PIMS MAGAZINE

DIRECTOR'S ᴮLOG

It's a great pleasure for me to write these lines as the Director of PIMS. As you will read in this newsletter, this year was full of scientific activities throughout the PIMS sites, including workshops, summer schools as well as educational and industrial events. The wonderful vitality of the PIMS community is evident, as well as our deepening connections to the rest of the world. In July the University of Saskatchewan became a member of the PIMS consortium, thus fully extending our distributed institute across three provinces in Canada as well as Washington State.

The PIMS International Graduate Training Center in Mathematical Biology entered its second year. This program has been successful at attracting top level graduate students and creating exciting activities in Western Canada. Next summer PIMS will be organizing two world-class thematic programs, one of them in PDE and the other one on Challenges and Perspectives in Probability. This second program is a joint venture with our partner institute in Montreal, the Centre de Recherches Mathematiques (CRM).

In October, PIMS hosted the Western Section meeting of the American Mathematical Society, which had a record participation. That same month I attended a meeting of the Korean Mathematical Society as part of a PIMS-sponsored CMS delegation led by Anthony Lau (President of the CMS).

Speaking of international meetings, PIMS is helping to organize the first congress of the Pacific Rim Mathematical Association (PRIMA) to be held in Sydney next July (see http://www.primath.org). And in August PIMS will be hosting the second joint meeting of the Canadian and Mexican mathematical societies at UBC.

PIMS educational activities have attracted a lot of attention and support. In particular, our aboriginal summer math camps were recently featured in the Vancouver Sun. On the industrial side, the next Industrial Problem Solving Workshop will be held in Calgary in May and our recently launched Geomathematics Program will feature a summer school on seismic imaging in Seattle in 2009.

As you can see, life at PIMS has been busy and there is plenty more to come! I hope that what you read here will entice you to learn more about our activities by visiting our redesigned website (http://www.pims.math.ca). I also want to invite you to contact me directly if you wish to share any information, ideas or comments about PIMS.

Warmest regards,

Alejandro Adem
director@pims.math.ca

HIGHLIGHTS

UNIVERSITY OF SASKATCHEWAN JOINS PIMS

By Raj Srinivasan (Saskatchewan)

The University of Saskatchewan is now a full member of the PIMS consortium. Combined with the recent addition of the University of Regina, PIMS now has as its member institutions the major research universities in Alberta, British Columbia, Saskatchewan and Washington State.

As one of Canada's leading research-intensive universities, the University of Saskatchewan is home to leading research centres such as the Vaccine and Infectious Disease Organization (VIDO), International Vaccine Centre (InterVac) and the Canadian Light Source (CLS) synchrotron in addition to having a long and respected tradition of agricultural research and two Nobel Laureates: Gerhard Herzberg and Henry Taube. The University of Saskatchewan currently holds a number of Canada Research Chairs in areas that include X-Ray Absorption Spectroscopy, Synchrotron Radiation, and Molecular Environmental Science and boasts outstanding research facilities for its faculty and students such as the Saskatchewan Structural Sciences Centre, the Plasma Physics Laboratory, and a high performance computing lab.

At the University of Saskatchewan, mathematical science is undertaken across a wide spectrum of departments and faculties. In addition to offering traditional majors and honours in Mathematics and Statistics, interdisciplinary programs of Mathematical Physics and Bioinformatics are also available. A Ph.D. program in BioStatistics and an Applied Math programme for undergraduate and graduate students are currently in development.

The demands of modern research in the physical and natural sciences combined with the tendency towards interdisciplinary work is broadening the scope of mathematical science immensely. Interdisciplinary research being carried out at Canadian Light Source (CLS), the Vaccine and Infectious Disease Organization (VIDO) and the International Vaccine Centre (InterVac) provides evidence of this trend with respect to extremely large quantities of data being generated and the imperative to extract meaningful results and interpretations.

The challenges of data collection and analysis have become ubiquitous across the sciences and even reaching into the social sciences. Applied mathematical science continues to develop methods and techniques to solve exactly these sorts of problems across disciplinary boundaries. Concrete evidence of this widespread need for mathematical sciences is evident when seeing the number of investigators in diverse areas requesting high-performance computing clusters to help them cope with their data analysis requirements. Membership in PIMS will further present outstanding opportunities for researchers in all areas of science and social science to interact with mathematical scientists.

The University of Saskatchewan representative on the PIMS Board of Directors will be Professor Jo-Anne Dillon, Dean of the College of Arts and Science. Their site director will be Professor Raj Srinivasan, who is currently Head of the Department of Mathematics and Statistics.

SITE DIRECTOR NAMED FOR UNIVERSITY OF CALGARY

Clifton Cunningham began his term as site director at the University of Calgary in July 2008. He is an Associate Professor in the Department of Mathematics and Statistics, and has been a member of the Board of Directors of the Canadian Mathematical Society since 2007.

Dr. Cunningham received his doctorate from the University of Toronto in 1997. After a postdoc at the University of Massachusetts and visiting positions in Paris at the Ecole Normale Superieure, he moved to the University of Calgary. He has also held visiting positions at the Institut des Hautes Etudes Scientifiques and the Centre National de la Recherche Scientifique (France). Dr. Cunningham uses group representation theory, algebraic geometry and number theory to work on problems relating to the Langlands Programme, including results on the computability of local orbital integrals and distribution characters.

University of Calgary

New Deputy and Assistant Directors Appointed

David Brydges has been appointed PIMS Deputy Director. Dr. Brydges is a Professor of Mathematics and Canada Research Chair at the University of British Columbia. He is a distinguished researcher in mathematical physics and probability, and has served on numerous scientific and professional committees.

Mark Gotay has been recently appointed as PIMS Assistant Director overseeing scientific reporting for the institute. Dr. Gotay has just settled in Vancouver following a 16-year stint as Professor of Mathematics at the University of Hawai`i at Manoa. Prior to joining UBC he was on the faculties of the United States Naval Academy (1984-1992) and the University of Calgary (1979-1984). He received his PhD in physics in 1979 from the University of Maryland. Dr. Gotay has held visiting positions at the Universities of New South Wales and Aix-Marseille and the Bulgarian Academy of Sciences, and was a Ford Foundation Fellow at the Mathematical Sciences Research Institute in 1988-1989. Assistant Director Gotay took up his new position October 1, 2008.

Chern Institute and PIMS Sign Collaborative Agreement

The Pacific Institute for the Mathematical Sciences has signed a collaborative agreement with the Chern Institute of Mathematics (CIM) at Nankai University in Tianjin, China. The Chern Institute was founded by the late Professor S. S. Chern, who was also the first director of the Institute until 1992. The current director is Yiming Long, a member of the Chinese Academy of Sciences. Cooperation between CIM and PIMS will take place through exchanges of scholars and students as well as by the organization of joint events. The agreement with CIM extends the network of mathematical institutes in the Pacific Rim which actively collaborate with PIMS, and colleagues at both institutions are looking forward to a very productive relationship.

Pictured Left-to-Right: Ivar Ekeland, Yiming Long and Alejandro Adem

fUNCTIONS

PIMS SUMMER EVENTS 2008

Several main events of PIMS' summer program were aimed at some of the youngest members of our community. The **Fifth Canadian Young Researchers Conference in Mathematics and Statistics** held at the University of Alberta (UA) provided a unique forum for young mathematicians across Canada to present their research and to collaborate with their peers. The conference had over 60 graduate and post-doctoral participants from 10 different Canadian universities, 36 of which gave talks. Participants voted for their favorite three talks, and prizes were awarded. A banquet was held on Saturday night at which guests were treated to a keynote address by Dr. Herb Freedman titled "Solving irrelevant problems mathematically." A social event was held after the banquet, at which live entertainment was provided by The Martingales (a local math band!) Undergraduates were the beneficiaries of **The Sixth Annual PIMS Mathematical Biology Summer Workshop** on the "Mathematics of Biological Systems." The eleven-day May meeting at The Centre for Mathematical Biology at UA introduced senior undergraduate students to mathematical modelling and analysis as applied to real biological systems. **The Second Prairie Network Annual Meeting and Student Workshop**, at Brandon University in May, welcomed senior undergraduates and beginning graduate students. Its objective was to convey a flavour of research-level mathematics to the students, and to encourage them to consider an academic career in mathematics. The workshop included a Question and Answer session on the subjects of postgraduate study and academic careers. Geared to burgeoning mathematical scientists as well was the **15th Canadian Undergraduate Mathematics Conference**. This year's edition was hosted by the University of Toronto (UT) in July.

A highlight of the early summer was **Lie Theory and Geometry: The Mathematical Legacy of Bertram Kostant**, a conference at the University of British Columbia (UBC) attended by eminent mathematicians from around the world to celebrate the group representation theorist's and geometric quantizer's 80th birthday. Prof. Kostant's famous lecture "A. Garett Lisi's E8 theory of everything" on the exceptional Lie group E8 may be viewed online at: http://www.pims.math.ca/files/kostant_video.ram

Bertram Kostant (photo courtesy of Gijs Tuynman)

Other fêtes partially sponsored by PIMS included **The Mathematical Interests of Peter Borwein** at the IRMACS Centre of Simon Fraser University (SFU), and the **Ivar Ekeland Banquet** recognizing the contributions of the Professor and former PIMS Director. In late August, Harvard University was the site of **Geometric Analysis: Present and Future**, which celebrated the birthday of Fields Medalist Shing-Tung Yau.

Peter Borwein

The heart of PIMS' summer program is its slate of summer schools. This year there were several. They started up in May when the **MITACS-PIMS Summer School on Mathematical Modelling of Infectious Diseases** was convened at UA. It provided effective training for collaborative research in infectious diseases based on mathematical modelling and qualitative analysis. A main goal was to prepare students to work as modellers in a public health environment, and to help public health people and mathematical modellers learn to communicate with one another.

The Accelerate BC/PIMS-sponsored **2008 Summer School in Probability** consisted of two advanced graduate courses, given by Geoffrey Grimmett and Krzysztof Burdzy. Burdzy's course introduced techniques of stochastic analysis by showing how Brownian motion applies to interesting and challenging questions. Grimmett's course presented a coherent theory of discrete spatial processes emerging from a number of areas including: random walks, percolation, models for ferromagnets and spin glasses, and interacting particle systems. Each course included 30 hours of lectures, and course credit was available for graduate students in Western Canada through the Western Deans' Protocol.

The event was held mid-June to mid-July at UBC.

Another Accelerate BC/PIMS-sponsored event, the **IGTC Summer School in Mathematical Biology** took place at PIMS UBC in Vancouver, May 11 - June 11, and featured a graduate course given by Leah Edelstein-Keshet and guests Karl Hadeler, Bard Ermentrout, Alex Mogilner, and Raibatak Das on molecular processes in the cell. Jonathan Martin, a student at the summer school, stated that "... [it] was a very rewarding experience. ...Each participant walked away with a new perspective on modelling which should prove useful in whatever field of research they decide upon."
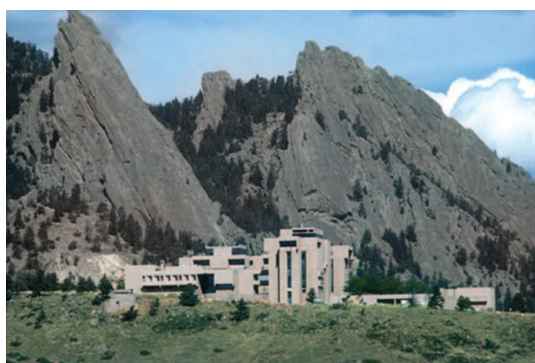
The PIMS-funded **International Graduate Summer School on Statistics and Climate Modelling** was held in August at the National Center for Atmospheric Research (NCAR) in Mesa, Colorado. The school took advantage of a rich learning environment that cannot be found elsewhere, even in universities; in particular, NCAR provided access to the high-performance computational and observational facilities needed to improve human understanding of atmospheric and Earth system processes.

Summer School in Mathematical Biology
(Photo courtesy of Vishal Rajani)

The **Sixth Summer School on Particles, Fields and Strings**, an ongoing series of annual summer schools in theoretical physics held in Canada, was hosted by UBC in late July. These schools educate graduate students and early career researchers on contemporary and avant-garde developments in string theory.

At the same time and place, the **PIMS Summer School in Perceiving, Measuring and Managing Risk: Illiquidity, Long-term Risk, Natural Resources** included the participation of five organizations from Canada, Chile, Paris and Germany. Its purpose was to introduce the full role of advanced risk management in our economy and society. The lectures focused on risk pooling in financial markets, cost benefit analysis for long term environmental decisions, and natural resources management. Building on this integrated approach, the conference contributed to the current debate on the policy and institutional changes that must be initiated to face global long-term risks.

The **Summer School on Stochastic and Probabilistic Methods for Atmosphere, Ocean, and Climate Dynamics** was intended for beginning researchers who are interested in the application of stochastic and probabilistic modelling and analysis techniques for atmosphere/ocean dynamics. Due to popular demand, a subsequent repeat Summer School Workshop was also hosted at the University of Victoria (UVic).

National Center for
Atmospheric Research

Also aimed at burgeoning scientists was the **Summer School on Bayesian Modelling and Computation** at UBC. It consisted of 5 modules spread across 5 days. The modules included model selection, stochastic computation, MCMC, non-parametric Bayes, as well as an introduction to WinBUGS and machine learning. The summer school was attended by 37 participants and was a great success.

As usual, PIMS collaborated with a large number of universities and organizations throughout North

America to support a variety of conferences and meetings. Among these were:

The **2008 Society for Mathematical Biology Conference** brought together 330 mathematicians, biologists, statisticians and researchers from a variety of other disciplines at the Centre for Mathematical Medicine (UT) for three-and-a-half days of talks. The conference tied into the activities of the Fields Thematic Program on Mathematical and Quantitative Oncology with Cancer being one of its major themes. Two new SMB traditions began at this year's event: the awarding of the first Lee Segel Prizes and the inaugural presentation of the Torcom Chorbajian Lecture.

Mathematical concepts are often most effectively communicated by images. Nowadays, everybody has the technical means available to produce professional quality graphics to help in the exposition of research, but the skills necessary to produce great graphics are not easy to come by. At **SAGE DAYS 9: Mathematical Graphics and Visualization Workshop** which took place at SFU in August, graduate students and advanced undergraduates learned the basic skills necessary to produce professional quality visualization of mathematical concepts. For example, to the right is an image produced at the meeting using SAGE:

More stunning images can be see at :
http://www.pims.math.ca/science/2008/08mgvw/gallery.html
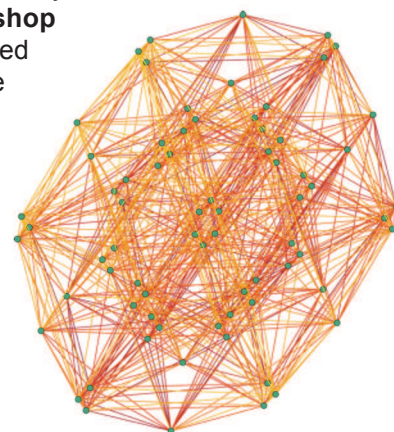
Visualization of The Polytope Associated with the Exceptional Lie Group E6, produced at SAGE Days 9

The **19th Annual Conference of the International Environmetrics** *Society* was held at UBC-Okanagan in May, focusing on "Quantitative Methods for Environmental Sustainability." It covered both technical and practical applications, ultimately encouraging the participants to bridge the two. Issues addressed included: biodiversity, climate change, sustainable agriculture, air quality, water quality, soil contamination, energy, environmental economics, and ecosystem and human health.

Another conference on **Climate Change Impacts on Ecology and the Environment** took place in May at UA. This workshop brought together a variety of environmental scientists, statisticians, and epidemiologists, in order to assess the impact of climate change on agriculture, forestry and human health conditions.

Continuing from a rich tradition of scientific ingenuity, the **Ninth International Conference on Quantum Communication, Measurement and Computing** provided an occasion to discuss scientific and technological results on quantum communications and related topics for researchers in very different fields. QCMC IX took place at the University of Calgary (UC) in August. Also at UC in August, the **International Conference on Information Theoretic Security** brought together the leading researchers in the area of information and quantum theoretic security.
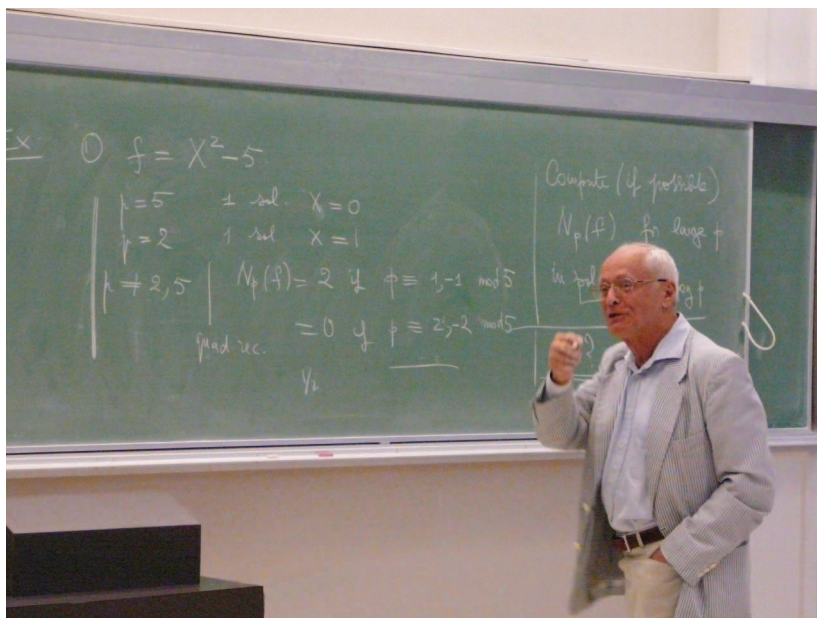
Economics was well-represented in this summer's activities, starting off with the **PIMS Vancouver Econometrics Workshop** at SFU in early June. This was followed by the **Workshop on Transport, Optimization, Equilibrium in Economics** in July, devoted to the broad problem of transporting a given distribution of mass from one location to another distribution of mass in a different location, while minimizing a certain cost. At UBC as well, Professor Walter Schachermayer (Vienna University of Technology) gave a series of Distinguished Lectures on **Optimal and Better Transport Plans** in June.

The summer was replete with many other events and workshops, which we can only briefly mention here. These included **Index Theory for Symplectic Matrix Paths with Applications; the Workshop on Variational Methods and Nash-Moser**, which concentrated on the application of the

titular techniques to the three body problem; and **Similarity: Generalizations, Applications and Open Problems**, all held at UBC. The 65th birthday of Karl Petersen (University of North Carolina) was celebrated at **The Northwest Dynamics Symposium** at UVic in August. A conference on Algebraic Aspects of Association Schemes and Scheme Rings was held in July at the University of Regina. Sponsored by PIMS and held at Stanford, the *2008* **Workshop on Algorithms for Modern Massive Data Sets** addressed algorithmic, mathematical, and statistical challenges in modern large-scale data analysis. **Number Theory Day** was observed at

Jean-Pierre Serre
(Photo courtesy of David Boyd)

the University of Lethbridge in May, and gave a glimpse into the diverse aspects of the field which Gauss coined the "Queen of Mathematics." Number theory was also the subject of **The Eighth Algorithmic Number Theory Symposium** at the Banff Centre in May. Boasting 138 participants from 18 countries spanning all six populated continents, it was the first in the series to be held in Canada. Also in Banff, in August, was the **Third Canadian Summer School on Communications and Information Theory**, while the University of Manitoba held **The 2008 Western Canadian Linear Algebra Meeting**.

PIMS also supported several Distinguished Lectures. Renowned Professor Jean-Pierre Serre of the College de France lectured on **Variation with p of the number of solutions mod p of polynomial equations** at UBC in May. The lecture, **40 Years of Linear Algebra and Optimization,** at Stanford traced Michael Saunders' (Stanford University) career of applying stable matrix methods to numerical optimization. This August's talk at UBC included some illustrations of the use of optimization within the aerospace industry.

Further information about these and other PIMS-sponsored events can be found at:

http://www.pims.math.ca/scientific/current-events.

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PIMS SUMMER MATH CAMPS ADDING UP TO SUCCESS FOR ABORIGINAL STUDENTS IN BRITISH COLUMBIA

The graduation ceremony for the PIMS Summer Math Camps for aboriginal students attending or entering Britannia Secondary School was held at the UBC First Nations House of Learning on August 15 and it was featured by the Vancouver Sun. The article noted that no aboriginal student in recent memory completed the Grade 12 math course at Britannia secondary. Vicki Vidas, Head of the Britannia Mathematics Department said, "The whole point is to get more aboriginal children into high school and get them to graduate. The challenge is to get them into university." This year, there will be three graduates from the PIMS Summer Camp program entering Grade 12 math at Britannia armed with the tools for success. The Junior Math Camp at Britannia prepared 19 children for Grade 8 mathematics.

PIMS Summer Math Camp Graduates
(Photo courtesy of Vancouver Sun)

PIMS, with support from the BC Government, the Vancouver Foundation, the Department of Mathematics at UBC, as well as private sponsors, ran both Junior and Senior Camps over 6 weeks this summer. Summer camps for aboriginal students were also organized by PIMS at schools in Kamloops and in Lytton. This program is a partnership between PIMS and schools in British Columbia.

UNIVERSITY OF REGINA HOSTS IPSW AND GIMMC

By Shaun Fallat (Regina)

The Industrial Problem Solving Workshop (IPSW) and the Graduate Industrial Math Modelling Camp (GIMMC) brought a number of high profile experts in applied mathematics as well as many bright young aspiring mathematicians to the University of Regina for a two-week span from July 9 to 21, 2009. Held during the first week of the event, the 11th Graduate Industrial Mathematics Modelling Camp attracted fifty graduate students from Canada, USA, Mexico, Greece and Australia. Five distinguished mathematicians were invited to act as mentors for the camp: L. Cowen (UVic), E. Doolittle (UofR), N. Fowkes (U. West Australia), D. Kreher (Michigan Tech), and R. Momon (UWO). One activity that garnered much interest was to come up with an efficient and organized plan to plow the streets of Regina during the winter. This work piqued the interest of the City of Regina, so they sent a representative to listen to a talk from this group on the 13th.

Five companies participated in the week-long Industrial Problem Solving Workshop, which delivered a number of outstanding results throughout the week and culminated in presentations on these accomplishments to the industrial partners: MOSAIC Potash, Casino Regina, Evarz, Accutrek, and Cross Cancer Institute. A highlight of the workshop was the accomplishment of the group working on the Evarz proposal. An efficient model for purchasing scrap metal was developed and specifically designed for the local plant.

Support for the modelling camp and industrial workshop was provided by the Government of Saskatchewan, MITACS, Faculty of Science and Department of Mathematics and Statistics at the University of Regina and NSERC.

This is a flagship event for PIMS contributing greatly to its industrial mandate, and was a major success for the University of Regina. Bringing such a large number of visitors to the campus and department will have a significant impact on our image and reputation. The local organizers for this event were S. Fallat, B. Alspach, and L. Cosgrove.

2009 EVENTS
APPROVED BY THE PIMS SCIENTIFIC REVIEW PANEL

PIMS DISTINGUISHED LECTURE SERIES IN THE DEPARTMENT OF MATHEMATICS & STATISTICS
January 9 - December 15, 2009
University of Regina
Shaun Fallat (sfallat@math.uregina.ca)

ALBERTA TOPOLOGY SEMINARS
April 1, 2009 - March 31, 2010
University of Calgary
Kristine Bauer (kristine@math.ucalgary.ca)

ABC ALGEBRA WORKSHOP
April 17 - 18, 2009
University of Alberta
Jochen Kuttler (jochen.kuttler@ualberta.ca)

ALBERTA NUMBER THEORY DAY II
April 30, 2009
University of Calgary
Matthew Greenberg (mgreenbe@ucalgary.ca)

SIXTH COMBINATORICS DAY AT THE UNIVERSITY OF LETHBRIDGE
March 27, 2009
University of Lethbridge
Hadi Kharaghani (kharaghani@uleth.ca)

APPLIED MATHEMATICS SEMINAR
April 1 - March 31, 2010
University of Saskatchewan
Alexei Cheviakov (cheviakov@math.usask.ca)

THIRD ANNUAL MEETING OF THE PRAIRIE NETWORK FOR RESEARCH IN MATHEMATICAL SCIENCES (PNRMS) AND STUDENT WORKSHOP
April 29 - May 1, 2009
University of Saskatchewan
Murray Bremner (bremner@math.usask.ca)

CANADIAN ABSTRACT HARMONIC ANALYSIS SYMPOSIUM 2009
May 11 - 15, 2009
University of Alberta
Brian Forrest (beforres@math.uwaterloo.ca)

ALGEBRA SUMMER SCHOOL
May 23 - June 3, 2009
University of Alberta
Gerald Cliff (gcliff@math.ualberta.ca)

SPRING RESEARCH CONFERENCE ON STATISTICS IN INDUSTRY AND TECHNOLOGY
May 27 - 29, 2009
Simon Fraser University
Boxin Tang (boxint@stat.sfu.ca)

WORKSHOP ON GEOMETRY RELATED TO THE LANGLANDS PROGRAMME
May 27 - 31, 2009
University of Calgary
Clifton Cunningham (cunning@math.ucalgary.ca)

WORKSHOP ON STATISTICAL METHODS FOR DYNAMIC SYSTEM MODELS
June 4 - 6, 2009
Simon Fraser University Harbour Centre
Dave Campbell (dac5@sfu.ca)

SELECTED AREAS IN CRYPTOGRAPHY 2009 (SAC 2009)
August 13 - 14, 2009
University of Calgary
Michael Jacobson (jacobs@cpsc.ucalgary.ca)

PRAIRIE DISCRETE MATHEMATICS WORKSHOP (PDMW) 2009
August 22 - August 23, 2009
University of British Columbia, Okanagan
Wayne Broughton (wayne.broughton@ubc.ca)

WORKSHOP ON ELLIPTIC CURVE CRYPTOGRAPHY
August 22 - 24, 2009
University of Calgary
Mark Bauer (mbauer@math.ucalgary.ca)

SEMINARS OF ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS
September 1 - April 30, 2010
University of Calgary
Cristian Rios (crios@math.ucalgary.ca)

PIMS WEST END NUMBER THEORY SEMINARS
September 1, 2009 - August 31, 2010
University of Calgary
Clifton Cunningham (cunning@math.ucalgary.ca)

WORKSHOP ON DISCOVERY AND EXPERIMENTATION IN NUMBER THEORY
September 22 - 26, 2009
Simon Fraser University
Peter Borwein (pborwein@sfu.ca)

FORMER DIRECTOR ELECTED TO ROYAL SOCIETY OF CANADA

Ivar Ekeland, the outgoing Director of PIMS (2003-2008), was recently elected a Fellow of the Royal Society of Canada and received the following citation for his work: as "an outstanding mathematical scientist, an internationally renowned mathematical economist, a dedicated educator, and a prolific writer and disseminator of sciences. His contributions to Mathematics include fundamental results in Convex and Non-linear Analysis, Control Theory, Hamiltonian Mechanics, Symplectic Geometry, Mathematical Economics and Finance."

Election to Fellowship in the Society is the highest academic accolade available to scientists and scholars in Canada. The Society consists of approximately 1800 Fellows selected by their peers for outstanding contributions to the natural and social sciences and in the humanities. This distinction adds to the many honors that Ivar Ekeland has received during his career.

2008 PIMS EDUCATION PRIZE WINNERS

Virginia Warfield (University of Washington) and Harley Weston (University of Regina) have received the 2008 PIMS Educational Prize. Virginia Warfield has made significant contributions to education in the Pacific Northwest through teaching, graduate student mentoring, and outreach activities with K-16 communities. Her collaboration with the French mathematician Guy Brousseau, a pioneer in the "didactics of mathematics," has resulted in significant contributions to mathematics education research. In 2007, Warfield received the Louise Hay Award from the Association for Women in Mathematics.

Pictured Left -toRight: Alejandro Adem, Ivar Ekeland, Harley Weston, Virginia Warfield

Harley Weston has demonstrated a lifelong dedication to the advancement of mathematics and education in Saskatchewan, Canada and beyond. He has cultivated relationships with K-12 students and teachers, education faculty and aboriginal communities, opening lines of communication between these groups and mathematicians. Weston has made fundamental contributions to "Math Central," a collection of internet services designed for teachers and K-12 math students. Recently retired, Weston served as Head of the Department of Mathematics and Statistics at the University of Regina and Chair of the Education Committee of the Canadian Mathematical Society.

Dr. Weston has been honoured with the 2008 CMS Adrien Pouliot Award in acknowledgment of his outstanding contributions to mathematics education particularly with the creation of the Math Central website and outreach to Aboriginal communities.

U. OF C. RESEARCHER WINS CMS 2008 DOCTORAL PRIZE

Matthew Greenberg (University of Calgary) is the recipient of the Canadian Mathematical Society's 2008 Doctoral Prize which will be awarded this December in Ottawa at the Society's Winter Meeting. Dr. Greenberg's thesis was commended by the Society for developing a "strikingly elegant approach to computing the overconvergent modular symbols attached to automorphic forms on certain higher rank groups. Greenberg's method, which builds on a fundamental idea of Pollack and Stevens, has found applications to the efficient calculation of p-adic L-functions attached to forms on GL(n), and of Mordell-Weil groups of elliptic curves defined over imaginary quadratic fields. Greenberg's more recent work makes substantial strides towards generalizing the definition of so-called "Stark-Heegner points", and provides the most satisfactory general framework for studying these objects."

2008 CRM-Fields-PIMS Prize Winner Announced

The Centre de recherches mathématiques (CRM), the Fields Institute, and the Pacific Institute for the Mathematical Sciences are pleased to announce that Professor Martin Barlow of the University of British Columbia is the recipient of the 2009 CRM-Fields-PIMS Prize. The CRM-Fields-PIMS prize is intended to be the premier mathematics prize in Canada. The winner received a monetary award, and an invitation to present a lecture at each institute during the year following the award announcement.

Professor Barlow has been a Faculty member in the Department of Mathematics at UBC since 1992. Prior to UBC he was at Cambridge University. In 2005 he became a Fellow of the Royal Society of London.

In the 1980's Dr. Barlow was one of the two founders (with T. Jeulin) of the field of filtration enlargement in which one observes a stochastic process with different levels of information. During this time he established his celebrated results giving necessary and sufficient conditions (the latter with J. Hawkes) for the continuity of the local time of a Lévy process. This was the resolution of a thirty-year old problem. The methods he introduced have been used by others to study more general Markov local times and continues to have impact today.

Professor Barlow is best known as the leading international expert in the behaviour of diffusions on fractals and other disordered media. First with Perkins and then in a series of papers with Bass, he initiated a detailed study of diffusions on fractal-like sets including precise upper and lower bounds on the heat kernels of such sets. The first paper developed techniques which were applied by others to handle general 'finitely ramified' fractals while the second series of papers required the development of some original coupling techniques. These papers laid the groundwork for a new area of study in probability which has attracted experts in Dirichlet forms, diffusions on manifolds and statistical mechanics.
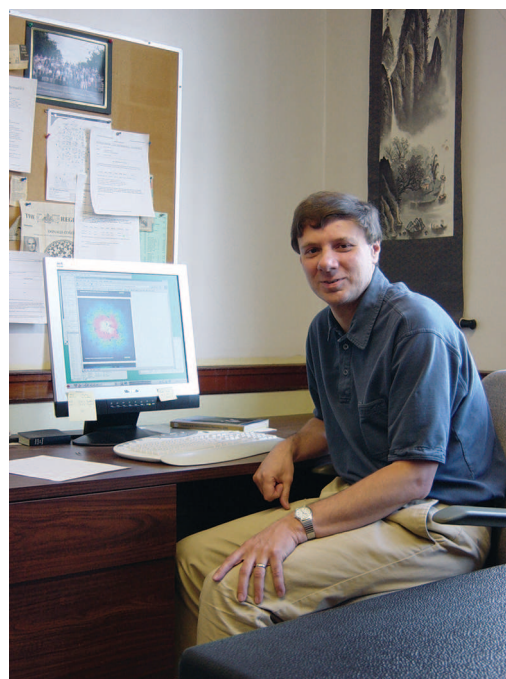
Dr. Martin Barlow

The original motivation for the study of diffusion on fractals came from the physics community who were interested in more general disordered random media but viewed typical fractals like the Sierpinski carpets and gaskets as good testing grounds for highly inhomogeneous media. Thanks in large part to the pioneering efforts of Martin Barlow the discipline has reached the point where the original objectives of the physicists are now within mathematical reach.

He has also used probabilistic techniques to study partial differential equations, leading to major progress on the De Giorgi conjecture. His other interests include mathematical finance analysis of electricity pricing and infinite-dimensional stochastic pde and branching measure diffusions.

The Pacific Institute for the Mathematical Sciences (PIMS) was created in 1996 by the community of mathematical scientists in Alberta and British Columbia, and subsequently extended to Washington State and to Saskatchewan. The mandate of PIMS is to:

- Promote research and applications of the mathematical sciences of the highest international caliber

- Facilitate the training of highly-qualified personnel at the graduate and postdoctural level

- Enrich public awareness of mathematics through outreach

- Enhance the mathematical training of teachers and students in K - 12

- Create mathematical partnerships with similar organizations in other countries, with a particular focus on Latin America and the Pacific Rim