Bringing Research to LIFE

In Brief

ResearchLIFE

ResearchLIFE, the new magazine published by the Research Communications and Marketing Unit in the Office of the Vice-President (Research), has hit shelves.

Published bi-annually, the magazine highlights research at the University of Manitoba.

The first issue reports on the CRYSTAL Project headed by the Faculties of Science and Education, how two kidney specialists have changed the way the world looks at biopsies, and what a story can tell us.

The issue also features an article written by filmmaker Guy Maddin, and insights from our new president.

The magazine is free and is distributed around our campuses and beyond our provincial borders. Pick up a copy and discover the research impacting your life.

Cool millions

Nine researchers received $2.1 in new funding from the Canada Foundation for Innovation on Jan. 6.

And the winners are: Mark Fry and Dirk Weihrauch from biological sciences; John Sorensen and Torsten Hegmann from chemistry; Arkady Major, electrical and computer engineering; Nicola Koper, Natural Resource Institute; Kiera Ladner, political studies; Karin Wittenberg, agricultural and food sciences; and Feiyue Wang, environment and geography, and chemistry.

Upcoming

Speaker Series

War in Outer Space

Wednesday, January 21, 2009

7:00 PM

Robert B. Schultz Lecture Theatre

For more information:

Phone: (204) 474-9020

Public Lecture

Making Every Kernel Count

Tuesday, February 3, 2009

8:00 PM

343 Drake Centre

For more information:

Phone: (204) 474-6915

War in outer space, coming soon

BY SEAN MOORE

Wars happen. According to the Heidelberg Institute for International Conflict Research, a think-tank, 2008 saw nine wars and almost 130 violent conflicts across the world. Peace on Earth is not likely in 2009, nor in the decade following, but what about peace in orbit?

For the past decade political studies professor James Fergusson has intently watched what many others have neglected: how militaries are exploiting outer space.

The god's-eye-view of battlefields entices militaries to take up an orbiting perch. And in turn they become targets to ground-based weapons. What scenarios unfold from the resulting posturing has many implications for how future wars are fought, and for the globalized economy that depends on satellites.

On January 21, as part of the Bringing Research to Life speaker series, Fergusson will give a free public lecture titled War and Outer Space (details below in Upcoming), in which he will discuss the prospects for, and implications of, war in outer space.

International law treats space as it does the high seas, as a global common. Countries can use it for "peaceful" purposes. But peaceful does not mean non-military, and as Fergusson notes, history suggests that military demands of fighting and winning will trump the demands of laws.

Satellites offer militaries, to use the jargon, force enhancement, which allows war to be fought with more precision – guided missiles, guided troops.

Submitted Photo

James Fergusson, political studies, seen here on a research trip in Afghanistan, will give a free public lecture on Jan. 21, about war's potential future.

"This has implications. If you are able to employ force in a clinical and precise manner, the argument runs that you are more likely to be willing to use force rather than alternative means to deal with the conflict," Fergusson said.

The U.S. has the most celestial capital, giving them huge advantages in wars, but that also means they have the most to lose if any conflict was acted out in orbit. As Pentagon thinking runs, if the US goes to war with any other country capable of reaching space (there are 10), that country has an immediate incentive to destroy US space assets. Therefore, the US has an immediate incentive to defend those satellites.

"And once you try to defend something, thoughts often turn to offense," Fergusson said.

Let's rewind the film to January 11, 2007, when, about 850 kilometers above Earth, a missile launched from deep within China hit one of that country's ageing weather satellites, effectively demonstrating the country's space capabilities. The impact resulted in a vast field of debris, and each tiny scrap of metal, now whizzing randomly about orbit at tremendous speeds, is capable of crippling any satellite it hits. So a question percolates: what is a weapon in space?

"The space shuttle is a potential space weapon. The Canadarm is a space weapon," Fergusson said. "During the cold war, for strategic reasons, we made arbitrary divisions between what was a weapon in space and what wasn't. A rocket, for example, is not a space weapon. And we still think about these things in cold war terms even though strategies have changed."

The Canadian government's policy is that weapons are not to be put into space. But it's safe to say space is littered with potential destructive agents.

"If we don't start paying attention, this issue will be driven by a military agenda rather than a broader political and strategic context. And that's important for Canada. We're not going to get anywhere saying 'let's not weaponize because it's a bad thing.' It's going to happen and the question is what can Canada do and what should Canada do?"

To learn more, come to Fergusson's free lecture on January 21, at 7 p.m.in the Robert B. Schultz Lecture Theatre, St. John's College. For more information, call 474-9020.

Following mercury's plot twist

BY SEAN MOORE

Climate change, like a soap opera, has many pernicious players each performing their own grim role, and invariably, when the spotlight is put on them, they reveal surprising plot twists.

For an environmental problem that's been recognized for more than 50 years, mercury still surprises.

It, among other contaminants like selenium and uranium, is a concern of Feiyue Wang in the department of environment and geography, who also holds a cross-appointment with the department of chemistry. He studies the interactions of trace element contaminants across environmental and bio interfaces.

On Jan. 6, Wang received funding from the Canada Foundation for Innovation. Wang's award will lead to the construction of the Sea-ice Environmental Research Facility (SERF), which will allow Wang and his colleagues, Tim Papakyriakou and David Barber, to conduct controlled experiments on sea-ice processes. It will be the only facility of its kind in Canada.

Wang will continue investigating the tale of mercury contamination in the Arctic.

In April 2008, he and his colleagues published a paper in Environmental Chemistry that said levels of organic mercury (the bad kind that can cross the blood-brain barrier) were increasing in marine mammals despite a letup in the amount of inorganic mercury being expelled, by industry, into northern systems.

What's the impetus?

The paper said it was likely the effects of climate change on a suspected group of sulphate-reducing bacteria capable of converting inorganic mercury into organic mercury by attaching a methyl group to it.

And as warmer temperatures reduce sea-ice coverage, the water will warm and coax these microbes into greater activity, further increasing the amount of methyl-mercury in the food chain.

This matters because normally, when you talk about contamination, you simply shut off the source and things dramatically change. But mercury contamination has inertia.

"The whole thing seems process driven, not source driven, and that surprised us," Wang said.

"The story is, we now think, that internal processes in the Arctic Ocean are driving the increases in mercury accumulation in mammals. But the question is, how?"

Inorganic mercury has a residency time of at least 30 years in the Arctic aquatic environment. Even if mercury emission ceased completely, there is still a large reservoir of the stuff that can, and will be, converted into methyl-mercury. So the next 30 years are already written. Sound familiar?

"That's almost the same story as climate change. So we were the first to demonstrate that for this group of contaminants, the mercury story is behaving similarly to the CO_2 story.

"So our message is that global contamination and climate change needs to be fought on the same front. You cannot separate them anymore."

To better understand the fundamentals of these biogeochemical processes, Wang will use SERF to conduct controlled experiments using various concoctions of sea water.

"Research has to be driven by curiosity, but in the environmental field, it is driven by real world problems as well. And it's depressing stuff. We don't yet see the horizon, but there is always hope."

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Comments, submissions and event listngs
to: lindsay_fagundes@umanitoba.ca
Phone: (204) 474-9020 Fax (204) 261-0325