

News from the Mathematical Institutes

AARMS Summer School

by Edgar G. Goodaire, School Director

“They’re writing on their bedroom doors, doing math, and the painters have no appreciation for their work, so please get your students to stop.” So wrote the housing manager at Memorial University in one of the more amusing and telling commentaries on the first AARMS Summer School.

From July 22 to August 16, 2002, the Atlantic Association for Research in the Mathematical Sciences (AARMS) hosted a summer school, the first of its kind certainly in Canada and planned as an annual event in Atlantic Canada. Twenty-two (primarily graduate) students from China, Germany, Poland, Turkey, Alaska, Alberta, British Columbia, Newfoundland, Nova Scotia, Ontario and Quebec each registered for two intensive graduate courses.



Hermann Brunner (Memorial, Organizer), Penny J. Davies (Strathclyde), Kathryn E. Hare (Waterloo), Sue Ann Campbell (Waterloo), Edgar G. Goodaire (Memorial, Organizer), Francisco César Polcino Milies (São Paulo), Jason Brown (Dalhousie)

On this occasion, four courses in all, each delivered through seven hours a week of lectures and tutorials, were offered: Algebra, by César Polcino Milies from the University of São Paulo, Brazil; Combinatorics, by Jason Brown of Dalhousie University; Differential Equations, by Sue Ann Campbell of the University of Waterloo and Penny Davies of the University of Strathclyde; and Fractal Geometry, by Professor Kathryn Hare of the University of Waterloo.

The goals of the School, modelled after one in Perugia, Italy, now in its 32nd year, are to provide young researchers with basic training in mathematics and its applications, to encourage strong undergraduates to continue their studies at the graduate level, to attract bright minds to Atlantic Canada and to raise the profile of mathematics and mathematical research in this region.

Students were responsible for their transportation to St. John’s, but upon arrival had all expenses covered, including text books or course notes. The School was supported generously by Dalhousie University, Memorial and the University of New Brunswick, as well as by the three Canadian mathematical institutes, the Centre de Recherches Mathématiques de Montréal, the Fields Institute in Toronto, and the Pacific Institute for the Mathematical Sciences in Vancouver.

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AARMS Summer School Professors and Students

“Congratulations on your efforts for putting together this amazing summer school at MUN, that unfortunately ended far too soon (as most great things do, anyway!),” wrote one student after returning home, a sentiment uniformly expressed. “Hats off to you for ... giving us an experience that we won’t soon (if ever) forget.”

For information about this year’s school, and plans for the future, visit <http://www.math.mun.ca/aarms/summerschools/>.



A side trip to Signal Hill

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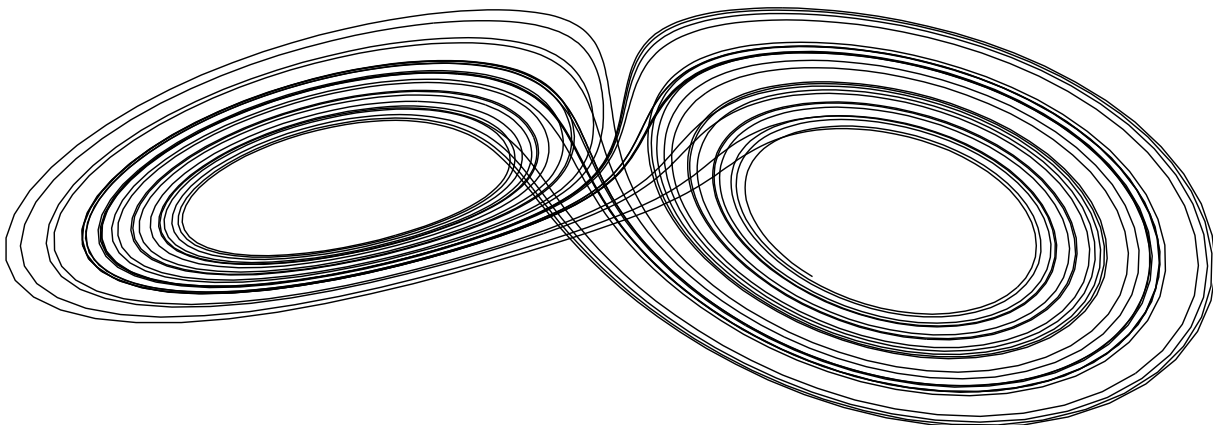
News from the Centre de recherches mathématiques

by Suzette Paradis

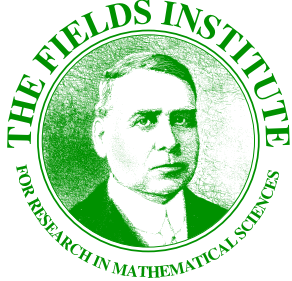
One longstanding priority and commitment of CRM as part as of its mandate as a national research center has been its continued emphasis on a broad spectrum of interdisciplinary and intersectorial initiatives. In that perspective, there is an exciting upcoming programme of scientific activities and research opportunities of potentially great interest to the CAIMS•SCMAI community. Just started is the 2002-2003 thematic program in the mathematics of computer science, with topics ranging from complexity theory to machine learning. After an exciting summer school on quantum computing, the thematic year is in full swing, with upcoming workshops on finite model theory, semigroups and automata, cryptographic protocols reduction, and advances in machine learning. Manuel Blum (Carnegie Mellon), Laszlo Lovasz (Microsoft Research) and Endre Szemerédi (Rutgers) will give the prestigious Aisenstadt chair lectures.

The theme year for 2003-2004 will be dedicated to spectral and geometric analysis and in 2004-05, the emphasis switches to the mathematics of complex multi-scale systems, with applications to fluids, medicine, chemistry, atmospheric science, finance, fronts. Other CRM opportunities for applied mathematics are the upcoming workshops on the mathematical and numerical challenges in quantum control, that will take place at CRM in October 2002 as well as the CICLOPE initiative between CRM and INRIA (Paris) on mathematical modelling of circulation, with a first symposium to take place this November in Paris.

There exist many opportunities for long and short term visitors interested in those activities, as well as support for students interested in attending the workshops or the short courses preceding the activities - see CRM's webpage for more details. <http://www.crm.umontreal.ca>



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Activities at the Fields Institute

by Carl Riehm

Last year was an extraordinarily busy one at Fields, with many activities centered around the thematic program in Numerical and Computational Challenges in Science and Engineering. At the heart of the program were the development, analysis and testing of new numerical methods for a broad range of mathematical problems arising in linear algebra, optimization, differential equations and dynamical systems.

The program featured a series of workshops which focused on several key application areas where fruitful interaction between scientists, engineers and numerical analysts takes place and where progress is likely to lead to important practical advances in the next decade—among these climate modelling, computational biology, computational finance and computer animation. The program also explored the exciting new area of interaction between symbolic and numeric computation. A complete listing of the events can be found at www.fields.utoronto.ca/programs/scientific/01-02/numerical/.

This year, the thematic programs are Set Theory and Analysis from September to December, and Automorphic Forms from January to May, 2003. The first of these is intended to foster the symbiotic relationship between set theory and analysis. Two workshops are planned, one during October 6 - 12 on Borel relations and dynamical systems and the other during November 10 - 16 on Banach spaces. For more information see www.fields.utoronto.ca/programs/scientific/02-03/set_theory/. The program on automorphic forms will concentrate on the geometric and analytic aspects of the subject, which have far-reaching applications in classical number theory, as well as on the analytic theory of L-functions. Two graduate courses will be offered, and in addition there will be a summer school for the month of June with the sponsorship of the Clay Mathematics Institute. There will also be two workshops during the semester, and another as a finale to the summer school. See www.fields.utoronto.ca/programs/scientific/02-03/automorphic_forms for more information.

Next year (August 2003 to June 2004) will feature Partial Differential Equations as the thematic program, and will focus principally on problems that stem from questions in applied mathematics and in mathematical physics. The fall semester of the program will concentrate on elliptic and parabolic systems of partial differential equations arising in the mathematical theories of super-conductivity and of phase transition phenomena in the physics of materials. The winter semester will focus on Hamiltonian PDE, in particular hyperbolic equations and nonlinear dispersive evolution equations that arise in mathematical physics and in continuum mechanics, and on the equations of kinetic theory that arise in the study of statistical mechanics and of wave turbulence. Registration for this program will be open in Spring 2003. To receive updates on the program, subscribe to our mailing list at www.fields.utoronto.ca/maillist or

contact pde@fields.utoronto.ca. Support for graduate students and post-doctoral students is available; applications must be received by January 2, 2003. Details concerning support as well as the year's activities are available at www.fields.utoronto.ca/programs/scientific/03-04/pde/.

The following year (2004-5) will see a thematic program on the Geometry of String Theory. The plan is for systematic, focused activity with the dual aim of discussing new results and putting new insights gained from physics into the general mathematical framework. More details can be found at www.fields.utoronto.ca/programs/scientific/04-05/string-theory/

Other Events at the Fields Institute

The Applied Mathematics Colloquium is an ongoing monthly series of colloquium talks open to the public and intended to be a focal point for mathematicians working in the areas of applied mathematics, mathematical physics and partial differential equations. Recent speakers include Rob Almgren (Toronto), J. Tom Beale (Duke), Luis Caffarelli (Texas-Austin), Constantine Dafermos (Brown), Irene Gamba (Texas-Austin), MinOo (McMaster), Paul Rabinowitz (Wisconsin-Madison) and A. Ruzmaikina (Virginia). The Colloquium is supported by the Canada Research Chairs Program, NSERC through the operating grants of the organizers, and the Fields Institute. The colloquium was organized during the past two years by Walter Craig (McMaster) and Catherine Sulem (Toronto), and this year the organizers are James Colliander, Adrian Nachman and Mary Pugh, all of the University of Toronto. More details can be found at www.fields.utoronto.ca/programs/scientific/01-02/applied_math/

The Fields Institute Colloquium on Mathematics Outside Mathematics, organized by Adrian Nachman of the University of Toronto, brings together scientists, engineers, and mathematicians once per month. The purpose of the colloquium is the exposition of areas of exciting current scientific and engineering inquiry involving mathematics which may benefit from further interdisciplinary research. Details will appear soon on the Fields website, www.fields.utoronto.ca/programs/scientific/.

For the seventh consecutive year, the Institute will host the Quantitative Finance Seminar monthly throughout the academic year on the last Wednesday of the month. At the time of writing, the program has almost been finalized for the year and will be appearing shortly on the seminar's homepage, www.fields.utoronto.ca/programs/cim/financial_math/finance_seminar/02-03/. September's seminar featured John Hull and Alan White from the Rotman School of Management at the University of Toronto on the topic of the valuation of credit default swaps.

Fields also hosted a conference on Adhoc, Mobile and Wireless Networks (Adhoc-NOW) on Sept. 20-21 (www.scs.carleton.ca/adhocnow/) and a workshop on Industry, Mathematics and Computer Algebra on Oct. 25 (www.fields.utoronto.ca/programs/cim/02-03/INDACA/)

For the second year in a row, the Individual Finance and Insurance Decision Centre and Fields will hold a conference on personal risk management. A keynote talk will be given by James Poterba (MIT) entitled After-tax Benchmarks for Individual Investors. The conference takes place on Nov. 21 and more information can be found at www.fields.utoronto.ca/programs/cim/financial_math/ifid/personal_risk/02-03/

The Fields Institute and CIRANO, the Montreal-based economics institute, have teamed up to create a series of short courses on quantitative finance aimed at professional financial managers. With a two-day format which involves both theoretical background and hands-on computer labs, 9 courses will be offered throughout the year. For more information, see www.fields.utoronto.ca/programs/cim/02-03/quantitative_finance/

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Recent PIMS Workshops

by Heather Jenkins

The Pacific Institute for the Mathematical Sciences (PIMS) held its 5th Annual Graduate Math Modelling Camp (GIMMC) at Simon Fraser University on May 18-23. At the camp 60 graduate students from all over Canada, the US and even some from as far away as Europe worked on problems in industrial mathematics. The problems were presented by the following academic mentors: Petra Berenbrink (SFU), Chris Budd (University of Bath), Alexander Melnikov (University of Alberta), Tim Myers (University of Cape Town), Brett Stevens (Carleton University), Yongji Tan (Fudan University) and Brian Wetton (UBC).

The 6th PIMS Industrial Problem Solving Workshop (IPSW) was held at the University of British Columbia on May 27-31. About 100 people registered for the event, including the 60 graduate students who had taken part in the graduate modelling camp the week before. Faculty from as far away as South Africa, Finland and China were also involved. Participants split up into six groups to attack the industrial problems brought to the workshop, spanning a broad range of applications and mathematical techniques. The problems came from the companies Capital Health, Shell Canada, Semiconductor Insights, MacMillan-McGee, RBC Financial Group and Talisman Energy.

For more information about the problems from both GIMMC and IPSW please see www.pims.math.ca/industrial.

During the summer PIMS held two Thematic Programmes. PIMS-UBC hosted a 7-week Thematic Programme on Asymptotic Geometric Analysis which brought together over 220 senior experts, young researchers, postdocs and advanced Ph.D. students from mathematics and computer science. The programme was divided into 6 sections: a Conference on Convexity and Asymptotic Theory of Normed Spaces, a Concentration Period on Measure Transportation and Geometric Inequalities, a Conference on Phenomena of Large Dimensions, a Focused Research Groups Session on Random Methods and High Dimensional Systems, a Conference on Non-commutative Phenomena and Random Matrices, and a Conference on Banach Spaces. Approximately 100 of the lectures in the programme were taped and are available in both streaming realvideo and MP3 format at <http://www.pims.math.ca/video>.

The PIMS Thematic Programme on Selected Topics in Mathematical and Industrial Statistics consisted of:

- International Conference on Robust Statistics (ICORS 2002), UBC, May 12-18, 2002
- 3rd MITACS Annual General Meeting: Statistics for Large Scale Industrial Modelling, UBC, May 23-25, 2002
- PIMS-MITACS Workshop on Filtering Theory and Applications, University of Alberta and Jasper, July 25-30, 2002
- Design and Analysis of Experiments 1 (DAE 1), Coast Plaza Suite Hotel, Vancouver, July 14-18, 2002

For more information about these and future events at PIMS please see www.pims.math.ca.

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An update on MITACS
Dr. Arvind Gupta, Scientific Director

We are pleased to report that the MITACS network continues to progress at a remarkable rate. In October 2001, the Minister of Industry announced \$10.8 million in funding for MITACS to 2004 as we continue the national Network Centre of Excellence for mathematical science. This was the maximum amount available and signaled that the network continues to successfully meet its mandate.

Despite the recent economic downturn, MITACS continues to surpass its objectives. We've seen growth in our industrial funding and the number of research projects. Our production of patents, licenses, and spin-off companies is a testament to increased industry participation.

This year's Annual General Meeting clearly reflected the strength and scope of the network. Over 350 registrants benefited from outstanding lectures, a poster and demo exhibition - which drew an unprecedented 70 submissions - and informal discussions with other researchers and students from across Canada and the US. At the conference banquet, we were honoured to have Arthur Carty, President of the National Research Council and Philippe Tondeur, Director of the Division of Mathematical Sciences at the National Science Foundation as our keynote speakers.

We believe that international connections help enrich our culture at home and are pleased to be a part of the Banff International Research Station (BIRS). A joint initiative of the Pacific Institute for the Mathematical Sciences (PIMS), the Mathematical Sciences Research Institute, and MITACS, BIRS received its funding last September and will open officially in February 2003. This research station, located in the heart of the Canadian Rockies, will provide an inspirational setting for mathematicians from around the world. As a key participant in this venture, MITACS is charged with organizing the industrial component of the station.

International linkages are only one kind of connection in the network, for MITACS also fosters partnerships that extend beyond disciplines. The universality of mathematics lends itself to these types of novel interactions. Our research teams, composed of scientists from diverse intellectual backgrounds, work on a wide range of problems - from fighting diseases to managing financial risks and to developing new sources of energy. It also explains how events such as the Summer School in Quantum Information Processing can enable scientists from diverse fields to enter the world of quantum computing. In innumerable scientific domains, mathematics is a powerful tool for insight that can address the most urgent social and economic issues.

On the operational side, we are proud to announce that as of March 2002, MITACS is an incorporated not-for-profit organization. We also welcome John Schwenk as the new Chief Operating Officer of MITACS Inc., who joined us in July. He brings a wealth of management experience and know-how to the position.

We will be launching a one-day conference in Atlantic Canada in March; we plan to invite all graduate students and post-doctoral fellows in the Atlantic Region to show their research, exchange ideas, and create some funding opportunities by meeting and interacting with Atlantic Canada businesses and government entities. We hope that this will become an annual event and perhaps the first of many locations for such events. Our Annual Conference will be held in Ottawa this year in May, and we hope to see many CAIMS•SCMAI members at each event.

