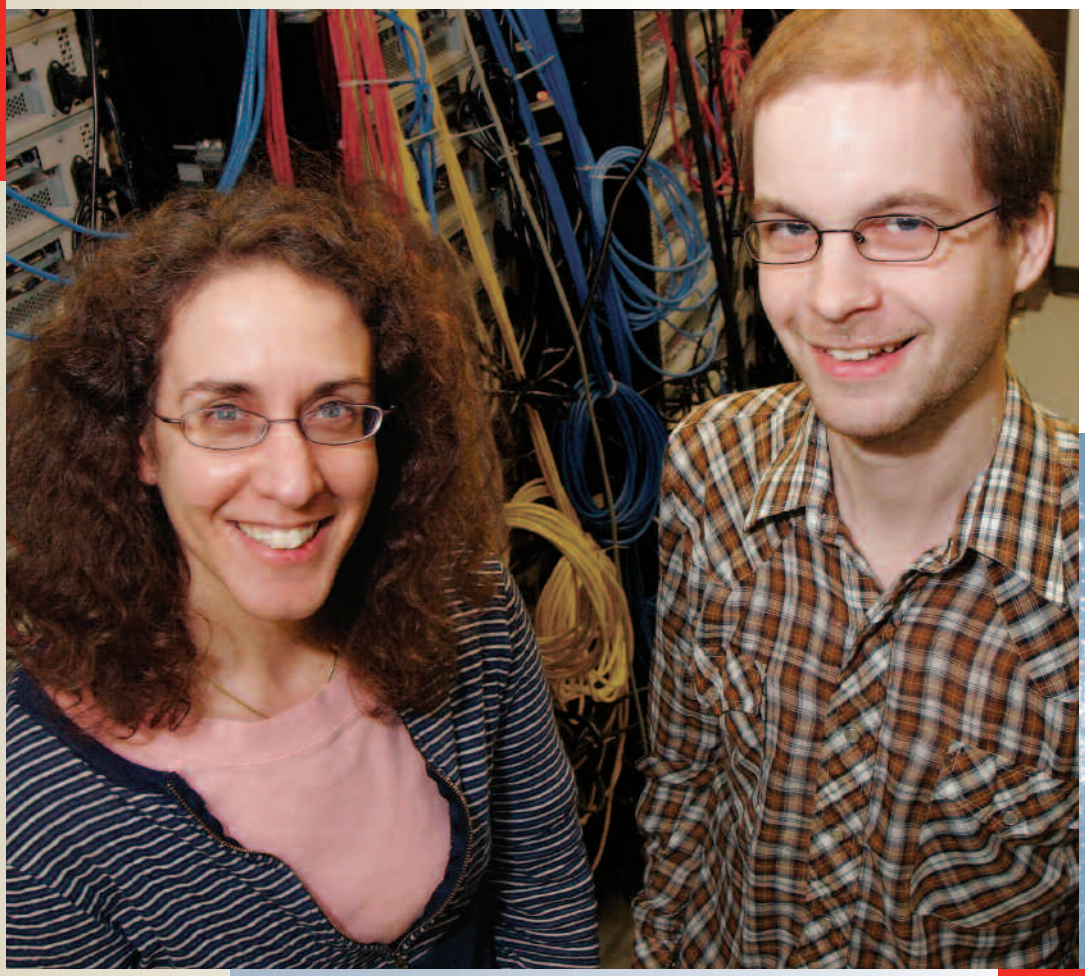
McGill *in* Focus

SPRING 2006

SCIENCE

edition



McGill's Big Bang in Astrophysics and Cosmology Research

THIS ISSUE

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Faculty of Science Newsletter

SPRING 2006

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On the cover
Pulsar Pioneers: Physics Professor Vicky Kaspi and doctoral candidate Jason Hessels. Photo by Owen Egan

Owen Egan

DEAR FRIENDS AND ALUMNI

Universities can seem remote from everyday life. McGill is internationally renowned for both teaching and research, but we cannot forget that it is also a Montreal university, a Quebec university, and a Canadian university, and that the people here are proud of McGill and its accomplishments. In turn, we have a responsibility to them. Not only do they help pay for our work, but they also want to know – and should know – about the latest discoveries and debates in science. Everything that is happening in the world of science is happening here at McGill in some form, and we must create meaningful ways to talk to people about our work. Sometimes I come across popular science that has been "dumbed down" for easy consumption, which is a bit like eating your favourite meal after someone else has chewed it for you: it loses its flavour. I've been to many conferences in my career, and have heard some pretty heated debates, so I know the passion that science can arouse. I want us to convey that excitement and intensity.

The Lorne Trottier Public Symposium on Climate Change and Energy, held last November, is a good example of how we scientists and researchers can involve the community beyond the University. People are interested in science, even though they do not have the technical background that university researchers have. But they are motivated – and this motivation is not a function of anyone's ability to fiddle with partial differential equations or do lab experiments. In fact, it's the other way around. Those skills are a product of that motivation, that ambition to understand what is going on in our world. This enthusiasm drives our undergraduate students and our alumni, as well as our faculty members. One of my goals as dean is to ensure that we share the fruits of our labour with the public.

And there will be fruits. Almost half of our faculty members have been hired in the last five years, and they are just getting to know each other and are launching some exciting collaborations. As you will read in this newsletter, these professors will be working on research with undergraduate students, who have as much intensity and drive as they'll ever have in their lives. And of course, you will also be meeting some of our newest faculty members at alumni events around the country, where they will be happy to share their enthusiasm as well as their discoveries with you.

Martin Grant
Dean, Faculty of Science

The Faculty makes it easy for you to keep in touch electronically. You can find alumni news at the Science Alumni and Friends website, www.mcgill.ca/sdo. Sign up for a quarterly electronic newsletter and periodic event announcements by sending an email with your name, degree and year of graduation to reply.alumni@mcgill.ca.

Public Science: Understanding the Climate Challenges

From November 28 to December 9, 2005, delegates from around the world gathered in Montreal for the United Nations Climate Change Conference. But for 500 interested people, the issues around climate change had an early airing on November 24, when the topic of the inaugural Lorne Trottier Public Science Symposium was Climate Change and Energy. This event was organized by Charles Lin, director of the Global Environmental and Climate Change Centre (GEC3) and professor of Atmospheric and Oceanic Sciences. It was moderated by Nigel Roulet, director of the McGill School of Environment, and sponsored by the Faculty of Science and the GEC3, with the support of the Trottier Family Foundation. It featured short presentations and a discussion by four internationally renowned scientists: Martin Hoffert, Professor Emeritus in Physics from New York University; Nebojsa Nakicenovic, Professor of Energy Economics at the University of Vienna; Romney Duffey, Chief Scientist at Atomic Energy Canada; and Amory Lovins, founder and CEO of the Rocky Mountain Institute. The panelists also responded to questions from the audience. And while they agreed that a "business-as-usual" approach to climate change would lead to catastrophe, there was an impassioned debate over the best steps to take.

"Can we continue with our current level of economic growth while phasing out greenhouse gas emissions?" asked Hoffert, calling himself a "technological optimist" who believes that we can invent ways to solve the climate problems. Current technologies, he argued, must be supplanted by creative, sustainable energy, including wind, solar, geothermal and tidal power. But time is running out. Nakicenovic proposed a pragmatic, graduated plan, beginning with immediate behavioural change that addresses waste and efficiency issues, followed by the development of emissions-free technologies, and eventually leading to a post-fossil fuel era and an entirely new paradigm of energy creation, distribution and consumption. According to Duffey, this new paradigm should feature nuclear energy prominently, as it is emissions-free and recent technological developments have created safer and more efficient reactors. Lovins, the final speaker, participated via a video connection. His organization helps corporations such as BP, DuPont and Wal-Mart to save money by using energy wisely. By way of illustration, he cited a production plant that saved 92 percent of its energy costs on a heat circulation loop by switching from long crooked pipes to short straight ones. "It's Victorian engineering rediscovered," he enthused.

Climate change is, of course, also a social and political problem, and the final word went to Thomas Mulcair, BCL'76, LLB'77, then Quebec's Minister of Sustainable Development, the Environment and Parks, who noted that Quebec, stretching from the Arctic to the American border, is a living lab for climate change. Several days after the symposium, the provincial government announced that it will aim to reduce Quebec's emissions by 20 percent by 2015.

The Panel (l-r): Thomas Mulcair, Nigel Roulet, Martin Hoffert, Nebojsa Nakicenovic and Romney Duffey

Owen Egan

Owen Egan

Louise and Lorne Trottier, BEng'70, MEng'73, listen to the debate over climate change and energy

SCIENCE FOR ALL

For a quiet man, Lorne Trottier has a high profile at McGill. In 2005, Trottier and the Trottier Family Foundation created the inaugural Lorne Trottier Public Science Symposium, with the goal of bringing high-level scientific debate to a broad public. "Lorne and I share the belief that some outreach can be too simplified," says Dean Grant. "People know there are complex debates, and Lorne wanted to make it possible for them to engage with these debates, so he generously funded this symposium." Trottier was also the catalyst for the information technology facility which now bears his name: the Lorne M. Trottier Building opened in 2003, thanks to the momentum provided by his $10 million gift. As co-founder of Matrox Electronic Systems and President of Matrox Graphics, Trottier's impact has been felt across Quebec business and industry. In December 2003 he was awarded the Quebec government's prestigious Prix Lionel-Boulet for his contributions to industrial research and development.

REACHING OUT

The Faculty of Science has appointed Ingrid Birker as the new Outreach Coordinator. Birker will ensure that Science activities and events reach the widest possible audience across Montreal, and will devise new strategies for sharing the knowledge of McGill scholars through public talks, school visits, and other outreach activities.

Owen Egan

Erica Besso

The Market Road

The pathway from lab to market is not well signposted, and relatively few professors make the trip. To encourage them on the journey, this February the Faculty hired Erica Besso, BSc'77, PhD'84, as research innovation officer. In this newly created position, Besso will identify promising research developments and guide them to the Office of Technology Transfer (OTT), the office in charge of bringing McGill-developed innovations to the marketplace. Besso, whose doctoral research focused on polymer chemistry, has worked with DuPont and the Natural Sciences and Engineering Research Council, as well as with McGill's OTT, where she served as a life sciences officer. While McGill researchers are recognized around the world, the University's culture of commercialization is subdued, especially when compared to American counterparts. But with almost half of its professors new to the Faculty in the last few years, the timing couldn't be better. "One of my challenges will be to encourage faculty members to consider commercializing those research products that have marketplace potential," says Besso. "It can be good for the individual, the Faculty and the University, and it includes the possibility of receiving financial returns that could be plowed back into research."

Hormones and Memory

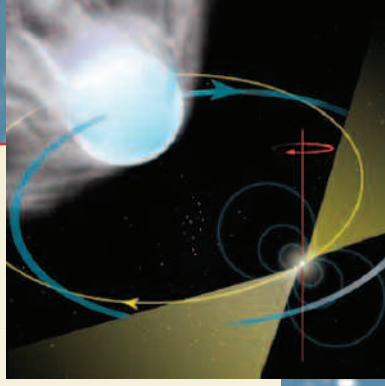
"Hormone production decreases in both women and men as they age, and aspects of cognitive functioning decrease as well," says Barbara Sherwin. "Our studies have shown that this is not a coincidence." Sherwin is a James McGill Professor in Psychology, a Canadian Institutes of Health Research Distinguished Scientist, and co-director of the McGill Menopause Clinic, where she meets patients weekly. Her research has explored the effects of estrogen on cognitive functioning, demonstrating that some types of hormone treatment can help women retain aspects of memory that normally decrease with aging. Estrogen affects brain structure and function in many ways: it increases the amount of an enzyme needed to synthesize a neurotransmitter that is critically important for memory, and it also increases the number of dendritic spines on neurons, allowing them to communicate more effectively and frequently with one another. "There are known sex differences in cognitive functioning," she explains. "Women tend to perform better on tests of verbal memory and fine-tuned manual dexterity, whereas men do better on gross motor coordination and spatial ability. We hypothesized that estrogen in adulthood would highlight its neonatal effects on the brain, so that if you gave it to post-menopausal women it would have an impact on verbal memory and other areas where women excel." And so it has, as Sherwin's work over the last fifteen years has proven. She is now beginning to study the effect of hormones on cognitive functioning in older men who have been diagnosed with mild cognitive impairment, a precursor to Alzheimer's. "If you give men estrogen, they may do better in verbal memory and perhaps less well in spatial-visual memory," she suggests. Her team has collected data for this project and is currently interpreting it.

Owen Egan

Barbara Sherwin

Research is still uncovering the subtleties of the relation between hormones and cognitive function. Giving estrogen to women around the age of fifty seems to slow the deterioration in memory that occurs with normal aging, but if it is given to women around seventy years of age, it does not help and may actually exacerbate memory loss. "Current thinking is that the time of initiation of therapy with estrogen is critical, and we're still working out those issues," she says. "Consequently, there are no sanctioned therapies yet." Women's health research is complex, crossing many disciplinary lines: Sherwin's graduate students end up learning about reproductive endocrinology, neuroscience and neuropsychology during their studies. "It is very gratifying to do research with direct clinical implications," she says. "People are living longer, so it is important to find preventative strategies against the degenerative diseases of older age."

McGill's Big Bang



Each week, the Physics department hosts an Astrophysical Tea, at which researchers discuss their work. These days, there is plenty to talk about. When Vicky Kaspi was hired in 2000, she was the only professor with an astrophysics background. Since then, focused recruitment has made McGill the country's gravitational centre of high-energy astrophysics and cosmology research.

Neutrons at the Edge

"I call my research 'Neutron stars in the extreme' – of rotation, density, and magnetic fields," says Vicky Kaspi, BSc'89, associate professor of physics. When neutron stars are extreme enough to catch Kaspi's attention, they are pulsars – extremely dense, highly magnetized and spinning very quickly – and can be most readily detected with radio and x-rays. Recently Kaspi and her collaborators looked to a cluster called Terzan 5 and found the largest collection ever recorded of millisecond pulsars (MSPs) – spinning hundreds of times per second. "So far in Terzan 5 we have found an unprecedented 33 MSPs," says Kaspi, who holds the Canada Research Chair in Observational Astrophysics. "And each has its own story to tell." One of them, in fact, is the fastest-spinning pulsar ever found, at 716 rotations per second (see "Spinning Stars").

The find confirms some important theories in fundamental physics. "This is exactly the sort of discovery we had hoped to make," says Kaspi. Neutron stars are 1.4 times the mass of the sun crushed into a radius of about 20 km – slightly smaller than the island of Montreal. "If you were to go to one and scoop a teaspoon full, it would weigh a billion tons. This is matter unlike any we are familiar with on Earth, and we don't know how it behaves. But neutron stars could help us to understand the nature of high-density matter." Scientists have yet to learn how pressure, density and temperature are related in ultradense matter, and different equations proposed by theorists predict different maximal rotation rates for these stars. "So if we find something spinning really fast, the fact that it exists and hasn't broken apart tells us something fundamental about the nature of the matter."

Check out the latest pulsar research at www.physics.mcgill.ca/~pulsar/

Spinning Stars

You can't tell by looking, but our sun spins once every 26 days. Across the galaxy, garden-variety pulsars spin anywhere from once every second or two to around five times a second. This January, Jason Hessels, a doctoral student working with Vicky Kaspi, was lead researcher on a paper describing a millisecond pulsar rotating a dizzying 716 times per second. The previous record holder, found 23 years ago, was spinning 642 times per second.

"Millisecond pulsars spin so fast because they strip material from a binary companion, and this material then spirals in to transfer spin to the pulsar," he explains. But finding a fast pulsar is no easy matter. "Usually, pulsars give extremely weak signals, so you need the largest telescopes available to look for them," Hessels says (his team used West Virginia's Green Bank single dish radio telescope, which has a diameter of 100m). They have an intrinsic spin period, but because they orbit their binary partner this period seems to be changing, emitting washed-out data signals instead of sharp ones – and helping them to stay hidden. "Because this pulsar was very difficult to find, there are probably similar pulsars that just haven't been observed." Terzan 5, home to the universe's fastest spinner (so far), boasts five of the ten fastest pulsars ever recorded. Says Hessels, "There is something very interesting about this star cluster."

Image courtesy of NRAO/AUI

Top: An artist's conception of a millisecond pulsar, complete with binary system partner

Right: The Green Bank Telescope

Vicky Kaspi and Jason Hessels

Owen Egan

Owen Egan

Robert Brandenberger

Big Bang – or Bounce?

"The standard paradigm of early universe cosmology, which includes the big bang, has severe conceptual problems," says Robert Brandenberger, the Canada Research Chair in Theoretical Cosmology. The singularity at the big bang itself means that physical laws cannot be trusted, and calculations based on combining string theory and cosmology suggest that there may not have been an initial singularity at all. "Instead of a big bang, there may have been big bounce," he says. "String theory is currently the best candidate for a fundamental description of nature that could overcome the problems with the current model, but it brings a new puzzle. In string theory there are nine or ten dimensions of space, not just space-time - so where are they?" Brandenberger has been refining the idea of string-gas cosmology, in which "stringy fluctuations" seed the density of the universe in its early phase, leading to the creation of stars and galaxies. "We are trying to build a new paradigm of the early universe," he explains. "Now we are working on how researchers would look for evidence such as remnant strings." He is also concerned with describing the material that makes up the universe. The matter we know about constitutes only ten percent of the universe's mass, with the remaining ninety percent posing an important scientific mystery. Researchers have theories and candidates for "dark matter," which comprises about 20 percent, but the other 70 percent, "dark energy," remains obscure. "Figuring out dark energy is going to be a crucial challenge over the coming decades," Brandenberger predicts.

The Wave of Gravity

"If the big bang theory is correct, we have to move somehow from a homogeneous early universe to the complex one we see today," says Matt Dobbs, BSc'97, Canada Research Chair in Experimental Astro-Particle Physics. "The theory of inflation provides this transition." In inflation, small quantum mechanical fluctuations – creations and annihilations that would normally cancel each other out – are suddenly stretched to a cosmic scale, so that they cannot annihilate one another. We have no direct evidence for inflation, but one clue might be found by measuring the polarization of the cosmic microwave background, remnants of an early point in the universe's development. Current theory suggests that gravity waves were released during the inflation period. "If we view gravity as a particle, it will flow like light, printing a signature on the sky," he says. But with a time period comparable to the age of the universe, we cannot put out a detector to wait for a gravity wave to pass. "However, these waves would perturb the metric of space-time, and as microwave background photons travel through this metric, they would scatter off electrons, polarizing the light," says Dobbs. "If we could measure not just the intensity of this light, but its orientation, we might find the signature of gravity waves – and the smoking gun of inflation." Dobbs is currently building experiments to measure this polarization.

Cosmic Evolution

"We don't know all the processes involved in the evolution of the universe," says Gil Holder, the Canada Research Chair in Cosmological Astrophysics. His research aims to uncover some of that evolution by developing observational tests to track the history of the universe, and he is collaborating with Matt Dobbs in creating detectors to apply some of these tests.

"We can now see fluctuations in the microwave background where massive galaxy clusters are," he says. "As microwave photons go through galaxy clusters, and especially the hot ionized cloud in between the galaxies, they scatter electrons. So with a high enough resolution, we can see some funny business in the microwave background where these galaxy clusters are." Thus, researchers can perform a galactic census, to track how structure grew, and to pin down questions about the property of the universe's mysterious "dark matter" – how much exists and what it does. Mapping galaxies also enables researchers to calculate local gravitational attraction, as gravity causes small things to collapse into bigger things, and gravity clusters are the largest objects to undergo this process. "As we look further into the sky, we are looking back at earlier times – so there won't be as many of these clusters," says Holder. "This allows us to trace the evolution of structure in the universe."

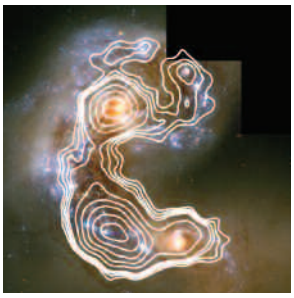
Owen Egan

Gil Holder and Matt Dobbs: the spinning ball shows a map of the universe's microwave background

Owen Egan

Tracy Webb
Left: Colliding Galaxies
Below left: Infrared image of colliding galaxies

Building Galaxies



"When we push our observations to the very distant universe, we are seeing back in time to when galaxies were forming – and there are a lot of exciting physical processes happening," says Tracy Webb. "The further out we look, the more galaxies we find." After the big bang, small galaxies formed from the universe's primordial gas, and gravity pulled these galaxies together to form larger ones. 'When two smaller galaxies smash into each other, an immense starburst occurs, and thousands of stars are formed each year, for millions of years – a thousand times faster than what our galaxy is doing today," she explains. "It is a violent, energetic process, spewing out gas and dust to form an opaque layer, so that these galaxies are almost invisible optically." As a result, there has been little evidence for the massive starburst scenario – until researchers like Webb began using infrared astronomy to see through the dust-mask. "Now we know these galaxies are out there, forming stars vigorously, but there is much to learn about the physics involved," she says. "Is it different for a massive galaxy, a medium sized galaxy like our own, or a dwarf galaxy? In addition, the growth of stars seems somehow linked to the parallel growth of a central black hole. So how do they regulate each other?"

Black Holes and Supernovas

"Gamma ray astronomy is similar to my previous work as a particle physicist," says David Hanna, BSc'75. Gamma rays are the highest energy photons crossing the universe, and Hanna and Ken Ragan, a fellow McGill particle-cum-astro-physicist, are working with an international team to build VERITAS*, a telescope capable of detecting these rays. VERITAS will look at two sources of gamma rays: active galactic nuclei, which are supermassive black holes at the centre of galaxies, and supernova remnants. "The black holes produce jets that occasionally beam at Earth, which we then perceive as very high energy radiation," says Hanna. "And supernova explosions produce 'ejecta,' eventually sweeping out enough material to form a shock wave with high-energy electrons spiralling around, producing radiation that we detect as high-energy gamma rays." Gamma rays are often transient: there will be a flare of activity for perhaps an hour, perhaps months, and then it will disappear. The research carried out by Hanna and Ragan will help map the high-energy universe, and the data collected will also have implications for fundamental physics. "The field is coming out of its wild west stage, when some bogus results would come up," he says. "But there were plenty of beautiful and robust results as well, and we plan to produce many more." Check out the VERITAS project at http://veritas.sao.arizona.edu.

*Very Energetic Radiation Imaging Telescope Array System

Owen Egan

Ken Ragan and David Hanna
Inset: One of the VERITAS Telescopes

The Physics department boasts a stellar team of astrophysicists and cosmologists. Theoretical astrophysicist **Andrew Cumming** researches the structure evolution of neutron stars, while **Bob Rutledge** studies the behaviour of neutron stars and black holes. **Jim Cline** investigates hypotheses for the early expansion of the universe, **Keshav Dasgupta** explores superstring theory and string cosmology, and **Guy Moore** is a high-energy theorist interested in cosmology.

Fundamental Research

THE OFFICE OF UNDERGRADUATE RESEARCH IN SCIENCE

Once students are involved with carrying out research, it's just a short hop to presenting what they have found. Many departments already sponsor summer research symposia and, last fall, the Faculty broke new ground with the inaugural Undergraduate Research Conference, held in conjunction with Homecoming festivities. Following last year's tremendous success, the 2006 Undergraduate Research Conference, once again coinciding with Homecoming celebrations, will be held on Friday, October 20. The keynote speaker will be Montreal native Rudy Marcus, BSc'43, PhD'46, DSc'88, winner of the 1992 Nobel Prize in Chemistry for his work on the theory of electron transfer.

This March the Science Undergraduate Society published Volume 1, Issue 1 of the *McGill Science Undergraduate Research Journal*, with the contents of the premier issue based on work presented at the 2005 Undergraduate Research Conference. "One of our main goals was to foster interest in research among freshman and new McGill students, and also to encourage interdisciplinary collaborations," says Marta Filipski, president of the SUS. "We're hoping that a student in physics, say, will pick up the journal and get interested in biology or psychology articles." The editorial board consists of twelve students and chemistry professor David Harpp. Check it out at www.msurj.ca

Owen Egan

The students whose posters won top awards at the Fall 2005 Undergraduate Research Conference reprised their success on April 5, when they presented their research at the Faculty of Science's Undergraduate Awards Reception in Redpath Museum. L-R: Dave Ronis, BSc'74, Chair of Physics; Sue Whitesides, Director of the School of Computer Science; students Elizabeth Flanary, Sarah Vereault, and Shreyans Shaw; Henry Leighton, Associate Dean, Student Affairs; Judy Mappin, BSc'50; Martin Grant, Dean of Science; Len Pinchuk, BSc'76, DSc'05.

"Research is fundamental to education," says David Burns, Associate Dean (Research), and Director of the Office of Undergraduate Research in Science (OURS). "Students carry out research in the library; they are also researching what they want to do with their lives. But lots of students don't experience actual science research until the last year of their undergraduate program, and we'd like to give them that experience earlier."

The Faculty has devised a multi-faceted approach, beginning with Freshman Interest Groups (FIGs) for first year students. Each FIG features twelve to fifteen freshmen along with a professor and a fourth-year undergraduate, and they provide new students with the opportunity to discover how the university functions. "They learn about McGill's research mission as well as how to negotiate the pragmatic issues that surface throughout their undergraduate years," says Burns. In the following years, students hooked on the idea of research can enroll in a research-based course in any department, to be launched this fall (and so far known by the appellation "396"). "We're developing a central web site that will list research projects for students who will then discuss the project with professors to see if it would suit their background and interests." Often students want to know what goes on in various departments, but once they have selected a major in one department it can be challenging to find the opportunity to explore other areas. The 396 structure will give students the chance to mix and match areas of interest – so a student could, over the course of the undergraduate program, take Chemistry 396, Biology 396, and Psychology 396. "The web site will give students some idea of what is going on across the faculty, which is especially important as research becomes more interdisciplinary," Burns explains. "A student might take a 396 course in Biology one year, and Mathematics another year, which would be a very good background for bioinformatics."

Owen Egan

Chemistry professor Chris Barrett and SUS president Marta Filipski (in pink) with other Freshman Interest Group members

Freshman Interest Groups: Giving a FIG

After he heard Science Undergraduate Society (SUS) representatives explain the concept of Freshman Interest Groups (FIGs), in which a small group of students meet regularly with a professor and a fourth-year student, freshman Michael Wang joined a group led by biology professor Jackie Vogel. "Most of our first-year classes have 500 people or more," says Wang. "But with the Freshman Interest Group, you can talk one-on-one with professors. I wanted to know more about research, and Dr Vogel's work sounds really interesting," he says. "I'm definitely thinking about biology as a major."

The FIG concept also appeals to professors. "I have absolutely no time for this, but it's such a good idea I cannot turn it down," Chris Barrett told Marta Filipski, president of the SUS, when the organizing committee approached him to lead a FIG. "I was eager to participate in this project so I could meet students," he explains. "Even though I teach 800 people in my introductory Chemistry class, it's easy to lose touch with their experience and concerns." Barrett's FIG defines topics for discussion, but then lets things evolve. "They have questions about the workings of academia, and our topics range from careers in science to the structure of universities. I probably get as much out of it as the students do," he says. "It's a wonderful program. I hope that, in addition to answering some immediate questions, the FIGs will make the university a much more human place than it might otherwise seem."

Each FIG also has a final-year undergraduate to share a veteran student's perspective on the McGill experience, and Sara Edwards, an honours student in biochemistry, plays that role in the FIG led by Louis Hermo, MSc'72, PhD'75, a professor of Anatomy and Cell Biology in the Faculty of Medicine. "The FIG program was Marta Filipski's initiative," says Edwards, who also helped develop the project. "We proposed it to the Dean's office in May, and then we worked out a schedule and recruited professors. I'm finding it fabulous. There are things I would have loved to have known a bit earlier, so I'm happy to be able to give new students a heads-up." As for the collaboration with Hermo, she says, "He stresses the academic side, and I try to balance it with other things."

Owen Egan

Biology Professor Gregor Fussmann shows a chemostat with planktonic organisms to first-year student Christopher Chalcraft at "Soup and Science."

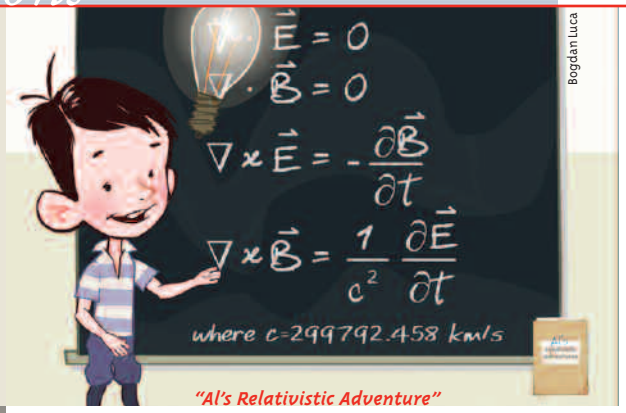
Soup and Science: Brain Food

With almost half of its professors hired in the last five years, the Faculty of Science is brimming with fresh, new and innovative research projects. And in an effort to share this research with students and other professors, the Faculty kicked off its new "Soup and Science" series, with the inaugural version of the lunchtime series running from January 9 to the 13, organized by the Office for Undergraduate Research in Science. Each session featured five new professors summarizing their work in quick five-minute sound bites, to an audience of students and other professors. "Our young professors are doing research that will be especially interesting for our undergraduate students who are looking for research projects to participate in," says David Burns. The audience, which grew tremendously over the course of the week, was lured not just by exciting science but also by the promise of a free lunch. The Faculty plans to continue the series in September.

Bringing Science to the Legislators

The political career of **Andrew Kovacs, BSc'00**, has come a long way since he was SUS president and a member of the McGill Senate. Currently completing graduate work in science and technology policy at the Woodrow Wilson School of Public and International Affairs at Princeton, he boned up on his topic last summer by interning in the US House of Representatives. But he arrived with plenty of experience – four years as legislative assistant to John Godfrey, former Minister of State (Infrastructure and Communities) in Canada's Liberal government. "I work on issues like climate change, where politicians face controversy and confusion; and in the United States, with debates on teaching evolution, science is under attack," he says. "The virtues of the scientific process are evident to scientists, but most politicians do not understand things we take for granted, like peer review and the refinement of hypotheses." Kovacs is considering working in Asia, but eventually plans to return to Canada to work in science policy. "Areas from biotech to nanotech to climate change need attention, and Canadians have not been very thoughtful about developing a long-term policy in science and technology." And the solution? "More science graduates should enter politics," he suggests. "And more professors should engage in political debates."

Andrew Kovacs



Bogdan Luca

"Al's Relativistic Adventure"

Absolute Success

Kiran Sachdev, BSc'01 (Math and Physics), shared the gold medal – and 25,000 euros – from the prestigious Pirelli Relativity Challenge 2005 with **Jackie English, BEng'00**, and Bogdan Luca, for their interactive online animation, "Al's Relativistic Adventures." The prize was awarded to celebrate the centenary of the publication of Einstein's Special Relativity Theory, and went to the project best explaining the theory to non-scientists. Join Al and reacquaint yourself with Einstein's special theory of relativity at www.onestick.com/relativity.

Bonnie Azab Powell

Michael Manga

Not Just A Beautiful Mind...

Last fall **Michael Manga, BSc'90**, an associate professor of earth and planetary science at the University of California, Berkeley, was awarded a John D. and Catherine T. MacArthur Foundation grant of $500,000. Winning a "MacArthur genius grant" is good news for any researcher, but Manga's story took a bizarre twist, when, in the wake of post-grant publicity, a *People* magazine staffer caught sight of his photo and was smitten by his hunkiness. Thus Manga was vaulted into pop-culture fame alongside George Clooney and Bono in *People* magazine's "Sexiest Man Alive" issue, published in November. He took some convincing before agreeing to appear, deciding that, in the end, "It's a way to remind people that science exists." Manga, a geophysicist, will direct some of his grant to studying the relation between fluctuations in underground springs and seismic activity along California's Hayward fault line.

Grid Grad Super Snapper

He doesn't wear a Super Bowl ring, but **Jean-Philippe Darche, BSc'97**, came closer than any other McGill grad, as a member of the NFL's Seattle Seahawks who lost 21-10 to the Pittsburgh Steelers in February's Super Bowl XL. As a long-snapper, Darche snaps the ball to the kicker, and then throws himself in front of the opposing team's players. A five-time Academic All-Canadian with the Redmen in the 1990s, he entered medical school after graduation, but two years later took a detour to the gridiron, playing for the Toronto Argonauts before joining the Seahawks in 2000. Prior to Super Bowl, he enjoyed brief media celebrity. "I guess being French Canadian and a med student made me a novelty," Darche says. After snapping his last big-league pigskin he plans to resume studies to become an orthopedic surgeon.

SAVE THE DATE! OCTOBER 19-22, 2006 IS HOMECOMING WEEKEND

Homecoming weekend offers something for everyone: the Deans' Breakfast, Classes without Quizzes and the ever-popular Leacock Luncheon. This year's program includes a tour of the Lorne M. Trottier Building and Tomlinson Square, where you'll be able to meet students at the second Undergraduate Science Research Conference. The conference lecturer will be McGill alumnus Rudolph Marcus, BSc'43, PhD'46, DSc'88, the 1992 Nobel Laureate in Chemistry. Reconnect with your fellow alumni for a weekend of reminiscing and celebration – and explore what McGill has to offer today! A brochure outlining the weekend's festivities will be mailed in early summer. For a tentative list of events and to find other information about Homecoming, please visit www.alumni.mcgill.ca.

HOMECOMING 2006

Women in Science

Tania Zouikin

As the country's need for highly trained scientists grows, the Faculty of Science has prioritized fellowships to boost graduate student research. Attracting the best graduate students enriches the Faculty, as collaboration between graduate students and professors drives most research efforts. To help bring talented women to graduate studies in Science, **Tania Zouikin, BA'72**, past CEO of Batterymarch Financial, has donated $50,000 to initiate a new Women in Science graduate fellowship. The Fellowship recognizes the achievements of McGill's first woman principal, Dr. Heather Munroe-Blum, for her work in psychiatric epidemiology, as well as her contributions to policy in science and higher education. Alumnae and alumni are invited to build on Tania's efforts to establish a $300,000 endowed graduate award by donating to the fellowship for women in science.

For more information, please contact Donna Henchey at (514) 398-3238 or donna.henchey@mcgill.ca

New Homes for Life Sciences

Life Sciences researchers at McGill have plenty to be happy about these days, with the new Developmental Biology Research Initiative (DBRI) facility opening and construction beginning on the Francesco Bellini Life Sciences Building and Cancer Research Pavilion. On December 6, a newly renovated wing of the Stewart Biology Building officially opened, completing the first phase of the DBRI. The $10 million renovation to 1,100 square metres of research space, supported by the Canada Foundation for Innovation (CFI) and the Quebec government, includes lab space, a high-throughput robotics facility for genomic and proteomic research, and the world's most extensive microscopy equipment, which will enable live analysis and rapid imaging of cellular activity. "McGill has a large, integrated group of scientists unequalled in Canada," said Paul Lasko, Chair of Biology and leader of the DBRI. "It's time to get our people out of the little boxes they had been working in."

Then, on December 9, 2005, the official ground-breaking ceremony brought the Francesco Bellini Life Sciences Building and Cancer Research Pavilion one shovel-dig closer to reality. The new facilities will join the Stewart and McIntyre Buildings to form the McGill Life Sciences Complex. As Martin Grant, Dean of Science, said, "The heart of the idea is simplicity itself. Researchers will meet in corridors and over coffee, will share graduate students, and will collaborate. We are creating a one-stop centre, from lab bench to bedside." But such facilities don't come without plenty of work, will power, and support. "Several years ago, McGill researchers shared a vision. And as when mixing a chemical reaction, you need a catalyst," said Grant. "Francesco Bellini has been that catalyst." Bellini's $10 million gift kick-started the project; support from the Quebec government and the CFI followed. Bellini, who founded BioChem Pharma in 1986, worked with the late Bernard Belleau, BA'50, a McGill Chemistry professor, and Dr. Gervais Dionne to develop the anti-HIV drug 3TC, which still remains central to HIV/AIDS treatment. "This setting will facilitate a cross-pollination of ideas, leading to new breakthroughs and placing McGill in an ideal position to produce the scientists of tomorrow," said Bellini. The facilities, which should be completed by 2008, will be home to 60 principal investigators and 600 other researchers, with 50 per cent of the floorspace dedicated to laboratories.

Owen Egan

Groundbreakers: Carmen Charette, senior vice-president, Canada Foundation for Innovation; Jacques Chagnon, MNA for Westmount - Saint-Louis; Marisa and Francesco Bellini, DSc'04; and Heather Munroe-Blum

Bequests and other planned gifts for McGill University

The Gift of a Lifetime

The McGill University 1821 Society

McGill takes great care to acknowledge and show its appreciation to everyone who makes a donation to the University. Planned gifts, however, often go unrecognized while the donor is alive because the University is not aware of the gift.

If you have made a provision for McGill in your estate plans, we invite you to join the McGill University 1821 Society by informing the Planned Gifts Office of your decision.

If you wish, you will also be recognized in the Annual Report on Private Giving for your generosity towards McGill.

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McGill

Alumni Events: Florida, Ottawa and Montreal

Charles Lin

Owen Egan

Clockwise from above: Interested alumni and friends of McGill in Ottawa gathered for a March 23 dinner and lecture presentation with Psychology Professor Barbara Sherwin, who posed the question "Does Estrogen Protect Memory in Women?" (l-r) Senator Lucie Pepin, Judge Mina Dover-Cohen, BA'44, and Senator Sheila Finestone, BSc'47, pay close attention to Sherwin's presentation.

Students, faculty and benefactors gathered on April 5 in Redpath Museum at the Faculty's Undergraduate Award Reception, an opportunity to recognize student excellence and thank those friends and alumni who make the awards possible.

On March 26, McGill alumni and friends gathered at the Miami, Florida, home of Leonard and Diane Pinchuk to share a lunchtime discussion with Charles Lin, Professor of Atmospheric and Oceanic Sciences. The talk, "Hurricanes and Climate Change: What are the Issues?," forms part of the Florida MAA's Exclusively McGill event series.

Psychology Professor Jeffrey Mogil (second from left) with friends and alumni after speaking on "The Nurture and Nature of Pain" at an Ottawa MAA event on March 15. Mogil is the E.P. Taylor Professor of Pain Studies and holder of the Canada Research Chair in the Genetics of Pain.

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