at Université Laval, recently hosted the inaugural meeting of [NetCOLOR](#), the Network on Coastal, Oceans and Lakes Optical Remote sensing. The network draws together Canadian experts in and end-users of water colour remote sensing. Established in 2014, its goal is to develop and co-ordinate a Canadian strategy for research, training and dissemination of water colour products. Such products provide information about phytoplankton biomass and other optically active parts of water. Remotely sensed water colour is the only way to observe marine ecosystems on grand scales. The committee, chaired by Babin, decided to focus the network's activities on using water colour remote sensing to monitor water quality in lakes, rivers and coastal environments; to monitor the bio-optical properties in the changing Arctic Ocean; and to study biogeochemical cycles on various scales, from local inland and coastal aquatic systems to the global ocean.



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Boyd hosts annual Schawlow-Townes Symposium on Photonics



Robert Boyd, CERC in Quantum Nonlinear Optics at the University of Ottawa, once again hosted the annual Schawlow-Townes Symposium on Photonics, which was established in 2012 to highlight the research and discoveries of photonics experts from across Canada and around the world. The symposium aims to bridge the gap between theory, research and applied science. This year's gathering was organized in collaboration with the National Research Council Canada. Guest speakers included Ian Walmsley, from the University

of Oxford; Miles Padgett, from the University of Glasgow; and Vahid Sandoghdar, from the Max Planck Institute for the Science of Light.

Messaddeq's team develops clothes that monitor and transmit biomedical information

A team led by [Younès Messaddeq](#), CERC in Photonic Innovations at Université Laval, has developed smart textiles capable of monitoring and transmitting wearers' biomedical information. Using wireless or cellular networks to send data, the technology clears a path for a host of new strategies for those suffering from chronic diseases, elderly people living alone, and even firemen and police officers. Messaddeq's team created the smart fabric by superimposing multiple layers of copper, polymers, glass and silver.



Global Institute for Water Security releases progress report



The Global Institute for Water Security, led by [Howard Wheater](#), CERC in Water Security at the University of Saskatchewan, has released its annual [progress report](#). The report shows the institute published 506 journal articles and 33 books/chapters; delivered 338 conference presentations, as well as 201 plenary, keynote and invited lectures; worked with 316 graduate students, 98 postdoctoral fellows and scientists, 63 technicians, 121 research

assistants and 98 visiting scholars; and leveraged \$47.2 million in funding on top of its \$30 million in CERC base funding.



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Sherbrooke announces provincial funding for CERC program

Quebec's ministère de l'Économie, de l'Innovation et des Exportations recently announced a grant of \$462,698 to the Université de Sherbrooke for its CERC in Quantum Signal Processing program. The grant will enable CERC [Bertrand Reulet](#) to acquire specialized equipment to study electronic noise at very low temperatures.



Farrer identifying genetic links to Parkinson's disease

Recent work by [Matthew Farrer](#), CERC in Neurogenetics and Translational Neuroscience, and his team at the Djavad Mowafaghian Centre for Brain Health and the Centre for Applied Neurogenetics has focused on identifying several genetic links to Parkinson's disease, including major Mendelian mutations in SNCA (a hallmark of Lewy body pathology), LRRK2 (which indicates the greatest population-attributable risk of Parkinson's disease worldwide), DCTN1 (which leads to Perry syndrome), VPS35 and RME-8. Farrer's lab is now developing and characterizing the neurobiology associated with these genetic links in disease models.

Rysgaard's field campaigns reveal new findings

The Arctic field campaigns led by [Søren Rysgaard](#), CERC in Arctic Geomicrobiology and Climate Change at the University of Manitoba, have started to reveal interesting findings—all of them published in journals. Among them is new evidence that openings in the ice—known as “polynyas”—change water circulation in fjords in coastal areas; that methyl mercury in the ocean bio-accumulates and is the toxic form of mercury; and that methylation of inorganic mercury is happening in the stomachs of the grazing copepod [calanus hyperboreus](#); and that melt ponds play an important role in transporting organic contaminants from the atmosphere to oceans.



Gardner's research leads his team to Asia

[Ian Gardner](#), CERC in Aquatic Epidemiology at the University of Prince Edward Island, recently gave a keynote address to the Third Global Conference for OIE Reference Centres in Seoul, Korea. OIE is the



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intergovernmental organization responsible for improving animal health and welfare worldwide. Gardner gave his keynote to representatives from reference centres and laboratories of the World Animal Health Organization. Gardner's team has been establishing research partnerships and relationships in Vietnam, where rural subsistence fish farming has been a way of life for centuries. Team members have begun a survey of 200 tilapia farms in the south, gathering data on mortality and growth. The area previously had little in the way of disease- or treatment-monitoring. The CERC team's efforts are leading toward a larger project involving surveillance and long-term management plans.

Gerbier sets up new labs at Queen's and SNOLAB



Since being named CERC in Particle Astrophysics in September 2014, Gilles Gerbier has been busy settling into his new research “homes”—at Queen's University and 2 kilometres underground at SNOLAB, near Sudbury, Ontario. Gerbier is currently at SNOLAB setting up a major collaborative project on cryogenic detectors for dark matter discovery. The project will strengthen ties between Canadian, other North American, and European researchers. Over the next few months, he is looking forward to two postdoctoral fellows and two PhD students joining his research team. [Find out more about Gilles Gerbier's research into dark matter.](#)

Houghton sets up new company to predict drug toxicity

[Michael Houghton](#), CERC in Virology at the University of Alberta, has set up a new company, Achlys, that will sell software products predicting drug toxicity. The technology is based on research done in Houghton's CERC lab, which led to a computing method to better predict drug-associated cardiotoxicity. Cardiotoxicity is a frequent cause of often severe drug toxicity, and has plagued the pharmaceutical industry for decades. Using state-of-art supercomputing techniques, Houghton and his team have produced an “atomistic dynamic” model of the hERG ion channel. This tool should improve the safety, efficiency and speed of global drug development.





Pearson busy prospecting for diamonds



Following the discovery of the first terrestrial sample of ringwoodite by [Graham Pearson](#), CERC in Arctic Resources, and his team at the University of Alberta, and its indication of vast amounts of water deep in the Earth, Pearson's team spent some of the summer working with Canadian companies and visiting diamond prospects in Arctic Canada and. Pearson's team used the opportunity to work towards mapping the deep roots of Arctic Canada through space and time.

Van Cappellen explores biogeochemistry of the Mediterranean

In two papers published in the *Journal of Marine Systems*, [Philippe Van Cappellen](#), CERC in Ecohydrology at the University of Waterloo and colleagues explored the unique biogeochemistry of the Eastern Mediterranean. Using model simulations, they explain why this land-locked sea has remained a biological desert despite big increases in nutrient inputs since the mid-20th century. Ongoing research is looking at the potential future impacts of population growth and water management on the environmental health of the Mediterranean Sea.



The CERC Ecohydrology group also co-organized a workshop on environmental electrokinetics, which brought international experts to Waterloo to discuss the state and future of using electrokinetic technology to remediate contaminated soils and groundwater.

Rysgaard takes part in International Arctic Change 2014 Conference



[Søren Rysgaard](#), CERC in Arctic Geomicrobiology and Climate Change at the University of Manitoba, and his teams from Manitoba, Greenland and Denmark, took part in the International Arctic Change 2014 Conference in Ottawa in December 2014. The conference attracted more than 1,200 participants, making it one of the largest transsectoral international Arctic research conferences ever held in Canada. Rysgaard spoke about international collaboration and co-led two planning workshops for his upcoming Baffin Bay & Labrador Sea campaign (2015-17) and the Station North campaign (2015). Rysgaard also co-chaired three sessions on "Arctic Sea Ice: Changes, Processes and Impacts."





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Rysgaard organizes Arctic Science Partnership field school in Greenland

The University of Manitoba and the Arctic Science Partnership will host the [second annual field school](#) in 2015, at the Greenland Institute for Natural Resources Nuuk, Greenland. This year's field course will be organized by [Søren Rysgaard](#), CERC in Arctic Geomicrobiology and Climate Change at the University of Manitoba, and will bring together 15 graduate students with diverse backgrounds in Arctic science to examine the role snow-covered sea ice plays in the Arctic system. The school also aims to engage local communities by developing and implementing an outreach program for local students, and by including elders as instructors.

Global Institute for Water Security launches water security research awards

The Global Institute for Water Security, of which [Howard Wheater](#), CERC in Water Security at the University of Saskatchewan, is director, has launched three awards to recognize excellence in water security research and support the development of new ideas. The Water Security Research Excellence Award will recognize outstanding water security research as acknowledged by peers; the Best Doctoral Thesis Award in Water Security Research will recognize excellence in water security research and innovation; and the Capacity-Building Competition will provide seed funding to stimulate new research.

Owen discovers Hitchcock movies can affect brain activity of vegetative patients

In a widely disseminated story, Adrian Owen, CERC in Cognitive Neuroscience and Imaging at Western University, showed that a patient in a vegetative state can have the same brain activity while watching an Alfred Hitchcock film as healthy volunteers. [Find out more about Adrian Owen's research.](#)



Date set for next CERC annual meeting

The fifth annual gathering of CERCs has been set for April 13 and 14, 2015, at the University of Waterloo, and is being organized by David Cory and Philippe Van Cappellen. More details will be available in the near future.



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