McMaster Review

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Putting a new spin on learning

$100,000 grants awarded by the Centre for Leadership and Learning are changing the ways students learn

A "pendulum of death" might sound like something calculated to scare off students, not attract them. But it’s one of a long list of demonstrations being developed to engage undergraduates in introductory physics courses at McMaster under one of three departmental grants provided this spring by the Centre for Leadership in Learning (CLL).

“I want students to be enthusiastic about physics,” says Prof. Kari Dalnoki-Veress, Physics and Astronomy, who leads the demonstration project. Allison Sills and Dalnoki-Veress were co-applicants on a successful grant application which will enable the Department of Physics and Astronomy to continue this effort.

The departments of biochemistry, physics and astronomy and the undergraduate MD program received funding earlier this year under the second round of learning innovation grants offered by the CLL.

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Mac getting its ACT together to ease the parking crunch

With parking spaces becoming more scarce by the minute, McMaster faculty, staff and students are being asked to bike, hike, take transit and share the ride to campus this fall.

To prepare for the growing population on campus, the Alternative Commuting & Transportation (ACT) Office was recently created to reduce the demand for parking at McMaster and in surrounding neighbourhoods through increased awareness of alternatives and enhanced services and infrastructure. Daryl Bender, ACT Office co-ordinator who hops on his bike every day for the 20-minute ride into work, says, "As the University expands, we have to figure out alternatives."

Faculty, staff and grad students, while eligible for a parking permit should they wish one, are now relegated to peripheral parking lots. If you are planning to use Central Campus lots, get in line - there’s a long waiting list already in place. Undergraduate students, whose permits may be allocated by lottery if lots are oversubscribed, may not receive an on-campus permit at all. Fortunately, thanks to the work of ACT, you have more transportation choices than ever.

For example, May 2003 marked the launch of the University’s new carpooling program for faculty, staff and graduate students. The pilot program has become part of the regular slate of parking options offered at McMaster and has been extended to undergraduates.

All full-time undergraduate students are entitled to unlimited transport on HSR (Hamilton Street Railway) buses throughout the school year. The cost of this special pass is $65, included in the fees students automatically pay to the McMaster Students Union (MSU).

For September the HSR is doubling the number of buses running along Emerson Street, Whitney Avenue, and Main Street to the base of the Wilson Street hill. It has also completely re-built its three articulated buses, which will be dedicated each day, all day, to the University route.

If, in September, HSR service levels are adequate, the University will begin negotiating a staff/faculty bus pass program with the HSR. The target will be a 20 per cent reduction in the cost of a monthly pass.

The University hopes to develop a program, which staff and faculty commit to for the eight months of the academic year, leaving summers available for cycling, walking, and vacations.

Also keep in mind that GO Transit offers several programs for people commuting to McMaster: the Highway 407 Express Bus Service, GO Bus service between McMaster’s campus and the Burlington GO Station, and all-day Express GO Bus service from Union Station.

Breaking new ground with Campus Renewal project

Keeping true to its culture of innovation, McMaster is the first university in Canada to become a partner of Campus Renewal Partnership. Commencing this fall, the Campus Renewal Partnership (CRP) is a comprehensive strategy and management system developed by Ameresco Canada Inc. to:

- provide creative ways to relieve funding challenges and advance renewal more rapidly;
- offer new capital asset management approaches to help maximize the value of McMaster’s physical assets; and
- enhance Mac’s learning and working environment.

Right now, university buildings, and their associated facilities, across the country are in need of significant renewal – some more than others. Even campuses such as McMaster, with strong alumni support and funding through SuperBuild and private donors, have renewal challenges to deal with in the short- and long-term.

Ameresco Canada Inc. is an independent energy solutions company whose strategy focuses on facility renewal funded directly through energy savings. "Essentially, this initiative uncovers financial opportunities from within the current infrastructure, and redirects these dollars into higher investment priorities," says Karl Flood, project manager, Ameresco Canada Inc.

This proven approach is designed to help cope with the “funding gap” that is created by aging structures and limited budgets. "As we prepare for the additional challenges involved with increased student enrolment from the incoming double cohort, the timing for a new strategy for facility renewal couldn’t be any better," says Anthony Cupido, director of Physical Plant, McMaster University. "Campus Renewal Partnership is also a perfect fit with our mission to create a healthy, safe, and inspiring physical environment conducive to study,

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Susan Elliott plays a new tune
First woman dean of Social Sciences up for the challenge

BY CHANTALL VAN RAAY

When Susan Elliott turned 40, she decided it was time to try something new: setting out to master the piano.

A year later, sitting on a piano bench and looking at her hands on the keys in front of her, she thought, "to make your left hand do one thing and your right hand do another and your foot do something completely different, that’s a huge challenge."

Now, at 43, she’s up for a similar challenge as the new dean of the Faculty of Social Sciences. She will need a lot of hand-eye co-ordination, and she’ll be using a different part of her brain. It will also be one of the biggest challenges of her life.

She didn’t take the decision lightly. She deliberated on it for more than a month. But it was obvious she was right for the job. At least, that’s what others thought. "This was the third time I had been asked to consider a position of administration. The others times I had always said no because I thought it was premature. I’m pretty young to be a dean and I wasn’t sure it was something I wanted to do at this stage."

Elliott doesn’t regret her decision and feels privileged and excited about her new role ahead. She joined the faculty on July 1, but didn’t officially move over until Sept. 1. In the meantime, she met with heads, chairs and directors of departments to get to know them on a one-to-one basis and find out what the issues are.

One issue she’ll focus on is an integrated health and social sciences initiative. "At the end of the five-year term, I want to be able to point to something tangible in terms of an initiative around an integrated health and social sciences strategy," she says.

Elliott also strives to build a common vision within the faculty, starting with a deficit-free plate. Capitalizing on the innovative teaching and education initiatives is part of this, she says. "Innovation in teaching is a key part of what McMaster is. We sell not only a product to undergraduate students, we sell a process."

Technology in teaching is a creative way to do that, Elliott says, especially in light of the double cohort. "We’re going to have a lot of students in our classrooms and this is one way that we can start to address that issue."

As a mother of two teenage girls, Elliott understands what is important to students. She is also glad she can set the example of being the first woman dean of social sciences at McMaster. "I think I’m setting a very good example, especially for two female children, that they can go and be whatever they want to be," she says.

Her example is wearing off. Her 14-year-old is determined to go into arts and science and her 11-year-old wants to do a dual masters and PhD in math and chemistry with ambitions of being a chef.

Elliott emphasizes with parents who demand accountability from universities. "Parents are showing up at open houses and saying, ‘what is my child going to get from all of this money that I’m giving you,’ and quite rightly so. I think there has been a refocusing of our teaching on what we’re giving students and what they’re going to get for their money."

In social sciences, they’ll get a lot, she feels. "We consistently see students who have a broader liberal education are getting hired faster, they’re employed longer, they make more money. Statistics Canada data tells us that all of the time. We’re not creating students who can do one thing. We’re creating students who can do many things."

As a social sciences graduate, Elliott knows this first-hand. Since graduating from McMaster with a PhD in 1992, she has been able to do many things with her research that focuses on environmental health and heart health promotion.

Her most recent research involved the only study in Canada on West Nile virus with John Eyles, director of the McMaster Institute of Environment and Health. This research involves taking blood samples from people in southern Oakville, where West Nile was prevalent last summer. "If we can determine how many people were bitten by an infected mosquito but didn’t actually get sick, we can determine what the magnitude of the problem is."

Her work in the Aral Sea, located in Uzbekistan and Kazakhstan, was equally as significant. The Aral Sea disappeared after two rivers feeding the sea were rerouted to irrigate cotton crops. The dried-up sea caused extreme health issues due to toxic sand storms. Recently, a consortium was formed between McMaster and researchers at Sunnybrook Hospital and the Centre for International Health at the University of Toronto to take over operational research in the Aral Sea.

Reflecting on her years’ past, she is excited about the ones ahead. Her predecessor, Alan Harrison, appointed vice-president academic and provost at Carleton University in Ottawa, left a tremendous legacy in terms of the organization of the office, she says.

Elliott has similar sentiments for other staff, including acting associate dean Susan Watt, a professor of social work, who is filling in the position for one year. "I feel privileged to work with the incredibly great group of people that are already in the administration here, like the other deans, the provost and the president," she says. "I’m really looking forward to working with them and their team."

"Susan has been a member of the McMaster community for 16 years," says provost Ken Norrie. "She earned her Masters and PhD in geography at the University and since that time has developed a stellar reputation as a world-class researcher, an innovative and dedicated teacher, and a thoughtful and progressive administrator."

Elliott joined the School of Geography and Geology as an assistant professor in 1992 from the University of Victoria where she spent two years as an assistant professor. She has been an associate professor at McMaster since 1998, served as the School’s associate director since 1999, and is a member of McMaster’s Institute of Environment and Health. She also served one year as acting director of the School of Geography and Geology.
Unlike awards provided to individual faculty to improve one or a couple of courses, these three-year, $100,000 grants help departments or schools make larger and more substantial changes throughout the undergraduate curriculum. The program is funded by a $1-million grant from the Imperial Oil Charitable Foundation.

“This is transformational money. It’s money to change a program, not to sustain it,” says Dale Roy, executive director of the CLL.

Among possible candidate projects: introducing the inquiry approach to labs; adding a co-op stream to an honours degree; converting a program to distance mode using streaming video; modifying a degree program to develop a set of skills systematically over four years; changing how student learning is assessed; or introducing large-scale simulations into a program.

Dalnoki-Veress says the new grant will allow his department to continue a project begun last year to make introductory physics courses – notorious for their difficult content – more engaging for roughly 1,500 students in engineering and science.

He began designing large-scale demonstrations for lectures of about 120 students last year, including the pendulum of death demonstration using a bowling ball to illustrate momentum and conservation of energy. “When students see this, they’ll remember it.”

The grant will enable recently hired physics and astronomy faculty member Ken Sills to devote most of his time to developing these demonstrations. Ken Sills has taken a leave from his company which designs and builds scientific instrumentation. His experience with instrumentation will be a valuable asset to the project.

The Department of Biochemistry will establish active and experiential learning in undergraduate courses, including developing new lab modules, computer simulations, instructional videos, problem sets and other approaches, says Prof. Gerry Wright, chair.

He says the grant will also help in developing assignments to improve students’ communication skills, introducing inquiry-based approaches to existing and new courses, and foster ties with students and alumni.

“Students can expect to be in a more dynamic and stimulating environment where they take on a more active role in their learning and develop strong communication and research skills,” says Wright.

The project leader will be Prof. Michelle MacDonald, undergraduate co-ordinator and academic adviser, and herself a McMaster biochemistry graduate.

The undergraduate MD program of the Faculty of Health Sciences will use the funding to provide the first significant curriculum change in its MD program in 20 years. The new curriculum will focus on “deliberate practice,” applying concepts and understanding how people may become ill. Practice will be provided by having contact with simulated and real patients, to introduce students to the multiple dimensions of their professional roles.

Two projects received learning innovation grants during last year’s inaugural competition.

The School of Geography and Geology has used part of its funding to introduce more field trips and other hands-on activities for “several thousand” first-year students. For example, students might head into the city to learn about housing in Hamilton for human geography or become rock hounds for a course in earth and the environment.

“We want to ensure every student in our programs gets a substantial amount of experiential learning,” says Carolyn H. Eyles, chair of the school’s undergraduate curriculum committee. She is a project co-leader along with lecturer and undergraduate student counsellor Susan Vajoczki.

The school has also used its grant to hire undergraduates to help in developing course and program materials to introduce more learning skills such as inquiry, problem solving and communication throughout the undergraduate curriculum.

Prof. Margaret Denton, director of the McMaster Centre for Gerontological Studies, is using part of a grant approved last year to hire an academic program assistant to develop more community placements for students in first- and third-year courses.

Along with project co-leader Prof. Christopher Justice, she is also developing professional development courses, changing an introductory course from six units to three in order to expose more students to gerontology, adding inquiry courses, introducing problem-based learning, and conducting surveys of students and graduates within a more formal evaluation process.

The “pendulum of death” as demonstrated by professor Dalnoki-Veress
He has the whole world under his watch
Researcher Imre Szeman tackles global news coverage

Since joining McMaster’s Faculty of English in 1999, Imre Szeman has been winning national recognition for his unique teaching and research style.

The 35-year-old is a leading researcher on globalization’s effects on culture. A founding member of cultural studies groups in both Canada and the United States, Szeman is now the director of McMaster’s Institute on Globalization and the Human Condition. Most recently he was named the inaugural winner of the 2003 Petro-Canada Young Innovator Award, which provides $25,000 to a new McMaster professor (less than eight years from a PhD) to encourage creative thinking about how undergraduate students can participate in University research.

Creativity isn’t a problem for Szeman. He plans to use the award for a project beginning this fall called The World of News: Global Coverage of International Events – A Comparative Analysis. It will involve five undergraduate students who will analyze national newscasts from around the world to develop an understanding of how people interpret events on a local and global level.

Students will be using the new global video facility funded by the Canada Foundation for Innovation that will allow them to monitor news broadcasts, record them in digital form on a hard drive and output them to DVD.

“As a team we will be looking at what kinds of things are not being focused on and why and how that produces a link between the local and the global,” said Szeman. “Part of this research is to understand what the international landscape looks like from different national sites.”

Integrating research with the undergraduate learning experience is a key element of the project.

“What we’re aiming at is to get the students engaged in the inquiry and discovery process,” said Szeman. “It’s sometimes difficult to integrate research, teaching and learning in the humanities as there is the notion of the solitary scholar in humanities. This award is meant to engage students directly in research and should be a project that will carry on into the future.”

By Shelly Easton & Lisa Caines
research, and work.”

Initial measures and improvements of the program will be completed over the next three and a half years, with a 20-year payout. The first phase of the project now underway will see University Hall, the Nuclear reactor and Life Sciences buildings, Gilmour and Togo Salmon Halls and the Thode Library receiving new energy efficient lighting.

“As a result of lowering energy cost and consumption by 23 per cent, which equates to roughly $1.5 million annually, we expect to create $28 million in facility renewal improvements,” says Cupido.

At the same time, the campus will achieve a 20-30 per cent reduction in greenhouse gas emissions, which exceeds Kyoto Protocol guidelines by 20 per cent,” adds Joe Madeiros, project manager, McMaster.

According to Al Paskevicius, manager of utility services, specific facility renewal measures include:

- Lighting retrofits – replace old inefficient T12 bulbs with T8 bulbs, as they use less energy, have less glare, and provide better quality of light
- Install new occupancy lighting sensor controls to create energy efficiencies during unoccupied times
- Water efficiency measures – utilize water efficient flush valves and aerators to reduce the amount of water usage
- Refurbish Air Handling Units (AHUs) to provide better air quality
- Fumehood system renewal for the Life Sciences Building
- Energy efficient window replacements throughout the campus

“These measures will improve system reliability, renew aging equipment, improve air quality, reduce waste and ultimately create a more comfortable campus for staff, faculty and students alike,” says Cupido.

As a show of genuine support for this pioneering partnering initiative, McMaster is receiving a $250,000 NRCan Natural Resources grant. A kick-off celebration for the McMaster Campus Renewal Partnership is being planned for later this fall. Watch for details in the McMaster Daily News at http://dailynews.mcmaster.ca. In the meantime, if you have any questions, please contact Anthony Cupido at 905-525-9140 ext. 23054.

-Chantall Van Raay

&Marie Olds-Cresswell
Using math and medicine to wipe out deadly viruses

David Earn’s mathematical models could lead to breakthrough vaccines

By Andrew Vowles

SARS was all over the news headlines last spring when the phone began ringing in the office of McMaster’s Prof. David Earn, mathematics and statistics.

The calls came from several directions, from a physician at Scarborough Grace Hospital – site of the original cases of severe acute respiratory syndrome in Canada – to government agencies, notably Health Canada and the Ontario Ministry of Health.

Their question: Could Earn use his math smarts applied earlier in modeling disease epidemics and conservation of wildlife species to help understand – and hopefully help to stop – the spread of this deadly new infection?

Closer to home, another call came from Prof. Mark Loeb, pathology and molecular medicine, who regularly finds himself tapped during health crises as an infectious diseases consultant. Since this spring, Loeb has been leading a research team studying the diagnosis and epidemiology of SARS as part of a $1.7-million research strategy funded by the Canadian Institutes for Health Research (CIHR).

“We wanted a comprehensive approach to SARS and felt that David’s expertise in mathematical modeling would be an important asset to our proposed research,” says Loeb, referring to Earn’s models of measles and influenza outbreaks.

By mid-summer, SARS had more or less receded from the news, but the number-crunching was still going on in Earn’s office. As a theme leader in the Canadian SARS Research Network, the McMaster mathematician is using travel and hospital statistics to model the capacity of Canada’s health care system to deal with this and other disease threats.

Predicting when the next such outbreak might occur is impossible, says Earn, who had already received a CIHR New Investigator award last year and an award from the Rx&D Health Research Foundation this year. But it’s important to learn more about the spread of diseases, and our ability to resist them, in order to meet the next threat head-on.

Earn uses mathematics to model infectious disease transmission. A breakthrough reported in 2000 revealed the mechanism behind mysterious irregularities in historical measles outbreaks. “We discovered that it’s possible to predict changes in the frequency of measles epidemics from birth rates and vaccination levels.” More recently, Earn and his group have shown that simple models can also explain the outbreak patterns of rubella, chicken pox and whooping cough.

He has also developed a new way to design vaccination programs. “I’m using mathematical techniques to determine immunization strategies that would synchronize epidemics, especially measles,” he says, explaining that new types of mass vaccination campaigns might cause the trough in an epidemic cycle to occur simultaneously around the world, increasing the chance that the disease will disappear everywhere.

About half of vaccine-preventable deaths in the world are caused by measles. Some 30-40 million cases of measles occur each year and about 750,000 people die from it, mostly in Africa.

Another recent project investigated the cost-benefits of voluntary versus mass-imposed vaccination for smallpox. Earn says mass vaccination against smallpox would save lives in the event of a bioterrorism attack. But would you still want to impose vaccinations – and risk the side effects of the vaccine itself, including deaths – if no attack took place?

He hopes agencies such as the World Health Organization might use his research to design more efficacious control programs. “It would give me a lot of satisfaction if a vaccination strategy that I helped develop was used and helped to save lives.”

For Earn, working on disease eradication is a kind of mirror image of another way he uses math, to help conserve endangered wildlife species. “In one case we want to cause extinctions, in the other case we want to prevent them.”

He has shown that conservation corridors, which connect patches of habitat and allow endangered animals to move among them, have the potential to make matters worse for the very species they aim to protect. “The trouble is that connectivity promotes synchrony and – like in the epidemic problem – synchrony promotes global extinction,” instead of allowing isolated groups to survive.

Neither epidemiology nor ecology had been part of Earn’s initial plans. The Winnipeg native had studied mathematics and the dynamics of solar systems and galaxies, first at the University of Toronto, then at the University of Cambridge.

As a post-doctoral fellow, he was swayed from physics to biology after his wife asked for help in modeling the evolution of parental care in fish (Prof. Sigal Balshine is a faculty member in the Department of Psychology).

Unlike physics, in which he might be refining mathematical methods to make progress on well-defined problems, he says that for many biological problems “the greatest challenge is to figure out what the right question is.”

Motivated by his desire to contribute to improving public health, he has begun work with Prof. Julia Abelson in McMaster’s Centre for Health Economics and Policy Analysis on how best to turn mathematical research results into information that policy makers can use. “It would obviously be a shame if valuable research results were not passed on in a useful way to the people who make policy decisions.”
Gearing up for double cohort

BY JULIA THOMSON

Like other Ontario institutions, McMaster University has been planning for several years now for the double cohort. This month, the plans will be tested as two groups of post-secondary school graduates – Grade 12 and OAC students – arrive on campus.

This group presents numerous challenges and opportunities for McMaster. The lasting effects will be many.

Here is a fast facts offering on the double cohort:

**Numbers**
- McMaster received about 39,000 applications from Ontario high school students for approximately 3,900 spaces. As of Jan. 15, 2003, 6,748 students listed McMaster as their first choice;
- As of June 19, 2003, 4,770 high school graduates accepted first-year places at McMaster;
- The University’s enrolment target agreement with the province was 4,330 students. McMaster’s overall enrolment target for first-year this fall is 5,100;
- Across the province close to 72,000 students have accepted offers to university. The government had made a commitment to provide 70,000 student spaces.

**Facilities**
- Two temporary classroom buildings, which will serve a combined total of 750 students, will be in place for September 2003. These facilities will remain in operation until September 2004 when the new Centre for Learning & Discovery opens.
- The $71-million Centre for Learning & Discovery, scheduled to open in September 2004, features technologically advanced classrooms and laboratories.
- The new Mary E. Keyes residence building is now open and accepting students for September 2003. This six-storey building houses about 280 occupants and features self-contained suites. Each suite contains four bedrooms, two bathrooms, a kitchen and a living room. The residence also includes a 720-square-metre (8,000 sq. ft) dining hall for use by students in neighbouring residences and the campus community.

**What McMaster is saying**
- Jennifer Kleven, manager, Off-Campus Resource Centre, believes that the double cohort and the increase in the number of students living off-campus has created several positive results. “There is an increasing recognition of off-campus issues as this population of students grows … I would like to think that our office is becoming somewhat of an ‘essential service’ for all students; virtually every student will be living off-campus or commuting to school at some point in their university career, and will have a need to consult our office or our Web site. We are continuously striving to evolve our services to create a link for those who feel they’re missing something by not living in residence.”

- Neville Boney, president, McMaster Students Union (MSU), is very excited about the fall. He explains, “I’m confident that they [first year students] will fare well in the double cohort environment. Why? Because Mac attracts some of the smartest and hardest working people around. That being said it is our collective responsibility, the University and the MSU, to make sure that all is being done to meet the needs of undergraduate students at Mac.” The main issues he sees facing the University are housing and residence space constraints and financial aid. But Boney points to steps taken in parking and transit services as positive examples for the future.

**What the students are saying**
- Holly Dzuba, a Grade 12 graduate who has been accepted into the engineering program, says, “I originally felt really discouraged about the double cohort; however, after I, and most of my friends, were accepted into the programs of our choice, I felt more confident about this situation.” Her main concern is being at a disadvantage compared to students who graduated with OAC. She states, “I hope that the school has taken the fact that we have missed out on certain math and science topics into account.”
- Alyssa Tilden, another Grade 12 student, is attracted to McMaster because of the number of activities offered for all students, including those living off-campus. She explains, “At all universities, it’s hard to get into residence, but at McMaster, they actually offer events for off-campus students and include them in Welcome Week.” She is worried about missing out by not living in residence, but has found accommodation in a house near McMaster.
- Dave Chawdhary Jr., an OAC graduate, chose McMaster because of its reputation for having strong science programs. “I was worried about getting in,” he says, adding that many of his friends were not accepted. “It’s a big weight off my shoulders, and I’m looking forward to the whole university experience.” For him, the university experience includes living on campus. He was one of the lucky 3,389 students who qualified for a guaranteed spot in residence.