UBC

Advancing Research and Teaching in the University of British Columbia Faculty of Science

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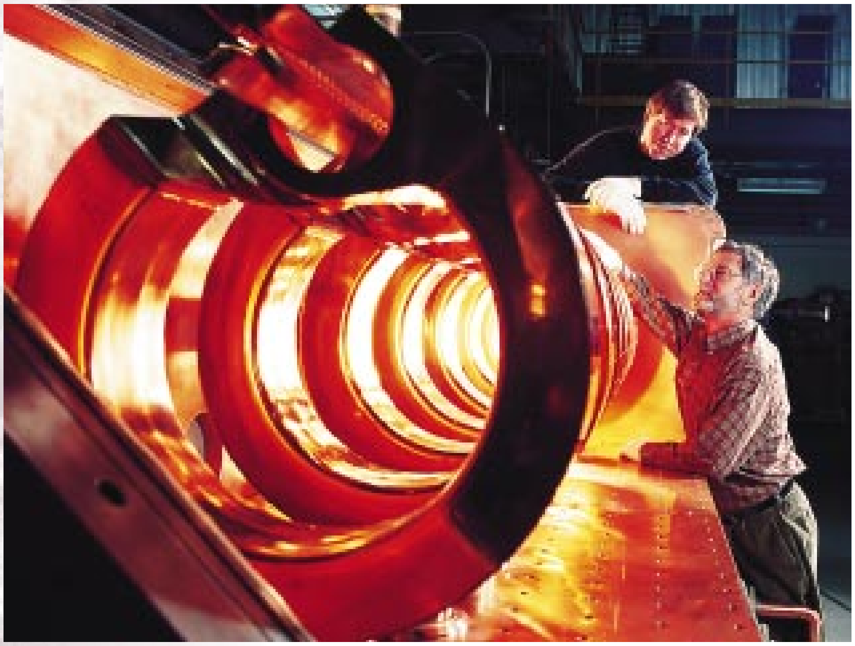
Accelerating Discovery

TRIUMF physicist Paul Schmor, project leader for the new Isotope Separator and Accelerator (ISAC), says it is the best facility of its kind in the world. Scheduled to begin experimentation in November of this year, the 5,000 square-metre facility is funded jointly by the federal and provincial governments—and nearly all of its equipment has been made in Canada.



The eight-metre long rib-like copper construction that physicists Rob Kiefl and Paul Schmor are examining is not postmodern sculpture, but ISAC's new radio frequency quadropole linear accelerator (RFQ-LINAC).

A tour around TRIUMF, Canada's National Meson Facility on UBC's south campus, can be both fascinating and daunting. The esoteric world of nuclear physics may seem far removed from physical reality and daily life. But research in subatomic particles attempts to answer some of our most profound questions. What is matter and what holds it together? What processes occurred as the universe began? How are new elements formed? By asking these fundamental questions we can begin to understand and solve more concrete problems. In fact, the kind of curiosity-driven research done at TRIUMF has led to applications such as proton therapy for cancer, radioisotopes for medical diagnosis, PET scans of the brain, and superfast microchips.

At ISAC, researchers will use radioactive isotopes to conduct studies in nuclear astrophysics and condensed matter physics. ISAC will ultimately use a 100-microamp proton beam from TRIUMF's cyclotron to produce large numbers of exotic, short-lived radioactive isotopes. Huge electromagnets focus and direct the proton beam at specific targets (for instance, calcium oxide, chosen to maximize production of the potassium-38 isotope). Since many other radioisotopes are formed simultaneously, another magnet separates and channels ions of the desired isotope into a beam, which is then passed to a radiofrequency linear **cont'd. on pg. 3**

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UBC's EM Director Launches Books and TV Slot

Photo: Elaine Humphrey

TUCKED AWAY IN THE basement of the Biological Sciences building is UBC's Electron Microscopy Facility. Under the enthusiastic direction of Elaine Humphrey, it is a treasure that is anything but hidden. With a PhD in biological oceanography, specializing in electron microscopy, Humphrey has helped to build UBC's EM lab into a world-class facility. For the past three years she has run an international 3D Live Cell Microscopy course out of her lab. Last year, over 650 researchers from both the Faculty of Science and the Faculty of Medicine used the facility.

Both the publishing and the television industries have discovered Humphrey's ebullience and expertise. Vancouver authors Shar Levine and Leslie Johnstone asked her to collaborate on a book for children using microscopy images similar to the fierce-looking tiger beetle shown here. What began as one book has now turned into at least four. *Bug Eyes and Butterfly Wings*, and *Snail Tongues and Spider Fangs*, both published by Somerville House, are being launched this fall in bookstores across North America. You can also find Humphrey on The Discovery Channel. Her segment, *Small Wonders*, is part of the program @ *Discovery Canada* which airs every Monday night at 8:00 p.m.

SNO Tracks Elusive Neutrino

Courtesy: Lawrence Berkely Lab

INFINITESIMAL NEUTRINOS MAY BE THE MOST NUMEROUS ENTITY IN the universe (about 10^{80}), but their lack of mass and electromagnetic interaction makes them extremely difficult to observe. To date, scientists have only been able to detect about 60% of their expected number, or flux. This is about to change. Deep in the Creighton nickel mine, over two kilometres underground, an international team of scientists from Canada, the United States and Britain is overseeing the final fill and commissioning phase of the Sudbury Neutrino Observatory.

The construction alone is a miracle of engineering. A 12-metre diameter acrylic sphere (with only 1/8" tolerance for kilometre long bonds), filled with 1,000 tonnes of heavy water (on loan from Atomic Energy of Canada Limited), surrounded by a geodesic array of 10,000 photomultiplier tubes, all immersed in a 30-metre cavity excavated out of the rock to shut out cosmic radiation. And everything had to be brought down through the mine shaft elevator and assembled underground. TRIUMF's Rich Helmer can attest to the challenge; he is managing the final phase of construction. "We couldn't think of anywhere else in the universe that would be as free of ionizing radiation as this," says Chris Waltham, head of the UBC group, who recently celebrated his tenth anniversary on the project.

There are actually three types, or flavours, of neutrinos: the electron, muon and tau neutrinos. However, something happens to neutrinos in transit from sun to earth. Scientists have postulated that some of these solar electron neutrinos could change to muon neutrinos. The SNO facility is the only one in the world capable of detecting this phenomenon, because it can see all three neutrino types. By observing these "flavour oscillations," SNO will provide data that could determine whether neutrinos have mass. This could shed light on the energy generation process of the sun and possibly solve the "Solar Neutrino Problem," which would help to determine what makes up the mass of the universe.

Elegans Worm Facility

MOST OF US WOULD RATHER NOT ADMIT OUR GENETIC LINKS TO THE LOWLY *Caenhorhabditis elegans*, a miniature nematode worm. But for UBC researchers, *C. elegans* is the perfect organism for the study of molecular genetics, since many of its genes are functionally replaceable by the human gene.

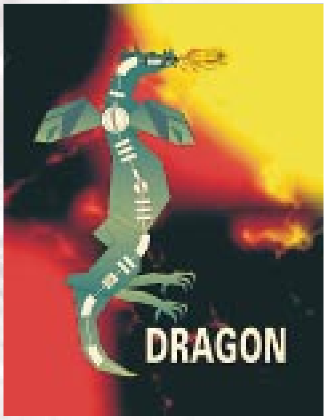
Gene sequencing has become one of the most important tools of biological research. To determine a gene's function, scientists first identify the coding part of the gene and then delete it from the organism—a procedure known as "gene knock out." All of the yeast genome is sequenced and *C.elegans* (which has 18,000 genes) is over 90 percent complete. However, the function of these genes is unknown. Currently only 2 percent of the 100,000 genes in the human genome are sequenced and scientists have identified a function for just over half of these sequences. In comparison to using mice, knocking out genes in *C. elegans* is a relatively quick, inexpensive and much kinder alternative. This research has applications in fighting not only cancer, but all human disease.

The new Reverse Genetics Core Facility (or Worm Knockout Facility) set up by **cont'd. on pg. 3**

Worm Facility; *cont'd. from pg. 2* UBC's Biotechnology Laboratory is a collaboration of genomics researchers: Don Moerman in Zoology, Terry Snutch in Biotechnology, Ann Rose in Medical Genetics, all at UBC, and David Baillie at SFU. It is slated to be part of a much larger facility — The Centre for Integrated Genomics. If funding is approved, it will be built around the BC Cancer Agency's Genome Sequence Centre directed by Nobel laureate Michael Smith and will unite the activities of the BC Cancer Agency and UBC's Biotechnology Lab.

Don Moerman and his team of worm specialists have recently been invited to participate in a tripartite Gene Knockout Consortium with the Sanger Centre in Cambridge, England and the Oklahoma Medical Research Foundation. Their mandate is to make a recombinant strain of worms for each of the 18,000 genes available to researchers world-wide. "This is extremely exciting for us," says Doug Kilburn, director of UBC's Biotechnology Lab. "It puts Canada in the first tier of genomic research."

ISAC at TRIUMF; *cont'd. from pg. 1* accelerator, emerging at stellar energies into the experimental area. Professor Michael Craddock notes that the only comparable facility of this kind is in Geneva, Switzerland, and it has only 2-microamp capability.



Courtesy: TRIUMF

"In many ways, we are at the stage with radioactive nuclei that we were with mesons before the meson factories," says Rob Kiefl, UBC Professor and associate of the Canadian Institute for Advanced Research. "Up until now they haven't been produced in sufficient quantities to be able to use them as a tool in condensed matter research on superconductivity and magnetism."

One advantage of using radioisotopes over muons is that they are created at relatively low energy, which allows them to probe very thin structures—a few hundred angstroms thick—whereas muons have a high energy and are deeply penetrating. Kiefl also anticipates a much greater signal-to-noise ratio, which would provide far more precise measurement. Another advantage is that while muons are extremely short-lived (2.2 microseconds), radioactive nuclei live on the order of seconds so they can be monitored over longer periods of time to provide better data.

While Kiefl's work on magnetic probes of matter is part of ISAC's low-energy experimentation, nuclear astrophysicists are interested in the kinds of products formed when beams of radioactive nuclei interact with selected target atoms, such as those encountered in stars. The DRAGON (Detector for Recoils and Gammas of Nuclear Reactions) facility will be installed in ISAC's high-energy area. It will help astrophysicists understand how heavy elements are formed in stars and supernova explosions, and even what happened a minute or so after the Big Bang.

ISAC project leader Paul Schmor notes that the spectrum of heavy elements thrown out by a supernova is one thing scientists want to understand. "It is not the stable isotopes that determine the elements' abundances, it is the unstable ones," says Schmor. "They are so short-lived that we could only speculate on what their properties are. Now we can study them. That is the raison d'être for the accelerators."

Putting a New Spin on the Study of Superconductors

Condensed-matter physicist Rob Kiefl uses muon spin rotation (µSR), which is a form of nuclear magnetic resonance (NMR), to study the electronic, magnetic and structural properties of solids. In µSR the spin precession frequency and spin relaxation rate are measured to provide specific data about a substance. In conventional NMR, 10^{18} spins are needed in a sample to generate a signal. In ß-NMR, which uses radioactive nuclei produced at ISAC, only 10^{8} spins are required to get the same signal, or about 10 orders of magnitude fewer spins—making ß-NMR ten billion times more sensitive.

"One of the reasons ISAC is so interesting to me," say Kiefl, "is that if you couple that sensitivity with very low energy, you can study monolayers of material. Whereas with conventional NMR, there just aren't enough nuclei to get a signal."

Kiefl's research is significant in the study of high-temperature superconductors. The phenomenon of low-temperature superconductivity, where metals undergo a transition to a state of zero electrical resistance, baffled physicists until 1957. High-temperature metallic-oxide superconductors are the latest—and in some ways most spectacular—examples of materials that scientists have difficulty understanding using previous models of behavior. Kiefl's research should put a 'positive spin' on these inquiries and help scientists understand the exotic properties of recently discovered materials.

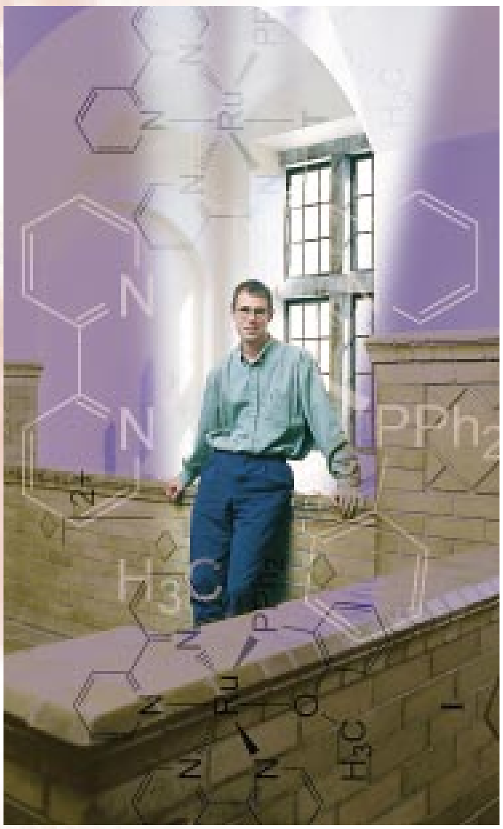
Manipulating Molecules

For materials chemist Michael Wolf, small is beautiful. His work in molecular electronics is poised to complement the silicon microchip with manufactured molecules as the materials of choice in high-tech electronics.

In just over two decades, we have gone from computers the size of a room to the size of a palm. High-tech miniaturization is one of driving forces behind Michael Wolf's research. The other is building molecules that can be put to work. Obviously, a single molecule is smaller than even the smallest silicon-based transistor in today's microchip. The trick is being able to design a molecule that acts like silicon but is stable enough to function for the life expectancy of the technology.

The use of organic materials has other benefits over inorganic semiconductors such as silicon. Wolf's work in electroluminescent polymers could revolutionize the light emitting diode (LED) as a light source for applications from laptop computer screens to brake lights. Size isn't the only limitation of silicon semiconductor technology. Most LEDs are red or green. For a colour monitor, you need LEDs capable of producing the full range of the spectrum. Since the image on a computer screen is composed of pixels—thousands per line—with current technology each pixel would have to be a miniature LED. Fabrication costs alone would be prohibitive.

"We are trying to develop organic materials that can function in a light-emitting diode," Wolf explains. "Polymers are a good choice because they are quite stable." Unfortunately, the heat generated in these LEDs ultimately degrades most of the polymers used so far. While stability may be a hurdle, chemical manipulation of organic polymers is much easier than traditional inorganic materials. For example, Wolf notes that it is a relatively simple process to change the colour of organic polymers by chemical modification.



Wolf and his team are investigating how sandwiching a thin film of an electroluminescent polymer between two surfaces can make it capable of emitting light. This research could help to solve the size dilemma in LED technology and ultimately result in cost-efficient brake lights or street lights, which now may only be made by using an array of smaller silicon-based LEDs. Electroluminescent polymers could also work on a laptop computer screen, where the polymer film would be suspended between layers of conducting plastic, the lower layer patterned with tiny pixels. The challenge is making a polymer that can be tuned to the full colour range by simply changing voltage in each pixel.

Wolf is also working on inorganic "host" structures that attempt to orient the organic polymers within the luminescent device. "If you think of a piece of a polymer as one long strand of spaghetti, and the host as a sponge with the pores all going in the same direction, what we are trying to do is fill those pores with ordered strands of polymers, similar to an uncooked bundle of spaghetti with strands oriented in the same direction." The spaghetti is an apt metaphor in more ways than one. Like an athlete carbo-loading on pasta before competition in order to optimize energy conversion, these host structures may allow a device to convert electricity to light more efficiently.

When asked if he considers himself an organic or inorganic chemist, Wolf shuns either label. "It doesn't matter if it's organic or inorganic. Whatever works best is what I look for."

With a PhD from MIT and a postdoctorate from the University of Texas, Michael Wolf's focus is "in making molecules that do things, that have function, and in incorporating those functions ultimately into chips."

Chemical Sensors

Today there is a growing need for chemical and environmental sensors to test everything from sulphur dioxide emissions in the atmosphere and solvents in our water supply, to oxygen levels in the blood of a heart patient. Michael Wolf's work in molecular electronics is finding ways to make these sensors not only smaller and cheaper, but more effective.

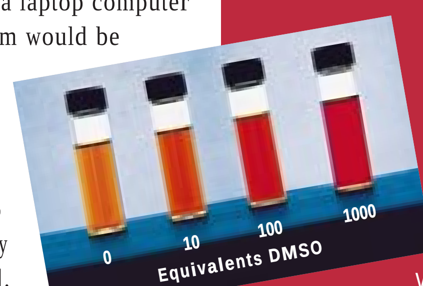


Photo: Michael Wolf

Wolf is trying to design a molecule which can detect a range of substances and give a different response to each one. This multi-functional sensor would either change colour or fluorescent properties depending on the chemical it was exposed to. His lab has already designed a molecule that changes colour reversibly when exposed to the solvent dimethyl sulphoxide which makes the skin more permeable and therefore more vulnerable to the absorption of toxic substances. "We are now trying to make the molecule sensor sensitive to other things. The advantage is that this technology would allow chemical sensors to be much more compact, while being able to test for a variety of substances."

Blocking and Cloning Calcium Channels

Terry Snutch's lab is leading the world in research into the function of calcium channels in the human brain. His discoveries could lead to new treatments for a wide range of human diseases.

EVEN IN THE DOG DAYS OF SUMMER, WITH its leader on sabbatical, Terry Snutch's lab is a hive of activity, with a dozen students and postdocs at work on research that is leading the world in the study of the function of calcium channels in the human brain. Snutch, who holds appointments in the Departments of Zoology and Psychiatry's Division of Neurological Sciences, is interested in how the different calcium channels function, and what their role is in nerve, muscle and endocrine cells.

To a casual observer, the breakthroughs seem to come at a rapid pace. One student has discovered a novel rat brain protein, and another thinks he may have identified a brand new calcium channel. Snutch, a professor in the UBC Biotechnology Laboratory, is accustomed to breakthroughs; his lab was the first to identify the first five types of calcium channels, and the only lab in the world that has been able to clone all nine types now identified.

Calcium channels are the gatekeepers that control the flow of calcium into cells. Calcium entry is critical to important bodily functions, including nerve cell signalling, muscle contraction, neurotransmitter release and hormone release. Snutch has found that the various types of calcium channels differ in the amount of calcium they let in, by their location on the neurons, and by the proteins which modulate their effect. So far, calcium channel mutations have been implicated in congenital migraine headaches, congenital ataxia, and night blindness. In addition, blocking specific calcium channels can alleviate cell death from stroke, treat heart disease and epilepsy, and block pain transmission. Because calcium plays such a critical role in so much of the human body's functions, Snutch's research could result in more effective and specific drugs for a whole range of human diseases.

At the forefront of calcium channel research, Terry Snutch has captured the highest awards in his field—the International Albrecht Fleckenstein Award and, in Canada, the Steacie Prize.

For example, it could lead to the development of a new class of drugs to treat heart disease. Currently, the drugs in use are L-type calcium channel blockers. These drugs can have serious side effects because L-type channels are found not only in the heart, but also in the brain. One of the more recently-discovered types of calcium channels is attracting huge interest from the pharmaceutical industry because it appears to more directly target the heart.

Another promising avenue of research could lead to a new form of pain relief. According to Snutch, opioids such as codeine and morphine act on the opioid receptor in nerve cells, not the calcium channel itself. The work in his lab has led to a new, direct and non-addictive approach to blocking pain.

Three years ago, Snutch formed a company, NeuroMed Technologies Inc., initially to sell biological reagents developed in his lab to the research community. NeuroMed has evolved into a drug discovery company that is currently at the financing stage. While Snutch remains a dedicated academic researcher, he is also branching out into a new role as entrepreneur.

Photo: Terry Snutch

Ode to the Clawed Toad

For the nine years that Terry Snutch's lab has been operating, female South African clawed toads have been playing an important role in this top-level basic science. It is their immature eggs (oocytes) which have served as the medium for cloning the calcium channels which Snutch and his research team are studying.

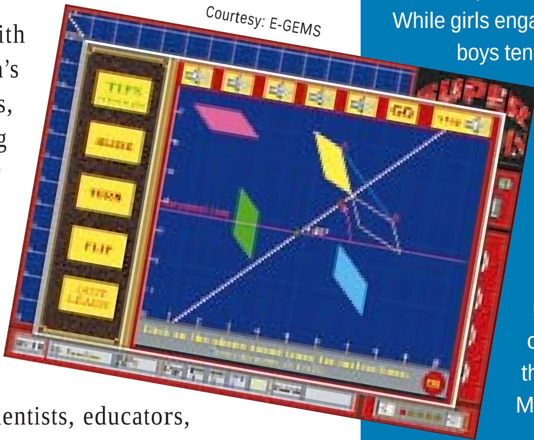
The oocytes are surgically removed from the frogs, and injected with DNA from the brain's calcium channel. The egg then makes the calcium channels that are encoded by that gene at a rate of up to a million within two days. (The frogs, by the way, are stitched back up and returned to the tank, where they heal up amazingly well.) Recently, however, the Snutch lab has been using another means of expressing brain calcium channels — by combining cultured cell lines with DNA. According to Snutch, you don't have to feed cultured cells, or clean their tank, so after many years, his lab may soon be saying good bye to the clawed toads.

E-GEMS = [Math+Multimedia] x Learning2

Why do mathematicians LOVE mathematics? Computer scientist and mathematician Maria Klawe's inquiry into this perplexing phenomenon has produced E-GEMS, one of the most innovative math and science education programs in the country.

MARIA KLAWE IS A SCIENTIST WITH many passions. The watercolours which adorn her office are her own work, and one gets the sense that she approaches her painting with the same intensity and enthusiasm as she does her academic and administrative work. "Painting is another way to explore ideas. Like science, it is discovery and the joy is in the searching," says Klawe.

This passion for discovery has been crucial to her research in discrete mathematics and theoretical computer science. However at UBC it is her skill as an innovator, motivator and implementor and her ability to bring the right people together to solve specific problems that has garnered her the positions of head, Computer Science (1988-95); director, E-GEMS (1992-present); vice-president, Student and Academic Services (1995-1998); and most recently Dean of the Faculty of Science.



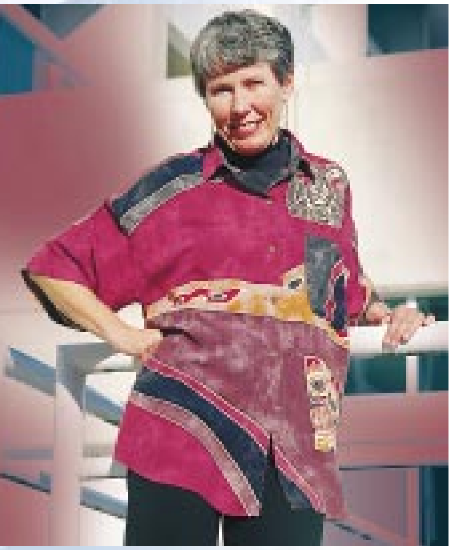
Courtesy: E-GEMS

Klawe's background along with observations of her own children's involvement with computer games, led to her interest in developing interactive multimedia technology as an educational tool. "Not only to help students learn mathematics, but to impart the same kind of magic and excitement that research mathematicians experience."

Klawe assembled a team of scientists, educators, writers, and professional video game and educational software developers to form E-GEMS (Electronic-Games for Education in Math and Science). Initially, their task was somewhat daunting—they found that very little was known about how children interact with computer games. However, six years after its inception, E-GEMS is a nation-wide initiative whose participants have included UBC, Queen's University, Electronic Arts, Apple Canada, Science World BC, and several elementary schools. Beta versions of games developed by E-GEMS are now available to teachers and children in about 60 elementary schools across Canada.

Her belief in the importance of the learning environment was evident in Klawe's tenure as VP Student and Academic Services. Klawe's Campus Advisory Board on Student Development (CABSD) spearheaded initiatives such as IMAGINE, a campus-wide orientation for first-year students to help make UBC a more student-centered environment. Another primary focus has been information technology. Her Advisory Committee on Information Technology (ACIT) brought together 150 faculty, staff and students from UBC to examine issues such as security, funding, how to improve access, and how to use it in teaching.

As the newly appointed dean of the Faculty of Science, Maria Klawe's skills as administrator will be put to good use. "I feel incredibly lucky to be the dean of Science. We have such innovative, energetic faculty in every department. We also have the same kinds of students. My job will be to balance the challenges with the opportunities."



Maria Klawe received one of five IBM-NSERC Regional Chairs for Women in Science and Engineering, which funds SWIFT (Supporting Women in Information Technology.)

Super Tangrams

One of the more disconcerting discoveries to come out of E-GEMS research is that boys and girls often interact differently with computers and computer games. While girls engage in exploring activities, boys tend to march through the levels in the game. Also after about grade six, girls are not as interested in traditional kinds of computer games. "E-GEMS is trying to create activities that provide a number of different ways children can learn about things," says project director Maria Klawe.

Super Tangrams is a game designed by PhD student Kamran Sedighian to investigate the effect of design strategies on children's learning and attitudes toward complex mathematical concepts. The game uses two-dimensional transformational geometry as the content area and tangrams, or geometric puzzles, as the activity to examine factors that make the game effective as a learning tool for all children. For example, what role does the user interface play in the learning environment? How does a game's environment and interface encourage children to reflect on a problem? How does it promote the optimal psychological experience of 'flow' in learning? And of course, what are the design elements that make a game fun?

For Maria Klawe, mathematics, computers, multimedia, and art are all interrelated. "I have always found mathematics very visual. It is a world you enter and walk around in." Sharing this vision is what excites Klawe about E-GEMS and its goal to create stimulating visual environments where children can explore — and also get excited about — mathematics and science.

Surveying Surging Glaciers

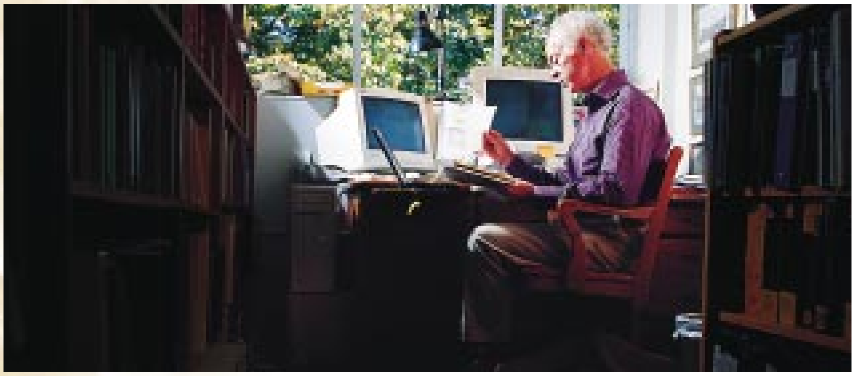
Geophysicist Garry Clarke has spent more than 30 years working to unlock the secrets of surging glaciers: what makes these slow-moving ice masses suddenly accelerate, and then just as quickly slow down again?

WHEN A PERSON SAYS THINGS ARE MOVING AT A GLACIAL PACE, WE TEND to think of something moving interminably slowly. One of the most surprising things Garry Clarke has discovered in more than three decades studying glaciers, is how quickly they can move and change.

"What we've seen over and over again in the past five years are startling transformations under the glacier. In a period of less than five minutes, there is dramatic change in all the sensors as the water pressure under the glacier rises, stresses alter, and icequakes occur," says Clarke.

Clarke made this surprising discovery in the course of field research on the Trapridge Glacier in the Yukon. Since 1969, he and his graduate students have been monitoring virtually everything that is possible to measure on this glacier. Clarke chose Trapridge Glacier because it is a surge-type glacier: it creeps along slowly for about 50 years, then accelerates rapidly, and slows again just as rapidly. Clarke expects the surge any year now, and it could be dramatic. A surging glacier in Alaska that crept along at 10 to 20 metres per year for 18 years jumped to a rate of 20 kilometres per year before resuming its slow pace.

The fact that glaciers can undergo such dramatic changes has major implications for those attempting to predict global climate change. Scientists are now aware of how volatile the Earth's climate has been over its history, but there is much to be learned about the mechanisms which cause such shifts. According to Clarke, surging glaciers behave in a similar way to ice streams, the high-velocity pathways through which the Earth's great ice sheets discharge their volume to the ocean. Such streams may control the volume of the Greenland and Antarctica ice sheets, and could have a major impact on the world sea level. Computer simulations predict a rise in sea level as Antarctica melts into the ocean, but it will be several hundred years before scientists can gather data needed to verify these predictions. However, there is a way to check the models now. According to Clarke, there is an intricate record of the effects of past climate change deposited in the ocean beds and within the Greenland and Antarctic ice sheets.

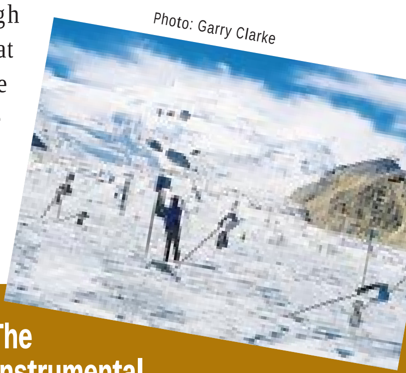


This year, Gary Clarke was awarded the Richardson Medal by the International Geological Society. He is also a Fellow of the Royal Society of Canada and the American Geophysical Union.

Clarke's research is key to the question of global climate change because in Earth's recent past, ice movement appears to have exerted a major influence on global warming. About ten years ago, Hartmut Heinrich discovered that during the most recent Ice Age, huge volumes of ice shot out of the Hudson Bay area into the north Atlantic, surging in 7,000-year cycles. These huge injections of fresh water into the sea upset the ocean circulation system resulting in a dramatic leap in world temperature, between five and ten degrees Celsius.

Clarke believes that these historical ice surges operate in a similar fashion to the surging glacier he and his research team are studying. His work is part of a national NSERC-funded project in which researchers across Canada are modelling the history and dynamics of Earth's climate system. It's a huge, complex undertaking, one that Clarke says may produce surprising results.

Photo: Garry Clarke



The Instrumental Trapridge Glacier

According to Garry Clarke, the Trapridge Glacier "probably the most-instrumented piece of ice in the world." He and his students have had to invent most of the instruments they use to gather data which could unlock the mystery of surge-type glaciers.

There are instruments on the glacier, under it, and inside it collecting data day and night on water pressure, stresses and changes in virtually all measurable aspects of the glacier. In recent years, new technology (such as remote data loggers, and fast ice drills), has enabled the researchers to acquire much more information. Clarke notes that over the past 15 years they have "equipped the entire discipline."

Every summer, Clarke and his team are dropped by helicopter in the remote Yukon mountains to gather data. In the field, the challenges are weather and the occasional grizzly; in the lab, the challenge is mainly intellectual.

Affleck and Vogt Receive Science and Technology Awards

Condensed matter physicist Ian Affleck won the award for New Frontiers in Research for his work on electron interaction in superconducting materials. Nuclear physicist and former TRIUMF director Erich Vogt received the Science Council Chairman's Award for Career Achievement. Vogt continues to conduct research and volunteers his expertise to teach first year physics at UBC.

Smith, Walters and Barlow new Royal Society Fellows

The Royal Society of Canada recently elected three new members from UBC's Faculty of Science: Leslie Smith of Earth and Ocean Sciences for his work on groundwater hydrology and contaminant migration; Carl Walters of Zoology and Fisheries for his research in applied ecology and fisheries management; and Martin Barlow of Mathematics for his work on probability theory and fractals.

Did you know…

UBC researchers, educators and volunteers won all six BC Science and Technology Awards presented by the Science Council of British Columbia this October.

Clowes receives Tuzo Wilson Medal and Order of Canada

Geophysicist Ron Clowes is this year's recipient of the Tuzo Wilson Medal from the Canadian Geophysical Union for his leadership and ground-breaking scientific contribution on the Lithoprobe project. Clowes was also appointed a Member of the Order of Canada.

CFI Award funds Marine Microbiology and Virology Lab

An award from the Canadian Foundation for Innovation will help to establish UBC's Molecular Marine Microbiology and Virology Laboratory to advance the study of seawater viruses (there are 10 million viruses in every ml of seawater) and their effects on organisms and ecosystems.

Science Graduate Students Top Achievers

Robert Chapman was recently awarded the Biomega Dissertation Prize for the best Canadian PhD thesis in organic or bioorganic chemistry. Nick Stoynov, a grad student in Chemistry received the 1998 Environmental Merit Award from the Dept. of Health, Safety and the Environment for his participation in the solvent recovery program. Physics grad student Michael Hughes was awarded the Ubyssey Community Contribution Award for his leadership in raising awareness of student issues. Fellow physics student Murray McCutcheon won the Whistler Triathlon.

Orvig and McNeil Receive Major Funding for Diabetes Research

Chris Orvig of Chemistry and John McNeil of the Faculty of Pharmaceutical Science received $700,000 in NSERC funding to continue their research on the role vanadium compounds play in regulating blood sugar to combat diabetes.

Associate Deans of Science Honoured with Student Development Awards

UBC's Campus Advisory Board on Student Development recently presented David Holm with the Margaret Fulton Award for individual achievement and Julyet Benbasat with the Alfred Scow Award for the Science One Program. Both awards recognize exceptional contribution to the student experience and learning environment.

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