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September 2014

CERC Newsletter

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@sshrc-crsh.gc.ca.

Date set for next CERC annual meeting

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

Welcome to two new CERCs

The CERC program recently announced two new chairholders:

On September 26, Gilles Gerbier became CERC in Particle Astrophysics at Queen's University in Kingston, Ontario. A world-renowned expert in astroparticle physics, Gerbier comes to Queen's from the French Atomic Energy Commission in Saclay, France. His research will focus on the hunt for dark matter—the elusive ingredient thought to comprise some 80 per cent of the universe's mass. [Find out more.](#)

On September 29, Robin Rogers became CERC in Green Chemicals and Green Chemistry at McGill University, in Montréal, Quebec. Rogers comes to McGill from The University of Alabama. His research focuses on the design and development of sustainable biomaterials for use in polymeric materials, fuels and commodity chemicals. [Find out more.](#)



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Ernst and Owen move on to final stage in Global Call for Ideas

The Canadian Institute for Advanced Research (CIFAR) has announced that Oliver Ernst, CERC in Structural Neurobiology at the University of Toronto, and Adrian Owen, CERC in Cognitive Neuroscience and Imaging at Western University, have been approved for the final stage of its Global Call for Ideas. CIFAR launched the Call in April 2013, inviting the global research community to submit proposals for ideas for long-term collaborative research into complex, fundamental questions of importance to Canada and the world. In the first phase, more than 260 letters of intent were submitted by researchers from all over the world. From these, seven finalists were selected. Now, CIFAR has approved four program proposals, including those from Ernst and Owen, to move into a six-to-18-month start-up phase, with an anticipated launch in 2015.

Ernst is part of a team of four working on a project to explore how the molecules responsible for biological processes are formed and interact. This research will lead to a deeper understanding of the minimum structural elements required to support life. Owen will work with colleague Melvyn Goodale to develop a network of neuroscientists, philosophers, ethicists and clinicians to focus on creating a deeper and more comprehensive understanding of human consciousness.

Houghton's discovery of Hepatitis C virus considered "Nobel-worthy"

According to an opinion piece by Lorne Tyrrell in the *Edmonton Journal*, the identification of the Hepatitis C virus (HCV) in 1989 by Michael Houghton, now CERC in Virology at the University of Alberta, was "one of the most important recent discoveries in medicine"—and is worthy of a Nobel Prize. In the op-ed marking World Hepatitis Day on July 28, Tyrrell noted that Houghton's discovery 25 years ago while working at Chiron, a biotechnology company in the United States, has meant that HCV, once a virus with no known effective therapies, is now curable. In addition to identifying HCV, Houghton and his team at Chiron also sequenced the genome of the virus and identified several targets for the future development of highly selective and effective antiviral drugs. Thanks to Houghton's research, HCV is detectable in blood supplies, which means, wrote Tyrrell, "our blood supply is now safe and, for all practical purposes, free of HCV (less than one in 10 million units). And people with HCV are currently being cured with just eight to 12 weeks of treatment." As Tyrrell writes, "[t]his extraordinary achievement deserves to be celebrated."

CERC in Virology's lab discovers new method for predicting drug-associated cardiotoxicity

Working out of Michael Houghton's lab at the University of Alberta, researchers Khaled Hassan Barakat, Anwar Anwar-Mohammed and Rakesh Bhat have discovered a new computational method for predicting drug-associated cardiotoxicity. Many drug development programs are ended because of serious



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(sometimes fatal) cardiotoxicity, which can be mediated by blocking the “hERG potassium ion channel.” This new method should be of great use to the global drug industry in better predicting and avoiding such toxicity in future. The team’s findings were published in *Toxicology Letters*, in a paper called “A human ether-á-go-go-related (hERG) ion channel atomistic model generated by long supercomputer molecular dynamics simulations and its use in predicting drug cardiotoxicity” .

Houghton’s work leads to major grant for Li Ka Shing Virology Institutes

Twenty-five years after Michael Houghton, now CERC in Virology at the University of Alberta, discovered the hepatitis C virus, new, recently approved drugs are now capable of curing almost all hepatitis C patients. This marks the first time that any chronic, persistent viral infection can be cured. The Government of Alberta has committed \$45 million over the next nine years to the Li Ka Shing Virology Institutes (of which Houghton is a director), to develop medical products based on these and other research innovations from the University of Alberta.

Wheater to speak at Agricultural Biotechnology International Conference

Howard Wheeler, CERC in Water Security at the University of Saskatchewan, will speak at the 2014 Agricultural Biotechnology International Conference on October 7. ABIC is the premier global meeting promoting innovation in bioscience to ensure sustainable food, feed, fibre and fuel security as the climate changes. Wheeler will address the links between agriculture and water security. “Alongside food security, water security is one of the 21st century’s major global challenges,” says Wheeler. “Unsustainable water use is widespread, and there is increasing competition for water resources at local, regional and international scales.” [Find out more.](#)

Wheater co-chairs GEWEX World Forum

Howard Wheeler, CERC in Water Security, co-chaired the Global Energy and Water Exchanges (GEWEX) World Forum: 7th International Scientific Conference on the Global Energy and Water Cycle, held in The Hague in July. The conference celebrated 25 years of GEWEX research and was attended by more than 560 scientists, managers and students representing 45 countries. The conference addressed a range of areas, including research on water resources, extremes in water (i.e., droughts and floods), weather climate and hydrological model development and exploitation, research capacity development and training for the next generation of scientists. Wheeler was also a guest speaker, and provided an overview of water and society.



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Wheater participates in response panel on United States-Canada border waters

CERC in Water Security Howard Wheeler took part in the 69th Soil and Water Conservation Society's International Annual Conference, in Lombard, Illinois. The conference addressed soil conservation and water quality issues, particularly applicable to North America. On the meeting's second day, Wheeler was invited to participate on a plenary session response panel on United States-Canada border waters and the water quality protection challenge the two countries face. The panel, which included Wayne Honeycutt and Alex Echols, gave their responses to the plenary address given by Jamshed Merchant, Consul General of Canada, who described the importance of shared waters and discussed the water quality protection issues facing the two countries.

Sustainable economic development and groundwater use in Saskatchewan

In October, the Global Institute for Water Security (GIWS) will host a stakeholder's workshop in Saskatoon to consider what groundwater science is needed to effectively support sustainable economic development and groundwater use in Saskatchewan, and ultimately ensure the future well-being of the province's people. The workshop aims to raise awareness of the Peach report (*Groundwater, Hydrogeology and Sustainability in Saskatchewan: A review of groundwater and hydrogeological issues for Saskatchewan and the development of a research strategy*). It will also provide an update on work done to date; propose an audit of groundwater research, data and knowledge; and seek views of a wide range of stakeholders about their needs for information on Saskatchewan's groundwater resources and hydrogeology. Organizers anticipate efforts stemming from the workshop will lead to a business plan to co-ordinate and facilitate future scientific research on the province's groundwater resources and hydrogeology.

CERCs collaborate to produce Atlantic Ocean white paper

Doug Wallace, CERC in Ocean Science and Technology at Dalhousie University, will give a presentation on his most recent research at the Oceans' 14 MTS/IEEE Conference, to be held in St. John's, Newfoundland. His presentation, "A Strategy for the Development of an Integrated Atlantic Ocean Observing System (IAOOS)," will provide information about the implementation of an Atlantic coastal and ocean observing system. The research behind this presentation was recently released in an academic article written by Wallace and two additional CERCs: Søren Rysgaard and Marcel Babin. The paper considers a Canadian approach to an IAOOS, noting new projects and initiatives for the larger-scaled system, and briefly introducing the Atlantic observing system in its conclusion.





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Start-up helps study genetic factors affecting chronic pain

Luda Diatchenko, CERC in Human Pain Genetics at McGill University, is collaborating with a start-up company in the United States to gather faster and more accurate data for a study on chronic pain. Diatchenko and her team at the McGill University Pain Centre are using a “customizable engagement platform,” developed by San Francisco-based Open Health, to undertake a study of the genetic factors affecting chronic pain. Study participants will work with a user-friendly, tablet-based questionnaire formatted on the Open Health platform to report their pain experiences. “We are excited to apply Open Health's technology to our clinical study protocol, as it allows us to collect data in a very efficient manner and in real time,” said Diatchenko. The platform connects patients with peers, caregivers, friends and family, doctors and researchers, through personalized mobile and web-based applications. [Find out more.](#)

The elegance and ease of a world without cords

A recent article in the *Edmonton Journal* explained how a team led by Thomas Thundat, CERC in Oil Sands Molecular Engineering at the University of Alberta, is working to bring us a world without cords by using a new technique of electricity transmission called “single wire transmission.” Instead of leaving you with a messy tangle of electric cords around your computer or in the kitchen, Thundat’s new quasi-wireless world would see our appliances powered by a strip of foil under the counter or desktop—and we would have no worries about electric shocks. By energizing a metal object with alternating current, researchers have managed to create a wireless hot spot on a table surface. The hot spot can be made from something as readily available as tin foil or a metal night stand. The hot spot acts as a transmitter and sends the electric energy into a coil in the appliance. [Find out more.](#)

Thundat’s group develop new sensor to measure miniscule amounts of liquids

A team led by Thomas Thundat, CERC in Oil Sands Molecular Engineering at the University of Alberta has developed a sensor that can measure the physical and chemical properties of different liquids in volumes that are only a few trillionths of a litre, a smaller amount than previously measurable. The device records the amount of heat generated by the interaction between light and the volume of liquid inside a channel 25 times smaller than the width of a human hair. It can also measure the weight of the liquid. The sensor could become an essential tool for researchers working on lab-on-a-chip technology, which brings different laboratory functions onto a single chip. The sensor’s many potential applications could also include in testing for cancer by detecting circulating microvesicles shed from tumour cells; and measuring the density, viscosity and chemical composition of oil.



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Cory invited to speak at Commonwealth Science Conference

David Cory, CERC in Quantum Information Processing at the University of Waterloo, has been invited to speak at the Commonwealth Science Conference in Bangalore, India, in November. This will be the first Commonwealth Science Conference in nearly 50 years. The conference is being organized under the aegis of the United Kingdom's Royal Society, and supported by the Government of India. Cory will take part in a panel on mathematics, computation and complex systems, together with Rama Govindarajan, of the Tata Institute of Fundamental Research (India), and Andrew Hopper, from the University of Cambridge. Cory has also been invited to talk at the *Bring the Nanoworld Together* workshop, to be hosted at the Institute of Physics in Beijing in late September.

Robert Boyd receives honorary doctorate from the University of Glasgow

Robert Boyd, CERC in Quantum Nonlinear Optics at the University of Ottawa, has received an honorary doctorate from the University of Glasgow, Scotland. Boyd has been an internationally recognized leading scientist in nonlinear optics for more than 30 years, and is a global leader in photonics research, the study of photons and their application in telecommunications and informatics. "I am very pleased to have been awarded an honorary doctorate by the University of Glasgow," said Boyd. "The University of Glasgow is a major academic institution, and this is one of the crowning achievements of my career." The doctorate was awarded at the University of Glasgow's annual Commemoration Day celebrations on June 18.

Van Cappellen gives keynote speech at Canadian Science Writers' Association conference

Philippe Van Cappellen, CERC in Ecohydrology at the University of Waterloo, was keynote speaker at the prestigious Canadian Science Writers' Association annual conference, held in June in Toronto. Through his lecture, "The Hitchhiker's Guide to Global Water Issues," Van Cappellen gave a broad overview of current and emerging global water issues, stressing the central importance of water not only for ensuring human well-being and prosperity, but also for maintaining healthy ecosystems.

Van Cappellen lectures at the Global Institute for Water Security

This September, CERC in Ecohydrology Philippe Van Cappellen, of the University of Waterloo, gave a public lecture at the University of Saskatchewan's Global Institute for Water Security. In addition to his lecture, titled "Environmental and biogeochemical effects of river damming," Van Cappellen also took part in field visits to Lake Diefenbaker and St. Denis National Wildlife Area. His goal was to further



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enhance engagement between his team and that of Howard Wheeler, CERC in Water Security at the University of Saskatchewan, as well as to explore collaborative research opportunities across the two research programs.

Younès Messaddeq elected as co-organizer for 2016 international conference

Younès Messaddeq, CERC in in Photonic Innovations at Université Laval, has been elected as co-organizer of the 2016 International Conference on Optical, Optoelectronic and Photonic Materials and Applications (ICOOPMA), which will be held in Montréal. Messaddeq is a member of the ICOOPMA International Advisory Committee, and was in Leeds, England, as a speaker at the 2014 conference, which featured notable plenary lectures from some of the world's top photonics and optoelectronics researchers. Messaddeq's 2014 presentation was on "Tailoring of the Morphology of Chalcogenide Glasses Using Femtosecond Laser."

Messaddeq speaker at international glasses symposium in South Korea

Younès Messaddeq, CERC in in Photonic Innovations at Université Laval, recently presented at the prestigious International Symposium on Non-Oxide and New Optical Glasses (ISNOG) 2014 at Jeju, South Korea. The conference enabled scientists, chemists, physicists, and device engineers to discuss ideas, solutions and issues related to the crucial role played by non-oxide and new optical glasses in cutting-edge technologies. Messaddeq's presentation was titled "Rare-Earth Doped Chalcogenide Fibre for Optical Devices." Messaddeq is a member of the ISNOG international advisory committee.

Rysgaard speaks at Circumpolar Council General Assembly

This July, Søren Rysgaard, CERC in Arctic Geomicrobiology and Climate Change at the University of Manitoba, was invited to the [Inuit Circumpolar Council](#) 12th General Assembly to give an overview of expected sea ice changes in the Canadian north. His presentation, "Decreasing ice—increasing ice hazards?" discussed ice hazards and the potential risk for collision as ice conditions continue to change in the Arctic. In areas with a mixture of thin sea ice, thicker multiyear sea ice and glaciers, ice can go in any direction within 24 hours, so it is difficult to predict the path of individual floes. Rysgaard emphasized the need to further develop and test management strategies and tools to deal with these new conditions.



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Rysgaard's team still active in Arctic field campaigns

CERC in Arctic Geomicrobiology and Climate Change Søren Rysgaard's team at the University of Manitoba continues to be active in the Arctic field campaigns in Daneborg, Greenland, and onboard the CCGS Amundsen, as part of the 2014 ArcticNet science expedition. In August, the American Geophysical Union (AGU) featured a paper by Rysgaard's research group in their AGU Publication Highlights. The original article, "Ice-dammed lake drainage cools and raises surface salinities in a tidewater outlet glacier fjord, west Greenland," was published in the [*Journal of Geophysical Research*](#).



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