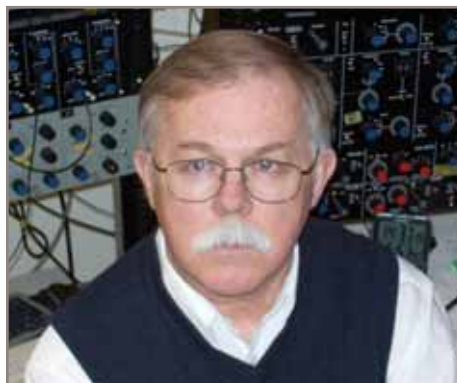


Bringing Research to LIFE

In brief

New Appointment



Phillip Gardiner, associate dean (research) for the Faculty of Kinesiology and Recreation Management and director of the faculty's Health, Leisure & Human Performance Research Institute, is the recipient of a prestigious Chair.

He was recently appointed Chair of the Institute Advisory Board (IAB) of the Canadian Institutes of Health Research (CIHR) Institute of Musculoskeletal Health and Arthritis.

The role of the CIHR's IABs is to act in an advisory capacity to the scientific directors of the institutes and to the CIHR Governing Council with respect to the full range of institute activities, including research priorities, strategies and implementation plans for engaging the broader research community.

While the University of Manitoba typically has half a dozen members on IABs at any given time, there has not been an IAB Chair since 2007.

Upcoming event

Bringing Research to Life Speaker Series

Bacteria: Refineries for Biofuel Production

Dr. Richard Sparling
(Microbiology)

Dr. David Levin
(Biosystems Engineering)

Wednesday, Sept. 29, 2010

7 p.m.

Robert B. Schultz
Lecture Theatre

St. John's College
Fort Garry Campus

**FREE ADMISSION
EVERYONE WELCOME**

Biofuels Breakthrough

Researchers are using bacteria—found in some unusual places—to produce renewable fuel



Richard Sparling (left) and David Levin have discovered a new use for Tim Hortons coffee cups.

Photo by Katie Chalmers-Brooks

BY KATIE CHALMERS-BROOKS

A teen pop sensation might be accustomed to capturing the world's attention. But two humble U of M professors? Not so much.

Research by Prof. David Levin (biosystems engineering) and Prof. Richard Sparling (microbiology) that involves turning Tim Hortons coffee cups into fuel made international headlines this summer after being featured in local news.

"It went global. At one point there was a clip of us on yahoo right beside Justin Bieber," says Levin. "It's been crazy."

Levin and Sparling are offering a free presentation about their research—open to the public Wednesday Sept. 29 at 7 p.m. in the Robert B. Schultz Lecture Theatre—as part of the upcoming Bringing Research to Life Speaker Series.

They are co-leading a \$10.5 million research project, funded by Genome Canada and managed by Genome Prairie, to find and investigate new ways to create the next generation of biofuels (which are derived from renewable energy sources). The need has never been greater: the cost of tapping traditional fossil fuels is on the rise since the more easily accessible wells are being used up. There's also the added risk of environmental catastrophes when venturing into these new wells.

"The environmental impact of incidents like the Deepwater Horizon oil spill (in April in the Gulf of Mexico) should remind us that we are often unaware of the long-term impact of our technologies on our surroundings," says Sparling. "However, old habits are difficult to break. We are addicted to cheap oil."

The pair are looking for local bacteria that eat cellulose and in the process produce biofuels like ethanol or hydrogen that can be used to power our cars, boats, and planes. Part of their quest involves finding materials with little or none of the chemical compound lignin: the less of this the better as it makes the transformation into fuel less efficient. As it turns out, fuel-making bacteria love the discarded and processed cups from the popular coffee-shop chain. Using the cups also keeps them out of the landfill (Tim Hortons cups can be recycled but not all recycling facilities accept the cups at this time.) Now Levin and Sparling are turning their attention to Starbucks cups, along with other processed products like paper collars and bags.

"From an outreach point of view we hope our efforts give the community an awareness of the potential uses of underexploited resources that are hiding in plain sight around us," says Sparling.

What sets this pair of professors apart from other researchers who are exploring biofuels elsewhere in the world is their multi-bacteria approach. They're producing co-cultures that can work together with the goal of making the process more efficient. A more common approach is to use genetic engineering to create one super bacteria that "can do everything," says Levin. "And that hasn't really worked out very well." Instead, Levin and Sparling are "trying to mimic nature."

"Micro-organisms don't live alone. They live in communities," Levin says. "They like to have friends around."

They are isolating bacteria found in a variety of local and far-flung environments, including hot springs in

New Zealand, a farm in Saskatchewan, and even from within the guts of a dead wood-eating insect found in a cherry tree in Sparling's own backyard.

"Basically, the idea is we isolate these microorganisms from these communities; we characterize the ones that break down the cellulose, break down the cells individually and put them back together to see what combination works best," says Levin, likening the process to mixing and matching.

It's difficult for he and Sparling to predict how far away their research is from actually being put into practice. It all depends on the price of oil. If it takes a leap, producing these alternatives becomes more economically viable, in comparison.

Already, wood materials are being used to produce ethanol and hydrogen. To do so, scientists use steam explosion, and then enzymes to break down the cellulose—but it's a costly process, explains Levin. In fact, the biggest challenge in biofuels today is finding a production technique that makes them less costly than conventional fuel and a more viable option for industry. The bacteria he and Sparling are investigating "have the enzymes built into their bodies, encoded in their genomes" which would skip a step and save money.

Sparling says the key is to think globally—about the issues surrounding petroleum—but act locally to reduce our dependency on oil extracted from ecologically sensitive areas, like the Gulf of Mexico or Beaufort Sea.

"There may be local means of converting some municipal and agricultural wastes into biofuels," he says. "The cups are one example that may strike a cord with people's imagination."