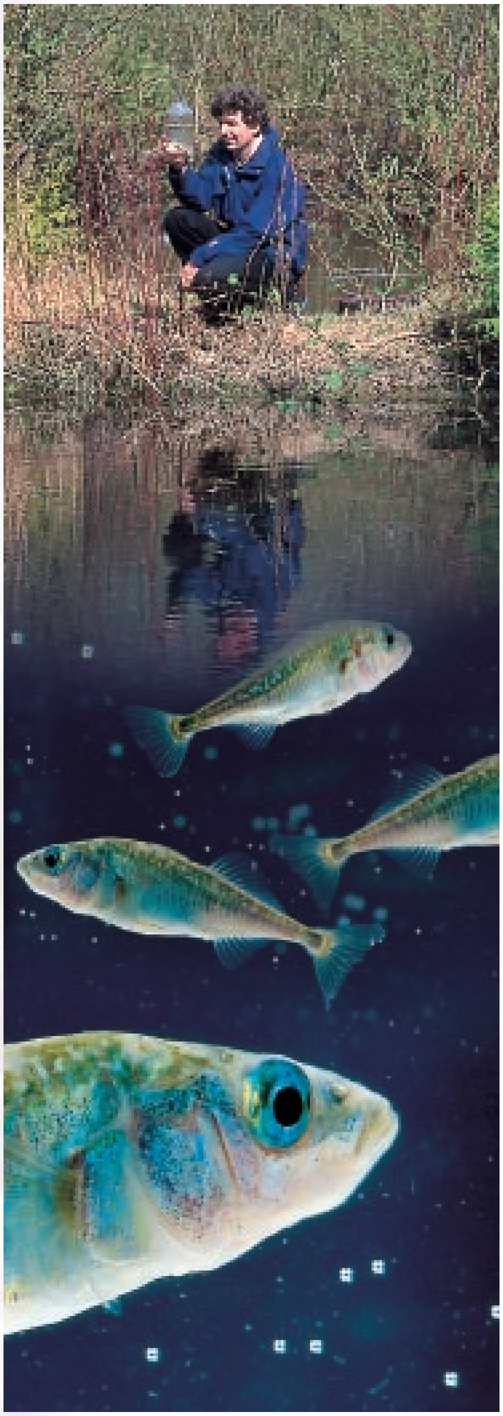
UBC

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

UBC Science Synergy

issue 5.2
summer 2000

Evolution in Action



Dolph Schluter is a Fellow of the Royal Society of London and in 1999 was a Scholar-in - residence at the Peter Wall Institute of Advanced Studies.

Following in Darwin's footsteps, Zoology professor Dolph Schluter uses field and lab research to study the proliferation of new species, and the evolution of ecological differences between them.

When Dolph Schluter skipped one of his undergraduate classes in wildlife management to hear Bob Montgomerie lecture on evolution—as observed in the territorial behaviour of hummingbirds in Mexico—the course of his life changed. Until that day, the avid naturalist had no intention of going to graduate school, but the realization that he could study evolution in action, not just from fossil records, set Schluter on the road to becoming a leading researcher in the origin of species.

Schluter was drawn to the idea of studying biology the "old" way, by heading to the tropics to observe animal populations. He offered to assist Montgomerie, but the fieldwork was already complete. So he applied, and was accepted, to do graduate work with McGill professor Peter Grant, who was studying evolution by observing Darwin's famous Galapagos Islands finches. It was a good thing he was accepted, Schluter notes, as he didn't apply anywhere else.

In the ensuing years Schluter's studies led him to many exotic locales, from the Galapagos, to Australia's Great Barrier Reef, to Kenya's Rift Valley. He settled in BC in 1985, and in 1989 was given a tenure-track position at UBC. About that time, Schluter started studying stickleback. These small, blue-eyed fish are found in coastal lakes in BC, Alaska, Russia and Japan, and are most diverse in the Strait of Georgia , where a mini-explosion of some of the earth's newest species has been occurring over the last 13,000 years. While no more than two species occur in any one lake, pairs of species in these lakes seem to be evolving on independent, yet parallel tracks.

One of the three major endeavours in Schluter's research is to understand how interactions between species can cause greater evolutionary differences between them. Studying the competition for resources is a focus of this work. The two stickleback species feed on different materials: the limnetics feed on zooplankton in open water, while the benthics prefer **cont'd on p. 3**

Inside

Life Sciences
Botany
Microbiology & Immunology
Zoology

Mathematics & Information Sciences
Computer Science
Mathematics
Statistics

Physical Sciences
Chemistry
Earth & Ocean Sciences
Physics & Astronomy

Biotechnology Lab

Dolphin garners $3.2-million in research funding

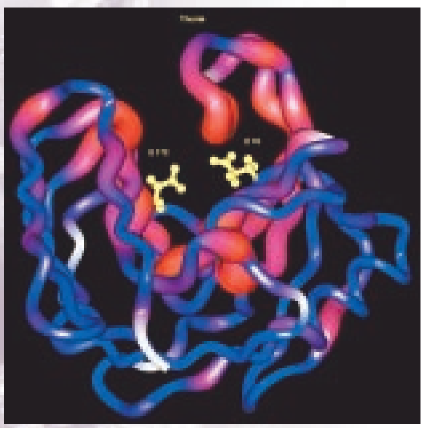
CHEMISTRY PROFESSOR and UBC's acting vice-president of Research, David Dolphin received a $1.4-million Collaborative Research and Development Grant from NSERC, and a $1.8-million contribution from QLT Phototherapeutics Inc. to continue his pioneering research in light-activated drug therapy for the treatment of disease.

Dolphin started his research in photodynamic therapy in the early '80s with microbiology professor Julia Levy, now president and founder of QLT (see Synergy 1.2 and 4.2). Internationally recognized for his work in porphyrin chemistry, Dolphin's numerous awards include a Guggenheim Fellowship, the Science Council of British Columbia's Gold Medal in Health Sciences, and an Izaak Walton Killam Research Prize. He has also served as associate dean of Science and acting dean of Science.

UBC Laboratory of Molecular Biophysics

MOLECULAR BIOPHYSICS, OR THE physical characterization of macromolecules such as proteins, DNA, carbohydrates, and biocompatible polymers is a growing area of research that involves biologists, physicists, chemists, and researchers from across campus.

The UBC Laboratory of Molecular Biophysics (LMB) is a new initiative designed to provide advanced instrumentation and a shared infrastructure for inter-faculty research, collaboration and technology development. Funded by the Canadian Foundation for Innovation, the BC Knowledge Development Fund, and a donation to UBC by Dr. Stewart Blusson, the $8.75-million project brings together over 50 researchers from the Faculties of Science, Medicine and Engineering. The LMB is comprised of eight technology centres or "hubs", and each hub houses specialized equipment. For example, the NMR Hub is acquiring two new spectrometers (600 MHz and 400 MHz) for the study of structural and dynamic properties of macromolecules in solution and the solid state.



CGI: Lawrence Mcintosh

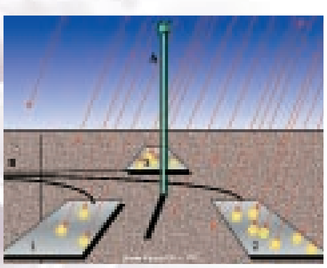
Biochemistry professor and LMB director, Grant Mauk describes the research as going beyond genetics or proteomics to a much more detailed understanding of proteins, nucleic acids and carbohydrates. "We are trying to understand how these molecules function, which functional groups are responsible for chemical and catalytic properties, binding recognition, and the structure and mechanisms by which they interact." Bioorganic chemist Steve Withers' work is a good example (see p. 6).

For Mauk, one of the more exciting areas is the technology hub devoted to development and maintenance of LMB's sophisticated instrumentation. Biophysicist Andre Marziali is another collaborator whose work in instrumentation design and nanopore-based DNA detection (see Synergy 5.1) will benefit from this initiative.

Another important goal for the LMB is to provide biotech start-up companies with access to advanced technologies and equipment, including high-resolution NMR spectroscopy, microcalorimetry, and X-ray crystallography. A combination of services and research will be provided through the Analytical Hub. Of course, training of graduate students, postdocs and faculty in use of the latest equipment is a fundamental feature of the LMB.

"I think that ideas still originate in individual minds, but if you want to do the best work, you need the best tools—and you need collaboration to use them optimally," says Mauk. "This is an effort to provide a serious infrastructure that is accessible to researchers across campus."

The BC-ALTA Project – Capturing Elusive Cosmic Rays



CGI: James Pinfold

COSMIC RAYS have been a conundrum for physicists since their discovery in 1912. "We don't know how they are made, what they are made of, what is making them, or how they get here," says Chris Waltham, UBC astrophysicist and director of the BC-ALTA Project. Short for BC-Alberta Large Time-coincidence Array, the project brings together university researchers with secondary school students and teachers to study this fascinating phenomenon.

Ultra high-energy cosmic rays are in fact elementary particles of enormous kinetic energy (10 million times higher than what can be produced in the largest accelerators on earth). When these primary particles strike the earth's upper atmosphere they create huge showers of secondary particles—mostly muons—that become the medium for cosmic ray detection and measurement.

cont'd on p. 3

BC-ALTA; *cont'd from p. 2* This requires an array of small, simple detectors placed a few kilometres apart over a large area. Secondary schools make perfect sites, notes Waltham. The project introduces these students to subatomic physics and provides educational opportunities in computing and electronics. In addition, the sensors can be used to monitor environmental changes and weather patterns.

Photo: Dexton Technologies Corporation

The BC-ALTA Project received $25,000 in seed funding from British Columbia's Information, Science and Technology agency. Abdul Ladha (left), a Vancouver entrepreneur, donated 100 computers and Hamamatsu Corporation donated the photomultiplier tubes. Co-op student Ben Warrington is now working with Chris Waltham and Andrzej Kotlicki from Physics and Patrick Walden from TRIUMF to assemble and test the detectors and develop project software. "This project can augment existing subject areas in career planning, earth sciences, information technology, and mathematics, as well as physics," says Waltham. "It gives students access to university research and the latest techniques in computer networking, data acquisition, and the Global Positioning System (GPS)."

Dolph Schluter; *cont'd from p. 1* invertebrates near the shore. The two species differ in size and shape, adaptations that enable them to better exploit their environment. In some coastal BC lakes, there is only one species of stickleback, and its traits are more intermediate. This pattern is seen over and over in studies of species diversity.

"It's an old idea, that competition promotes divergence, but there was no experimental evidence to support this," says Schluter. He and his team set out to change that by raising their own stickleback in experimental ponds at UBC. Don McPhail, professor emeritus of zoology and the discoverer of the stickleback pairs, believes the two BC species are the result of two different invasions from salt water into some lakes. Because stickleback ancestors still thrive in the Strait of Georgia, Schluter was able to simulate this "double invasion" to determine that when two species come together, divergence is favoured.

Schluter's second line of investigation is to determine how new species evolve in the first place. It is another idea that goes back to Darwin. To qualify as a new species, a form must be reproductively isolated from other forms. Schluter's work has led him to believe that reproductive isolation in itself is not the reason new species form. Rather, as species adapt to their environment, they accumulate genetic differences that, incidentally, lead to reproductive isolation. "It makes intuitive sense, but there are no tests from nature. Few people have considered what evidence would persuade them that a species evolved this way," said Schluter. He and his team are assembling this evidence. Dolph Schluter's work in evolutionary biology with grad students Howard Rundle and Laura Nagel, and postdoc Jenny Boughman, was recently featured in Science magazine.

The parallel evolution of BC's stickleback species is a powerful tool to test the role of natural selection in the origin of species. Based on this theory, a benthic from lake A should evolve along the same lines as a benthic from lake B, recognize it as the same species, and be willing to mate with it. In Schluter's experiments, the fish are willing. "We've concluded that natural selection is the only process that can produce a consistent pattern, so the species must be a product of natural selection."

In some ways, Schluter's work has come full circle, beginning with Darwin's finches, and proceeding to amass hard evidence of the truth of the early theories Darwin formed after visiting the Galapagos Islands. While BC may not match the exotic locales of Schluter's earlier research, the province provides him with ideal subjects, and a beautiful setting for someone with an enduring love for the natural world.

Evolution and Genetics

Schluter's research has recently branched into the field of genetic mapping, which has exciting implications for the study of evolution. He is working in collaboration with David Kingsley and Katie Peichel at Stanford University to produce a genetic map of the three-spined stickleback, and to find the genes that cause the differences between species. One of Schluter's labs is a breeding area for a hybrid of local freshwater stickleback and the more heavily-armoured Japanese marine stickleback. The amount of armour will vary among offspring; those with more armour will inherit different genetic markers than those with less armour if the marker genes are closely linked.

Photo: Matt McLeod

Once Schluter and his team have produced and measured 3,000 offspring from hybrid brother/sister matings, the team at Stanford will score each fish for the presence of hundreds of different genetic markers. Eventually they will find, sequence and characterize the genes responsible for the differences in body armour and other traits. Long-term goals for the research include gaining insight into the genetic basis for parallel evolution, and determining the evolutionary history of the species.

Charting an Interdisciplinary Course

With a two-thirds appointment in Earth and Ocean Sciences, one-third in Geography, plus membership in the Institute of Applied Mathematics, Douw Steyn has the perfect background to head the interdisciplinary Science One program at UBC.

JUDGING FROM THE WORK OF HIS STUDENTS, Science One director Douw Steyn's enthusiasm for the program is contagious. As an example, he brings out a paper by one of his first-year students, Alana Mackenzie. Like all Science One students, she was at the top of her high school graduating class, excelling in Science as well as English (an important criterion for acceptance into Science One). Alana is also an avid softball player, a pitcher, who decided to analyze the physics of a riseball, a pitch that looks like an ordinary fastball but rises just as it crosses the plate in front of the unsuspecting batter. Alana's paper includes the physics equations that describe the riseball's trajectory, computer programs, solutions to the equations, and an elegant conclusion. "The scientific maturity of her analysis is well beyond what one usually expects of a first-year student," says Steyn.

Science One is unique in that it teaches exceptional students the basics of separate scientific disciplines while also encouraging them to incorporate knowledge from across disciplines. Steyn does not believe in didactic teaching methods that merely present students with information to learn by rote. "In trying to do the learning for the students, these methods actually hinder learning," he says. Instead, he and other Science One instructors present students with a discursive guide to the most important aspects of an issue, which allows them to discover for themselves what they need to know. Another goal of Science One is to encourage students to allow their own interests to guide their learning.

Science One director Douw Steyn encourages his students to look at issues from many different angles—and to study what they love. (Back row from left: Tiran Matsubara, Derek Liu, Rebecca Freedman. Front row from left: Suresh Sivanandam, Longena Ng, Michael Sheldrake, Michael Groves, Douw Steyn.)

This is exactly what Steyn himself does in his research. "My overall concern is for the environment—especially air quality," says Steyn. He uses math and physics to study the movement of air pollutants and the meteorological and chemical factors that govern air pollution. The study of this complex area also requires a combination of tools, including analytical and computer modelling.

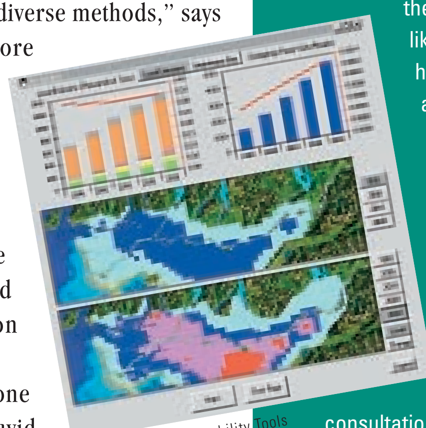
"I'm a great advocate for the power of diverse methods," says Steyn. "More tools allow you to study more complex problems and come up with more authoritative answers." He focuses his research on the details of how air pollution is formed, particularly in the Vancouver area, where the urban smog is far denser than it should be given the area's population. The coastline and topography combine to make the pollution here far worse, says Steyn.

The study of air pollution also involves one of his favourite passions: the sea breeze. An avid sailor, Steyn is truly in his element when out on his boat. As a scientist, he studies how the local sea breeze recirculates pollutants, and as an environmentalist, he is working on a project (see sidebar) to inform the public and politicians about this phenomenon so the future may be cleaner for our coastal city.

The Georgia Basin Futures Project

Douw Steyn's research is driven by his concern for the environment, and his involvement in the Georgia Basin Futures Project allows him to help shape government policy and inform the public about environmental issues. The project is funded as a multi-agency collaborative research initiative through UBC's Sustainable Development Research Institute. The study explores the future of the Georgia basin, including its land, forests, oceans, and air.

Steyn is helping to build a model to study the basin's future evolution. He is part of a team developing an interactive computer program that enables the public and policy makers to visualize what the area's future might look like. "By showing people how different choices and actions can affect environmental change, the program teaches them to think about sustainable development," says Steyn.



CGI: Envision Sustainability Tools

Model building is one of the project's three major initiatives. The other two are public consultation and the development of public policy on sustainability. Steyn says that while his work on this project is not classic scientific research, it gives him the opportunity to use his background in the broader community to advance a cause he believes in.

Following the Bumpy Path

Whoever thinks a statistician's work is tedious has never heard of bump hunting or data smoothing. Statistics Professor Nancy Heckman sculpts the statistical landscape with innovative tools that analyse data and turn numbers into information.

THE DISCIPLINE OF STATISTICS COMBINES MATHEMATICS WITH THE analysis of data. The advent of computers has added another, more visual, dimension to the statistician's work— the creation and refinement of data interpretation tools such as bump hunting and data smoothing.

"Computers can calculate and search data very quickly, which allows us to look for more complicated patterns in data," says Nancy Heckman. The data-mining techniques used to glean information on the shopping patterns of Safeway Club Card members, for example, would have been impossible ten years ago.

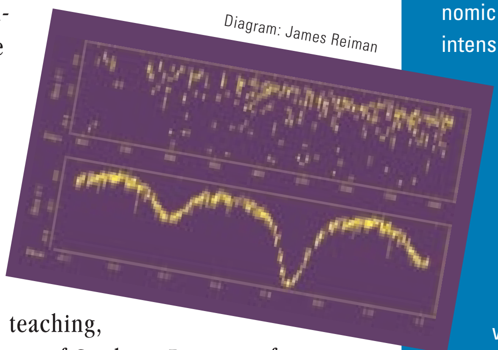
Before the use of computers, data patterns were usually modelled by simple relationships, such as linear ones. Now, computer graphics and other computer intensive techniques allow statisticians to "see" much more complex dependencies or patterns. Data smoothing techniques (see sidebar) allow statisticians to describe a pattern by a curved line, called a regression curve. "Until recently, a statistician's main goal in using data smoothing was to find a smooth curve close to the data points," notes Heckman. "But now there is more interest in using smoothing techniques to answer the question: what is the shape of the curve?"

Heckman studies the shapes of curves by looking for bumps, or localized blips, in the data. She and former graduate student Jarek Harezlak have been working with children's growth data to study the number of growth spurts they have. Since a child's rate of growth (called the derivative of growth) varies from year to year, most simple formulae describing growth in terms of age do not capture the complexity of this variation.

Professor and Director of Graduate Programs in Statistics, Nancy Heckman recently received a Killam Faculty Research Fellowship and was elected to the International Statistics Institution.

"Using smoothing, we can study a more complicated form of the derivative of growth," says Heckman. "With our smoothing-based method, called CriSP for Critical Smoothing Parameter, we can see that each child has a very prominent pre-pubescent bump in the growth rate, as expected. But many also have smaller bumps around age six or seven."

Diagram: James Reiman



When not analyzing data, organizing conferences, teaching, or busy with her duties as Director of Graduate Programs for Statistics, Heckman is out dancing—literally. Salsa, Swing, African, and Latin dance are all part of her repertoire, and she is also taking a drawing class at Emily Carr in her spare time. Clearly, Heckman is testament to the fact that there's more to a statistician's life than bump hunting and regression curves.

Data Smoothing and Star Gazing

Data-smoothing techniques help statisticians make sense out of "noisy" or widely scattered data by examining one small area of data at a time. The computer determines a "local curve" for each area and then pieces together these local curves to form the entire regression curve. This flexible approach to data analysis, called non-parametric regression, permits the data to "speak for itself," since the method does not use a pre-specified form for the curve. Data smoothing techniques are useful in a wide variety of statistical applications, such as the study of the relationship between air pollution and asthma; recognition of weather patterns; estimation of survival functions in evolutionary biology; modelling of life cycles of medflies (important to agriculture), and even the study of stars.

Last June, with the assistance of the Pacific Institute for Mathematical Sciences (PIMS), Heckman organized a workshop on the application of smoothing methods. A collaborator and principle speaker was John Rice, a statistician from UC Berkeley who is studying astronomical data—specifically, the energy intensity emitted by stars. For variable periodic stars the intensity is periodic over time, and the time period covers a wide range. For example, eclipsing binary stars have periods of between 3 hours and 24 years.

"The shape of the intensity curve gives some information as to what kind of star it is, or if two stars are rotating," states Heckman. "But the data set is huge. Our hope is to develop techniques to classify the intensity curves automatically, using shape." Heckman plans to spend a good part of her sabbatical next year working with Rice on variable star data.

Attack of the Mutant Enzymes

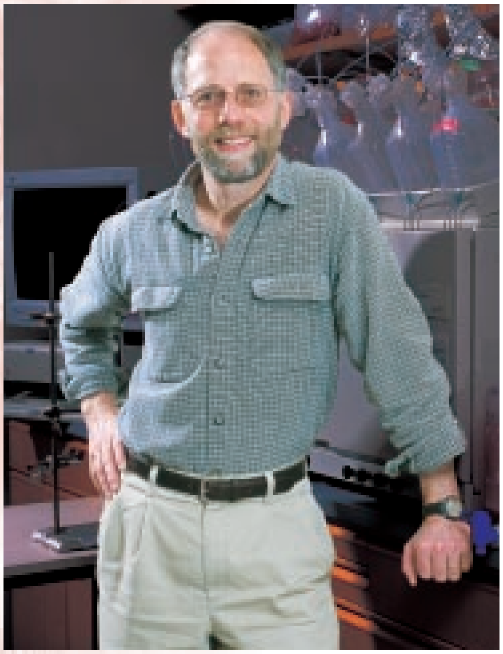
Joint professor of Chemistry and Biochemistry and a member of UBC's Laboratory for Molecular Biophysics, Steve Withers combines biochemistry, organic chemistry and biophysical chemistry to probe and manipulate the structure and mechanisms of enzymes in order to fight disease.

Consider each individual cell as a miniature reaction chamber where biochemical changes occur in a series of discrete steps. Enzymes are the proteins that catalyze these metabolic reactions and control the cell's internal chemistry. One aspect of Steve Withers' research is studying how enzymes in the human gut break down polysaccharides such as starch.

"Understanding how the linkages between sugars are broken has obvious implications in the food processing industry and, more importantly, in our understanding of how our stomach processes food," says Withers. Several new diabetes drugs have recently appeared on the market that work by inhibiting the enzymes that break down starch, thereby slowing down the release of glucose into the bloodstream. However, in order to design inhibitors for specific enzymes, scientists need to first understand the enzyme's structure and mechanisms.

A critical piece of the puzzle of cellular superstructure and degradation is found in oligosaccharides. A component of glycoproteins and glycolipids, these naturally occurring compounds play a key role in cellular recognition. "In many bacterial infections, the infectious process is initiated by the attachment of the bacterial cell to the gut wall through the interaction of an oligosaccharide with a protein receptor," says Withers.

Conversely, synthesized oligosaccharides can also play an important role in the prevention of disease by competing with their natural counterpart for the receptor, and thereby mimicking and stopping the infectious process. Their potential as orally administered antibacterial agents is being studied, says Withers. Synsorb, a company out of Calgary, is developing a drug treatment for the notorious hamburger disease, an E. coli strain that produces a toxin that binds to oligosaccharides on the stomach wall.



Steve Withers' awards include the Hoffman LaRoche Award of the Canadian Society for Chemistry, the Rutherford Medal, Royal Society of Canada, and Corday Morgan Medal of the Royal Society of Chemistry.

Oligosaccharides also play an important role as anti-infective agents in human milk. "There is a lot of interest in synthesizing these compounds and adding them to infant formula to produce a healthier product," says Withers. While the applications for drug therapy or food additives are promising, commercial, large-scale synthesis of oligosaccharides is difficult and costly. This challenge is what drives much of his research.

Traditional chemical synthesis is complex, lengthy and difficult to control. The alternative involves isolating, cloning and purifying "nature's own" enzymes. However, these enzymes require nucleotide diphosphate sugars in order to make oligosaccharides, and these "sugar donors" are very expensive. Withers and his lab recently patented glycosyl fluorides (see sidebar), an inexpensive alternative to these donor substrates. "While they are very easy to synthesize, we still have much work to do to speed up the process," he notes.

Patenting Designer Enzymes

If the function of a protein molecule depends upon its unique three-dimensional structure, which in turn depends on the linear sequence of amino acids, and the enzymes in a cell as well as its structural proteins are determined by the cell's genotype, then we can begin to understand the importance of genetic engineering in Steve Withers' research.

In collaboration with Tony Warren in Microbiology, and with funding from the Protein Engineering Network of Centres of Excellence and industry partner Neose Technologies out of Philadelphia, Withers has patented a group of enzymes called glycosynthases.

CGI: Christoph Mayer

"We wanted to see if we could take the enzymes that ordinarily hydrolyze—or break the bonds—in glycosidic linkages and make them work efficiently backwards," says Withers. "Now, instead of breaking the bond, we can make a bond between two sugar molecules." Using genetic engineering techniques pioneered by Michael Smith, they made a mutation to a particular amino acid within the active site of the enzyme thereby stopping it from being able to hydrolyze substrates. The structure of the mutant enzyme left a space, which then allowed them to design a complimentary substrate that specifically binds to the mutant enzyme to make oligosaccharides.

Just as a master of jigsaw puzzles gets a thrill from fitting the last piece in place, Withers is obviously excited about the potential of this work. "I would love to be able to go to the fridge and say, 'so, you want an enzyme that can make this linkage—here it is.'"

UBC's Science Brain Gain

Welcome to fourteen exceptional scientists who recently joined the Faculty of Science.

The Media Group (UBC)

PATRICE BELLEVILLE, Computer Science Instructor. Professional interests: curriculum development, theoretical computer science, and educational technologies. When not teaching, I love playing with my children. And being from Montreal, I am one of the few who wishes that Vancouver's winter rain would turn to snow.

MARY LOU BEVIER, Instructor, Earth and Ocean Sciences. "I use my previous research experience in field geology and radiogenic isotopic tracer studies of magma genesis to inspire the undergraduate students I teach."

JOERG BOHLMANN, Biology. Research: Plant Molecular Biology. "My work involves molecular analysis of the complex chemical defence systems that protect trees, particularly conifers, from insects. This is an exciting area of science and a particularly important one for British Columbia."

DOUGLAS BRYMAN, J.P. Warren Chair, Subatomic Physics. Research: Experimental Particle Physics. "I've always been fascinated by how much can be learned about the fundamental constituents and interactions of matter. UBC and TRIUMF provide the perfect environment to study this field—and I can bike to work!"

MATTHEW CHOPTIUK, Theoretical Physics. Research: Relativity, black holes and computational physics. "When I am not trying to simulate very small black holes with very big computers, I most enjoy spending time with my family."

ANNE CONDON, Computer Science. Research: Computational complexity theory, design and analysis of algorithms, DNA computing. "The theory of computing is rewarding because it combines the fun of solving puzzles with the satisfaction of knowing that the solution is not only beautiful, but can have significant practical import."

GREGORY DAKE, Chemistry. Research: Synthetic organic chemistry. "Organic chemistry has many similarities to cooking in that it is as much an art as a science. The good thing is that the compounds you make don't have to pass any taste tests."

MICHAEL DOEBELI, Zoology and Mathematics. Research: Analytical and computer-based investigation of fundamental problems in theoretical ecology and evolution, such as speciation or the evolution of cooperation. "I'd love to do lab experiments, but my PhD in algebraic geometry didn't prepare me for that."

FRANÇOIS JEAN, Molecular Virology. Research: Development and application of new therapeutic interventions for Hepatitis C virus and other important microbial diseases. "Besides science, there is nothing like cycling vacations to stir my imagination. One of my favourite itineraries is Cape Breton."

PATRICK J. KEELING, Botany (CIAR Scholar). Research: Protist evolution. "My lab uses molecular biology to study protist evolution, concentrating on gene transfer between unrelated organisms, and the origin of intracellular parasites such as the malaria parasite."

DEREK GATES, Chemistry. Research: Inorganic and Polymer Chemistry. "My research is directed towards the synthesis of new inorganic molecules and their potential use in the preparation of new classes of macromolecules. In my spare time, I enjoy playing golf and hockey."

CARL MICHAL, Biophysics. Research: Biological materials and novel NMR techniques. "Mother nature has solved most materials problems already and is willing to teach us how. When not trying to discover her secrets, I try to enjoy her beauty."

MICHAEL MURPHY, Microbiology and Immunology. Research: Enzyme structure and function. "Understanding and predicting the diverse catalytic properties of microorganisms has immense potential application. Outside the lab, I enjoy hiking the local mountains."

GORDON SLADE, Mathematics. Research: Statistical mechanics and probability, especially random walk, percolation and related models. "I was a graduate student at UBC, so I was delighted to return to an excellent department at a great university in a wonderful city."

UBC Science Team among world's top ten Putnam Winners

UBC science undergrads Joel Erickson, Jesse Goodman, and Ho Sen Yung were among the world's top ten teams in the 60th Annual William Lowell Putnam Mathematical Competition. Erickson was ranked in the top 14 and Goodman finished in the top 24 out of entrants from 431 colleges and universities in North America.

Constance van Eeden Fund honours achievements in Statistics

Distinguished statistician Constance van Eeden has donated $100,000 in the establishment of an endowment to the Department of Statistics. The fund supports a residency and lecture program; a West Coast summer school for graduate, undergraduate and secondary school students; and admission awards. The Department of Statistics has established an annual prize in her name for the top BSc graduate in statistics or actuarial science.

Mathematicians Boyd and Gui garner prestigious awards

Professor David Boyd is the first UBC faculty member to receive the Canadian Mathematical Society's Jeffery-Williams Prize for outstanding contribution to mathematical research. Associate professor Changfeng Gui was awarded the 1999 André-Aisenstadt Mathematics Prize from the Centre de Recherches Mathematiques.

Bryman and Young receive Physics appointments

Doug Bryman was appointed the Warren Chair in Physics and Astronomy in December, and Jeff Young is a newly appointed fellow of the CIAR program in nanoelectronics.

Chemists Merer, Sherman and James win top awards

Chemistry Professor Anthony Merer won the Prof. Jacob Biely Faculty Research Prize in recognition of his distinguished record of published research. Associate Professor John Sherman was awarded the Charles A. McDowell Award. Professor Brian James is the recipient of this year's Canadian Catalysis Lectureship and the 2000 CIC medal from the Chemical Institute of Canada.

Pedersen appointed Chair of International Steering Committee on Global Change

Tom Pedersen, Earth and Ocean Sciences professor, has been appointed to a three-year term as chair of the Scientific Steering Committee of Past Global Changes (PAGES), an international scientific organization in Bern, Switzerland.

Davies honoured with Bristol-Meyers Squibb Award

Microbiology Professor Emeritus Julian Davies has received the 1999 Bristol-Meyers Squibb Award for Distinguished Achievements in Infectious Disease Research. He is the first Canadian to receive the $50,000 US Award and silver medallion since the award's inception in 1977.

Math and Physics students ace awards

Alexei Razoumov, a PhD physics graduate, won the Plaskett Gold Medal for the most outstanding doctoral thesis in astronomy or astrophysics in 1999. Trevor Lanting, a fourth year honours undergrad in Physics, placed 9th in the 2000 CAP University Prize Exam competition. Mathematics undergrad Scott MacLachlan is a recent winner of the prestigious Harry Logan Scholarship.

CANADA POST POSTES CANADA
Postage Paid Post Payé
Publications Mail Poste-publications
1657402

UBC Science Synergy is published by the
Faculty of Science
University of British Columbia
Address correspondence to:
UBC Science Synergy
Faculty of Science,
6270 University Boulevard
University of British Columbia
Vancouver, B.C., Canada V6T 1Z4
Website
http://www.science.ubc.ca/

Publisher:
Bob Carveth, Director, Science Communications, Faculty of Science, University of British Columbia
carveth@unixg.ubc.ca.
Editor and Writer:
Mari-Louise Rowley, Pro-Textual Communications
Writer:
Leslie Ellis, Inkwell Communications
Designer:
Chris Au, Didax Design Group Inc.
Principal Photographer:
Janis Franklin, The Media Group (UBC)

Printed in Canada on recycled paper