Meet Our New Geologists
Over the past 60 years, the study of geological sciences at McGill has evolved, but has always tried to keep pace to suit the needs of the mining industry. In 2001, two new faces joined the Department of Earth and Planetary Sciences.

The Grease Monkey of Quantum Physics
In 2011, McGill physicist Guillaume Gervais engineered one of the world’s smallest electronic circuits, and that single discovery could significantly affect the speed and power of ever-smaller integrated circuits.

Redpath to the Bone
Famed biologist and Redpath Museum director David Green talks about the museum’s vast unseen collections and the challenges facing the Redpath as it celebrates its 130th birthday this year.

Otto Maass Gets a Facelift
Since it opened in 1966, the Otto Maass Chemistry Building has hosted thousands of researchers at McGill. Over the past two years, more than 80% of the building’s research and teaching laboratories have been completely redesigned and renovated.

Fast Fact:
Under an ambitious recruitment program that kicked off in 2000, McGill has hired more than 1,000 tenure-track professors. Of these, 586 were recruited from outside Canada.

McGill: A Grande École
McGill’s historical leadership in education and research has been based upon our excellent students. Our undergraduates are second to none, and they have been second to none for almost 200 years. What has changed over the last 10 years has been the quality of our academic staff. This is because our recent renewal took advantage of a climate where all factors played to McGill’s favor: innovative programs at the federal and provincial level, the contrasting political climate of Canada and the United States, the multi-cultural and welcoming environment of Montreal, and the excitement engendered by our renewal, with the multiplicative effect of strong hires building on strong hires.

For the last 10 years, we have been hiring about 100 professors a year. In the Faculty of Science, most of our 250 or so professors were not here five or 10 years ago. We have re-booted the university with 35-year-old kids starting their careers. Renewal has been like a raging fire.

I have been at McGill since 1986. I have never seen a greater potential for our school. When I examine the historical record, we have not been at this point for the last century. Through careful planning, through hard work, through happenstance, all indications are that McGill will move from being a strong national University, and become one of the world’s Grande Écoles. My view is that, as we do this, our students must be integrated into our academic mission in a seamless way. This is our unique advantage to go forward, to retain our great new professors, to have them build their careers here, to achieve excellence. There is no question but that our primary influence is through our students, through the added value of their research and education.

Now is the time for McGill (and in consequence for Montreal and Quebec) to step forward. Montreal was the historical leader in education and research in Canada before our country even existed. It is time for us to take up that role again, for the good of our families, our city, our province, and our country. We have an opportunity we have not had for a long time. Now is the time to act, and face outwards and not inwards, to consolidate and build upon our gains, and—before the United States wakes from its slumber—re-take our place of leadership in innovation, teaching, and research.

Much has changed and much has not changed at McGill, a Quebec institution founded by a Scotsman almost two centuries ago. It remains an institution in which Montrealers and all Quebecers can take pride, and which can be as important for us in this century as it has been for the last two.

Martin Grant
Testing the Waters

What’s eight kilometres long, bright blue, and about as thick as a crayon?

It’s the world’s largest thermometer, capable of measuring temperatures at metre-long intervals along its length to accuracies of a tenth of a degree Celsius.

Essentially a long fibre-optic cable, the thermometer uses pulses of light that are shot down its 8,000-metre length. The temperature is measured through the amount of time it takes the light to reach various intervals.

McGill is only one of two Canadian universities using this new technology, called distributed temperature sensing.

McGill’s ultra-long thermometer is regularly used by Jeff McKenzie, an assistant professor in the Department of Earth and Planetary Sciences. McKenzie, a hydrogeologist, says the thermometer is ideal for studying the interaction between groundwater, which is water that collects or flows beneath the Earth’s surface (as in spring water), and surface water, which is water that collects above the Earth’s surface, as in rivers, lakes and oceans.

To determine where groundwater may be entering a river, for instance, the long thermometer cable is laid along a stretch of riverbed. By measuring the minute changes in temperature of the water, the source of groundwater contamination can be pinpointed.

The thermometer has opened many new doors, putting McKenzie in contact with researchers from a host of disciplines.

“I use it a lot, and one of the best things about the thermometer is that it’s a collaborative tool,” he says. “It’s led to a lot of interesting collaborative opportunities.”

Over the past couple of years, McKenzie and his team have used the thermometer in a number of successful studies, including one of contaminated groundwater entering a river in New York State, and another, with Geography professor Michel Lapointe, of fish habitats at Parc National de la Jacques-Cartier, north of Quebec City.

“Another thing we’re thinking of looking at is using the technology to study energy conservation by observing heat loss through hot spots on the roofs of buildings,” he says.

Fast Fact:
Undergraduate research in the Faculty of Science is going gangbusters, with 46 per cent of students in 2010 having at least one research course on their record.
Guillaume Gervais, self-described quantum engineer and head of the low-temperature physics lab at McGill, has a drawerful of failed attempts at his latest project. Four hundred failed attempts, each the product of 29 processing steps—doping, glueing, cooling, etching—29 different places for something to go wrong.

But after three and a half years of trying, his PhD student, Dominique Laroche, “pulled a miracle,” and the team published last fall, to excited chatter in the quantum electronics community, the fact that they had successfully made a pair of circuits with two wires that are separated by just 150 atoms.

”Weird, unexpected (and presently unexplainable) things happen when you run current through wires that are that close. The bottom line: there are theories that might need some rethinking because of his research."

Gervais, associate professor in the Department of Physics, does more than just build small things: in addition to tinkering with motorcycles in his free time, everything in his Rutherford Building basement lab—the scanning microscope, the floor-to-ceiling Faraday cage, the plumbing system that carries liquid helium around the room—was either built or custom designed by him and his team.

Even the pet fish, Jimmy 2, is the work of a grad student, fashioned out of an orange piece of plastic after the original Jimmy, a live goldfish, went belly-up from all the dust kicked up in assorted lab construction projects. A sign tacked to the Faraday cage reminds lab members to ask forgiveness, not permission.

“We love to invent. We brainstorm all kinds of crazy things,” says Gervais.

Next up is a “black hole on a chip” (an analog to a black hole—not a literal one, Gervais explains, careful to hedge lest he incite public fears of global destruction) that will look at the way sound behaves near the acoustic horizon, something that so far has been part of the realm of pen-and-paper physics only.

“Gervais isn’t sure if it will work. “It’s totally nutty,” he says. But then again, so was the the last project.”
Where: The Billiard Room at McGill’s Faculty Club
When: 30 March, 2012
What: Celebrate past and present winners of the Reginald Fessenden Professorships and Prizes in Science Innovation, and to thank John Blachford, DSc’09, and his son Erik, for donating the funds to endow the awards, which were established in 2008.

Why: To recognize the powerful lift the commercialization of scientific research at McGill has been given by the Reginald Fessenden Professorships and Prizes in Science Innovation, established in honour of John Blachford’s great-uncle, Reginald Fessenden, the unsung inventor of radio.

Who: 1. Masad Damha, professor in the Department of Chemistry, 2010 Fessenden Professorship for the development of novel RNA chemistry for therapeutic and microarray applications. 2. Paul Wiseman, associate professor in the departments of Physics and Chemistry, 2009 Fessenden Professorship for his invention of a new clinical device to detect malaria infection and to rapidly count parasites in blood samples. 3. Greg Dudek, professor and director of the School of Computer Science, 2011 Fessenden Professorship for the creation of a robotic platform called AQUA. 4. David Burns, professor in the Department of Chemistry, 2010 Fessenden Professorship for the development of a smart ultrasound platform. 5. Youla Tsantrizos, professor in the Department of Chemistry, 2011 Fessenden Professorship for her discovery of novel inhibitors of the human FPPS and GGPPS enzymes. 6. Erica Besse, research innovation officer, Faculty of Science. 7. Nicolas Moitessier, associate professor in the Department of Chemistry, 2008 Fessenden Professorship for his development of software that can be used for drug discovery, design and process chemistry. 8. Martin Grant, dean of the Faculty of Science. 9. John Blachford, BEng’59, PhD’65, DSc’09, president of H.L. Blachford, who has also distinguished himself in the laboratory, creating noise-reducing materials and lubricants. 10. Janet Blachford, BA’61, BA’63, also a lifelong friend of McGill, whose generosity established the Archie Malloch Internship Awards in Public Learning and the Archie Malloch Graduate Fellowships in Public Learning in 2009.

W: The Billiard Room at McGill’s Faculty Club
The Redpath Gorgosaurus

- Most recognizable exhibit at the Redpath is the Gorgosaurus, the museum’s centerpiece attraction
- Size: 8 metres long (26 ft)
- Weight: 1000 kg (1 tonne)
- Age at death: Teenager, only about 70% full-grown adult size.
- Lived during: Late Cretaceous (74 million years ago)
- Diet: Meat
- Discovery: Found in Dinosaur Provincial Park, Alberta, by Levi Sternberg in 1920. The original fossil bones are at the Royal Ontario Museum.

Did you know? The right leg was broken. The lower bone of the right leg is lumpier than the left, showing where the bone tissue healed or ossified. Our gorgosaurus probably walked with a limp. Fractures to this bone are relatively common among tyrannosaurs and the break may have been caused by the tail club of an ankylosaur.

There’s more than what’s on display in glass cases at the Redpath Museum—and it’s not the fact that less than a mere 15 per cent of its collections is on show. Since opening its doors in 1882, the museum, 130 years old this year, has served as a keystone to McGill research, and, seated overlooking lower-field, a literal centerpiece to campus.

“This is its heyday,” says director David Green, citing exhibits, public lectures, and outreach programs, and a sundry of course offerings for students.

And of course, research. Below the surface—in the basement—despite the unchanging looks on the faces of the animals and skeletons—the collections are very much alive: there is a room full of recently acquired antelope heads, wrapped in cellophane, the styrofoam that protected their horns on their journey still in place.

There is a roomful of jars with snakes and frogs preserved in ethanol, each bearing three copies of a unique tag so that it can be referenced, like pieces of evidence rich with data. Drawers full of dinosaur fossils that were dug up decades ago, waiting to be cleaned up, waiting for questions to be asked of them,aminities casually leaning against a filing cabinet, filing cabinets full of birds are carefully laid on their backs, parakeets, and parrots, and owls, and the now-extinct passenger pigeons.

There are jars of frogs, dyed so that their skin is clear and their veins are bright blue—a researcher at another university just requested to look at some, so they’ll be in the mail soon.

Commissioned by sugar magnate Peter Redpath, the museum was intended to preserve and display the collections of Sir William Dawson, a paleontologist, but, curiously, not a believer in evolution.

Now the museum delights in deeper problems. The specimens help answer questions about population growth, extinction, and climate change, and—Green stresses in explanation for keeping and caring for so many animals—questions that haven’t even been thought of yet. Each specimen contains a wide number of parameters.

“This is not rocket science—this is harder than that,” Green says.

The historical record that is contained in these boxes, that has been established over the past 130 years, ensures the museum’s future in being a key part of research.

“You can only approach it historically—you can understand what is, if you knew what was.”

Harder Than Rocket Science: Celebrating 130 Years of Discovery at the Redpath

By Shannon Palus
Major renovations to the Otto Maass Chemistry Building included:

- Replacing the roofs, ventilation systems, secondary electrical wiring and demineralised water production system;
- Upgrading mechanical control devices;
- Repairing foundations and masonry;
- Rebuilding certain research laboratories.

Work in the Pulp and Paper Research Centre included:

- Installing a new alarm system;
- Painting public spaces;
- Upgrading mechanical control devices;
- Completely demolishing and rebuilding the research laboratories;
- Repair to the masonry in the north and west wings; renovations of all radiation systems and replacement of windows were also completed.

Built between 1964 and 1966, the Otto Maass Chemistry Building and adjoining Pulp and Paper Research Centre were long overdue for an overhaul. Old laboratory space and outdated facilities begged for refurbishing to better suit the Department of Chemistry’s needs. Thanks to funding from the Government of Canada’s Knowledge Infrastructure Program, over almost 50,000 square feet in the two buildings have been completely renovated. With additional funding from the Canada Foundation for Innovation and Quebec’s Ministère du développement économique, innovation et exportation, the total cost of the two-year renovation project was pegged at $27.6 million.

“It is a great time to be at McGill,” Ron Proulx, executive director, Facilities Operations and Development, told the McGill Reporter. “If you get $1 million, you have a limit to how much you can dream, but this is an opportunity to do things right and really hit a lot of targets. We’re going to reap these benefits for a long time. Not just the next few years. It will be a joy for people to do their jobs.”

By completion date this past Spring, large parts of Otto Maass’ second, third and fourth floor research areas were completely demolished and rebuilt, with new layout, lab benches and energy efficient exhaust hoods that meet modern industry and safety standards. Meanwhile, the Pulp and Paper building’s second floor and basement labs were refitted with new electrical conduits and wiring. The renovated areas provide more reliable power, and a new distribution system upgrades distilled water services.

In keeping with McGill’s focus on sustainable design, the renovations decreased the energy consumption of this intensively used building. In the past, Otto Maass consumed about 12 per cent of the energy used at McGill’s downtown campus. After renovation, the building’s energy use has decreased to about four per cent of the energy used.
Scenes From A Reunion

Working with the care and attention of a highly skilled surgeon, he uses the blade of his Swiss Army knife to make an intricate incision in the sesame bagel. For most, the slicing of this Fairmount Bagel Bakery standard would take several seconds. But Len Silver, BSc ’65, is carving something special, cutting the bagel into two linked halves. When he is done, Silver proudly displays the two sides, interlocked like links in a chain.

“That’s really something, Len,” someone says. “What is that, a bagel or a physics experiment?”

In fact, Silver’s rendition of the traditional Montreal bagel is, in mathematical terms, a pair of linked annuli, each with a full twist. Silver’s scientific skills were not lost on his audience. For the past six years, the Mathematics and Physics Class of ’65 has been gathering on campus to relax, reminisce, and re-kindle the spirit they shared as undergraduates at McGill.

It all started in 2006, when Sam Steppel’s wife, Barbara, died and he reached out to fellow Class of ’65 alumnus Rubin Gruber for support.

“Gruber suggested we call Ben Rouben to get some people together,” explains Sam. “We met just before American Thanksgiving in 2006, and we’ve been doing it ever since.”

It didn’t take long to bring together the 10 or so Mathematics and Physics former classmates for what has become an annual reunion. Len Silver recalled how one fellow classmate he contacted recalled his voice instantly, despite the fact that it had been decades since they last met.

“I hadn’t spoken to him in 40 years, but he still remembered my voice,” says Silver. “I didn’t even have to introduce myself—he just said, ‘Silver—is that you?’”

In 2011, the group gathered, for the sixth straight time, for bagels and coffee at a Frank Dawson Adams Building conference room. They call themselves by the their last names and seem to enjoy kidding each other. It doesn’t take long to realize that, besides the obvious connection they share with science, good-natured curiosity is one of the qualities that bind the group together.

Art Olin, who is currently an adjunct professor at the University of Victoria, admits that the reunion is a long way for him to come, but he fits it in among other projects he is working on.

“In the way to CERN in Geneva, where I’m conducting research spectroscopy on anti matter,” he says. “But like the others, he wouldn’t miss the annual reunion—and the chance to reconnect with the spirit and vitality that they shared at McGill—for the world.”

A Window on a Veiled World

Denise B. Dailey, BSc ’58, has provided an important new window from a female perspective on the mysterious culture of Pakistan with the publication of LISTENING TO PAKISTAN: A Woman’s Voice in a Veiled Land (Inkslingers Press, 2012).

Shortly after publication, LISTENING TO PAKISTAN captured Number One Bestseller ranking for Pakistan travel books on Amazon. Readers are guaranteed to come away from this book with a much-deeper understanding of the conflicted voices in this exotic nation.

Dailey grew up in Brazil, the daughter of a French father and a Chilean-French mother. She moved to Montreal when she was 13 and following her studies at McGill, received an MFA in writing from Columbia University.

Fluent in five languages, Dailey spent much of her adult life teaching in public and private schools in the New York City area. But perhaps her most intriguing professional and personal achievement has been her ability to translate her broad travel background into teaching moments for readers.

Dailey set up a Field Study Semester endowment to support students who wish to study overseas during their time at McGill, and she chose to do this because of her own passion for experiences abroad.
Study Reveals Ocean Oxygen Debt


Currently, in about 15 per cent of the oceans—so-called dead zones—in areas referred to as dead zones, dissolved oxygen concentrations are so low that fish and other marine life cannot breathe. The findings from the study show that these dead zones are increasing significantly at the end of the last Ice Age.

"As a result of this research, we can now say unequivocally that the oxygen content of the ocean is sensitive to climate change, confirming the general cause for concern," said Galbraith.

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For decades, a massive gold deposit sat completely unnoticed near the established Quebec mining centres of Val d’Or and Rouyn-Noranda. Over the years, thousands of geologists walked or drove over the south end of the town of Malartic, oblivious to the treasure below. One after another, mining powerhouses, such as Barrick Gold, fled town. Things got so bad that even the local Tim Hortons shut down.

What the mining firms did not see was a 10-million-ounce shallow gold deposit sitting directly under their feet. One geologist who understood what riches lay beneath Malartic was Robert Wares, BSc’79, who realized that while there were no flashy high-grade gold grades, there was potential for huge tonnage.

In 2004, Wares’ company, Osisko Mining Corp., bought the Malartic gold mine, and the rest is history. The Malartic operation currently represents one of the biggest gold reserves in Canada for a single deposit, and is still growing through ongoing drilling on new mineralized zones.

“This discovery is really important, not in just the size of the deposit but because it represents a new concept, a paradigm shift—and that is due entirely to Bob Wares,” said Wares’ former professor in the Department of Earth and Planetary Sciences, Anthony Williams-Jones.

In 2008, Wares and Osisko each donated an equal amount of Osisko shares to McGill, for the creation of a $4.1-million endowment in support of the next generation of Canadian geologists.

Wares, who will receive an honorary Doctor of Science degree from McGill at convocation this year, volunteered to take the inaugural Dean’s Quiz.

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Dean’s Quiz: Going For Gold

1. Who is your favourite hero of science? Galileo

2. What are the five greatest discoveries of all time?
   A) Agriculture  
   B) Newtonian physics  
   C) Electromagnetism  
   D) Penicillin  
   E) Relativity

3. Where were you when Neil Armstrong first stepped on the Moon? Too young to remember, but probably in front of the TV

4. If you could be a rock, what would you be? Anorthosite

5. What is your favourite geological era? The question should refer to a geological period, and that would be the Cambrian

6. What is your favourite film? Blade Runner by Ridley Scott

7. Name one book that everyone must read. Atlas shrugged by Ayn Rand

8. Most overrated discovery of the past 100 years? Cold fusion

9. If you could choose one musical piece as the soundtrack of your life, what would it be? Magic Carpet Ride by Steppenwolf

10. What did you learn at McGill that you couldn’t have learned anywhere else? Critical thinking

The study of science at McGill University goes back some 150 years, but there are hidden pockets of history that will surprise even the most avid McGill chronicler. From the underground stream near Burnside Hall and the role it played in the life of William Dawson’s son, geologist George Mercer Dawson, to the Duke of Edinburgh’s unpublicized visit to the toilets at the old Biology Building (now James Building) in 1952, there are many enlightening and entertaining facts in the history of science at McGill.

In September of 2011, the Faculty of Science published a 12-page booklet featuring some of our most celebrated historical locations. At Homecoming, three tours, followed by a special display of McGill science artifacts and memorabilia (such as physicist Harriet Brooks’ Anne Molson Medal and Sir John William Dawson’s teaching sheets) were displayed.
Name the most important donation in McGill history

A
The generosity of Richard Tomlinson, PhD’48, whose many gifts to the Faculty of Science include the Tomlinson Science Awards, which recognize and support such scholars as neuroscientist Karim Nader, whose work has revolutionized memory research.

B
Lorne Trottier’s visionary gift in 2006 to fund the Lorne Trottier Chair in Astrophysics and Cosmology, which has supported the work of chairholder, astrophysicist Vicky Kaspi, whose research has shaped our understanding of the Universe.

C
The exemplary gift of Frederico Bellini in 2002 that sparked the construction of the McGill Life Sciences Complex and launched a new collaborative, multidisciplinary way of doing research, as exemplified by the work of biologist Paul Lasko.

D
Peter Redpath’s gift in 1880 to fund construction of the Redpath Museum, completed in 1882, which originally housed the natural history collections of Sir William Dawson, McGill’s principal at the time, and remains an important research and outreach institution.

E
My gift of $________________ to the Faculty of Science, which will go towards maintaining and driving forward the world-class research conducted by our scientists, as well as supporting the studies of undergraduates.

For more information on making a donation, or to discover other ways of support, please contact:

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