



News from the Centre de recherches mathématiques

by Jean LeTourneux

Henceforth, academic years at the CRM will be organized around two thematic semesters, with emphasis on pure mathematics during one of them and applied mathematics during the other. Accordingly, the first semester of the 2006-2007 year will be devoted to combinatorial optimization, while the second one will deal with recent advances in combinatorics.

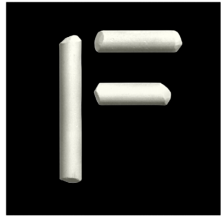
The “Combinatorial Optimization” semester (June-December 2006) is organized by D. Avis, D. Bremner, V. Chvátal, B. Cunningham, M. Goemans, P. Hansen, O. Marcotte and A. Vetta. The André-Aisenstadt Chair during that semester will be held by Noga Alon (Tel Aviv) and Paul Seymour (Princeton). The semester started (June 19-30, 2006) with the SMS-NATO ASI Summer School on “Combinatorial Optimization: Methods and Applications”, which was organized by V. Chvátal and N. Sbihi. It also features five workshops: June 12-14, 2006, “Approximation Algorithms”; August 14-16, 2006, “Optimization and Algorithmic Game Theory”; September 18-22, 2006, “Hybrid Methods and Branching Rules in Combinatorial Optimization Problems”; October 10-13, 2006, “Data Mining and Mathematical Programming”; October 17-20, 2006, “Polyhedral Computation”.

The main organizers of the program on “Recent Advances in Combinatorics” (January-June, 2007) are F. Bergeron, S. Brlek, P. Leroux and C. Reutenauer. The holder of the André-Aisenstadt Chair during that thematic semester will be Richard Stanley of MIT. The initial mini-workshop “Algebraic Combinatorics Meets Inverse Systems” (January 19-21, 2007) will be followed by five workshops: February 19-23, 2007: “Combinatorial Problems Raised by Statistical Mechanics”; March 12-16, 2007: “Recent Progress in Combinatorics on Words”; May 7-11, 2007: “Combinatorial Hopf Algebras and Macdonald Polynomials”; May 28 - June 1, 2007: “Interactions between Algebraic Combinatorics and Algebraic Geometry”; June 11-22, 2007: “Real, Tropical, and Complex Enumerative Geometry”. Four of these workshops will be preceded by a school: February 12-16, 2007: “Statistical Mechanics and Combinatorics”; March 5-9, 2007: “Combinatorics on Words”; April 30 - May 4, 2007: “Macdonald Polynomials”; May 21-25, 2007: “Algebraic Geometry and Algebraic Combinatorics”.

A short program on “Moduli Spaces and Related Topics” (June 4-15, 2007) will be organized at the CRM by D. Korotkin and M. Bertola.

The “Conference on Fractals in Engineering VI”, organized by F. Nekka and J. Lévy Véhel, will take place at the CRM (July 4-6, 2007), while a conference on “Banach Algebras” will be organized at Laval University (July 4-12, 2007) by T. J. Ransford and D. Jakobson. Finally, J. Ramsay is responsible for the workshop on “Statistical Methods for Modeling Dynamic Systems” that will take place at the CRM (July 9-13, 2007).

Support is available for visitors, graduate students and postdoctoral fellows attending the various events. For more information, see <http://www.crm.umontreal.ca>.



FIELDS

News from the Fields Institute

by Carl Riehm

One of the most successful recent events at the Institute was the week-long **Fields-MITACS Industrial Problem-Solving Workshop**, held in August. It was sponsored jointly by the Institute and MITACS and was organized by Huaxiong Huang (York), Barbara Keyfitz, the Director of the Institute, and Nilima Nigam (McGill). On the first morning, problems in Finance and Medicine were presented by the “industry” representatives, and then the academic participants worked on the problems—often very closely with the industrial participants—presenting their solutions on Friday. A full account can be found on www.fields.utoronto.ca/programs/scientific/06-07/FMIPW/.

Some of the upcoming events which might be of interest to CAIMS members are:

- The next lecture in the **Centre for Mathematical Medicine Seminar Series** will be delivered by Dr. John Parkinson, from the Hospital for Sick Children Research Institute, on January 19, 2007. See www.fields.utoronto.ca/programs/scientific/CMM/06-07/seminars/ for an up-to-date schedule.
- The **Fields Industrial Optimization Seminar**:
December 5, **Vinh Quan** (Workbrain, Toronto), Personnel scheduling. The Spring schedule will include seminars on financial optimization, optimization of energy systems, chemical process optimization, and convex optimization in electrical engineering. See www.fields.utoronto.ca/programs/cim/06-07/optimization_seminar/ for up-to-date information.
- The **Fields Institute Colloquium/Seminar in Applied Mathematics** is a monthly colloquium series in applied mathematics and analysis. Future speakers who have been scheduled to speak are Avy Stoffer (Rutgers) on November 29 and Phil Holmes (Princeton) on March 21 (2007). See www.fields.utoronto.ca/programs/scientific/06-07/applied_math/ for current information.
- The **Quantitative Finance Seminar** features talks on current research in this area. See www.fields.utoronto.ca/programs/cim/financial_math/finance_seminar/06-07/ for current information.
- The **PRMIA Risk Management Seminar** presents talks on issues of current interest to both professionals and academics in the fields of risk management. See www.fields.utoronto.ca/programs/cim/06-07/PRMIA/.

News from the Math Institutes

- **The ISAAC Workshop on Pseudo-Differential Operators:** Partial Differential Equations and Time-Frequency Analysis will take place at the Fields Institute, December 11 - 15. In addition to many one-hour lectures, there will be 5 minicourses given by Charles L. Epstein (Penn), Peter C. Greiner (Toronto), Karlheinz Gröchenig (Vienna), Luigi Rodino (Torino) and Bert-Wolfgang Schulze (Potsdam).
- **Fields Institute Graduate School Information Day:** On the afternoon of November 18, the Fields Institute will host an information session at which universities will display information on their graduate programs in mathematics, statistics and some computer science programs. Universities who wish to participate should email programs@fields.utoronto.ca.
- **Connecting Women In Mathematics Across Canada,** December 7-8. The CMS Committee for Women in Mathematics, in cooperation with the Fields Institute, is organizing a workshop for junior women (graduate students and postdoctoral fellows) in the mathematical sciences at Canadian universities. The workshop will take place just prior to the CMS Winter 2006 Meeting, and participants are encouraged to stay in Toronto to attend that meeting. All women in the mathematical sciences at Canadian universities are invited to attend.
- The annual **CRM-Fields-PIMS Prize Lecture**, *High dimensional convex bodies: phenomena, intuitions and results*, will be delivered on November 20 by Nicole Tomczak-Jaegermann of the University of Alberta.
- This term's **Fields thematic program is Cryptography**. Future programs are

2007 (Winter/Spring)	Geometric Applications of Homotopy Theory
2007 (Fall)	Operator Algebras
2008 (Winter/Spring)	New Trends in Harmonic Analysis
- Some **deadlines** for proposals:
 - **Thematic programs:** March 15.
 - **Workshops, seminars, conferences, summer schools:** October 15, March 15.
 - **Coxeter Lecture Series, Distinguished Lecture Series, Distinguished Lecture Series in Statistical Sciences** (nominations): March 15.
 - **Postdoctoral Fellowships:** December 17.
 - **Visiting memberships:** no special deadlines, but early application is advised.
 - **Fields Institute Fellows** (nominations): February 15.

Consult www.fields.utoronto.ca/proposals/ for further information.

To be informed of upcoming Scientific Activities, please subscribe to our mailing list at www.fields.utoronto.ca/maillist.

 News from the Math Institutes



News from Pacific Institute for the Mathematical Sciences

by Breeonne Baxter, PIMS Communications
Manager

The Pacific Institute for the Mathematical Sciences (PIMS) is celebrating its 10th Anniversary in 2006-07, with events to highlight mathematical achievement and excellence. We are hosting a series of speakers and events across our six member sites in Western Canada and the United States. Details on all of our 10th Anniversary events can be found on our website, <http://www.pims.math.ca/>.

Alberta Funding Support for PIMS Activities

PIMS has received a renewal of support from the Alberta Innovation and Science (AIS) for its mathematical activities in Alberta, for \$1.147-million over three years. AIS focused on PIMS' established record in mathematical research and education in Western Canada as the reason to renew and increase funding to \$1.147-million between 2006 and 2009.

PIMS plans to increase its commitment to education and outreach in Alberta, and will participate in the three AIS major research priorities: life sciences, energy research, and information and communication technologies.

International Collaborations

In the fall of 2005, PIMS signed two separate international co-operation agreements with two mathematical institutes: Centro de Modelamiento Matemático (CMM), located in Santiago, Chile, and the Instituto de Matemáticas at the Universidad Nacional Autónoma de México (IM-UNAM). These agreements are already proving their worth. PIMS and IM-UNAM held a successful week-long Algebra Summer School at the Banff International Research Station in June, 2006. In July, PIMS and CMM co-organized a three-week Frontiers in Mathematics and Economics Summer School at the University of British Columbia. Between Feb. 26 and March 2, 2007, PIMS and CMM will host a Rock Mechanics and Planning in Mining Workshop in Chile.

Conferences and Workshops

PIMS organizes and hosts a growing number of workshops and conferences each year through its member universities and Collaborative Research Groups:

- In June, 2006, Simon Fraser University hosted the 9th Annual PIMS Graduate Industrial Mathematics Modelling Camp, and the 10th Annual PIMS Industrial Problem Solving Workshop.
- The Motives and Periods conference at UBC on June 5-12, 2006, covered developments in the study of motives and periods, with an emphasis on connections to physics, arithmetic and algebraic cycles.
- The Fields-MITACS-PIMS Summer School on Mathematical Modelling of Infectious Diseases was held at York University on Jun 10-20, 2006. The conference highlighted the mathematical modelling process and the interaction between epidemiology and mathematics.

News from the Math Institutes

- On July 17-21, 2006, SFU hosted the Sequences and Codes conference, an interdisciplinary conference that brought together mathematicians, engineers, and informatics and computer scientists. PIMS Distinguished Speakers Robert Calderbank and Ingrid Daubechies, both of Princeton University, spoke in association with the conference.
- The University of Washington hosted the International Conference on Stochastic Analysis and its Applications on Aug. 7-11, 2006. Dr. Masatoshi Fukushima, the PIMS Distinguished Professor at U. Washington, presented one of three tutorial sessions at the conference.
- The Seismic Imaging Summer School and the Geophysical Inversion Workshop, held at the University of Calgary in August, 2006, focused on the connection between mathematical sciences and industry, in the fields of seismic imaging and wave propagation.
- The Canadian Number Theory Association meeting, held at UBC on July 9-14, 2006, featured 12 plenary speakers with lectures covering the breadth of international number theory research. In association with the conference, UBC's Dr. Vinayak Vatsal received the 2006 Ribenboim Prize, which is awarded for distinguished number theory research in Canada.

A comprehensive list of all PIMS activities, conferences and workshops can be viewed in the Activities section of the PIMS website.

PIMS Board of Directors

PIMS has appointed several distinguished scientists to its board of directors. The new members are Dr. John Hepburn, UBC Vice-President Research; Dr. Ron Irving, Interim Dean of the College of Arts and Sciences at U. Washington; Dr. Vaho Rebasoo, Chief Technology Officer of IT Services at the Boeing Company; and Dr. Zelda Zabinsky, Professor in Industrial Engineering at U. Washington.

PIMS also welcomes two new members to the Scientific Review Panel. Barry Sanders is the iCORE Professor of Quantum Information Science and Director of the Institute for Quantum Information Science at U. Calgary, and Richard Kenyon is a Professor of Mathematics at UBC. PIMS thanks outgoing SRP members Dr. Hugh Williams (U. Calgary) and Dr. David Brydges (UBC).

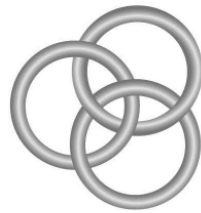
Call for PIMS Postdoctoral Fellow nominations

PIMS invites the nominations of outstanding young researchers in the mathematical sciences for Postdoctoral Fellowships for the year 2007-08. The deadline for nominations is Dec. 15, 2006.

For more information on PDF nominations and proposal submissions, please see the Proposals & Nominations section of our website.

News from the Math Institutes

Mitacs Update



MITACS

Since 2003, MITACS has been connecting university professors, graduate students and post-doctoral fellows with industry, government and not-for-profit organizations through the MITACS Internship Program. The program establishes collaborative research projects in the mathematical sciences between academia and industry while providing vital, applied research experience for graduate students.

The program also provides the opportunity to demonstrate, to industry, that the mathematical sciences can address key business challenges and improve business competitiveness and operational efficiencies.

HOW THE MITACS INTERNSHIP PROGRAM WORKS

Interns are required to spend a minimum of 50% of their time over a four month period on site at the partner organization, researching an identified issue. The rest of their time is spent at the university, further advancing the research under the guidance of their supervisor. Both MITACS and the participating organization contribute \$7,500 towards the program, resulting in a \$15,000 research to the supervising professor. MITACS recommends that the intern receive approximately \$10,000 per 4-month internship.

WHAT DOES THE PROGRAM OFFER to ACADEMIA?

- Increased research funding
- The opportunity to establish long-term relationships with industry
- An expansion of joint industry/academia partnerships
- The potential of further research projects
- A novel training experience for grad students and postdocs
- Potential future employment opportunities for the intern stemming from the applied research experience

EXAMPLES OF INTERNSHIP RESEARCH PROJECTS

- Modelling and analysis of the associations between SNP haplotypes and treatment outcomes in critically-ill sepsis patients for a hospital research centre
- Unifying a number of algorithms for structure prediction into a single formal framework that will form be the basis of a software toolkit using Natural Language Processing
- Investigating the relative financial benefit of adding different types of power generating resources to the energy portfolio of a utility company
- Developing a model, or clustering technique, that will enable Canada's national cryptologic agency to predict communications activity

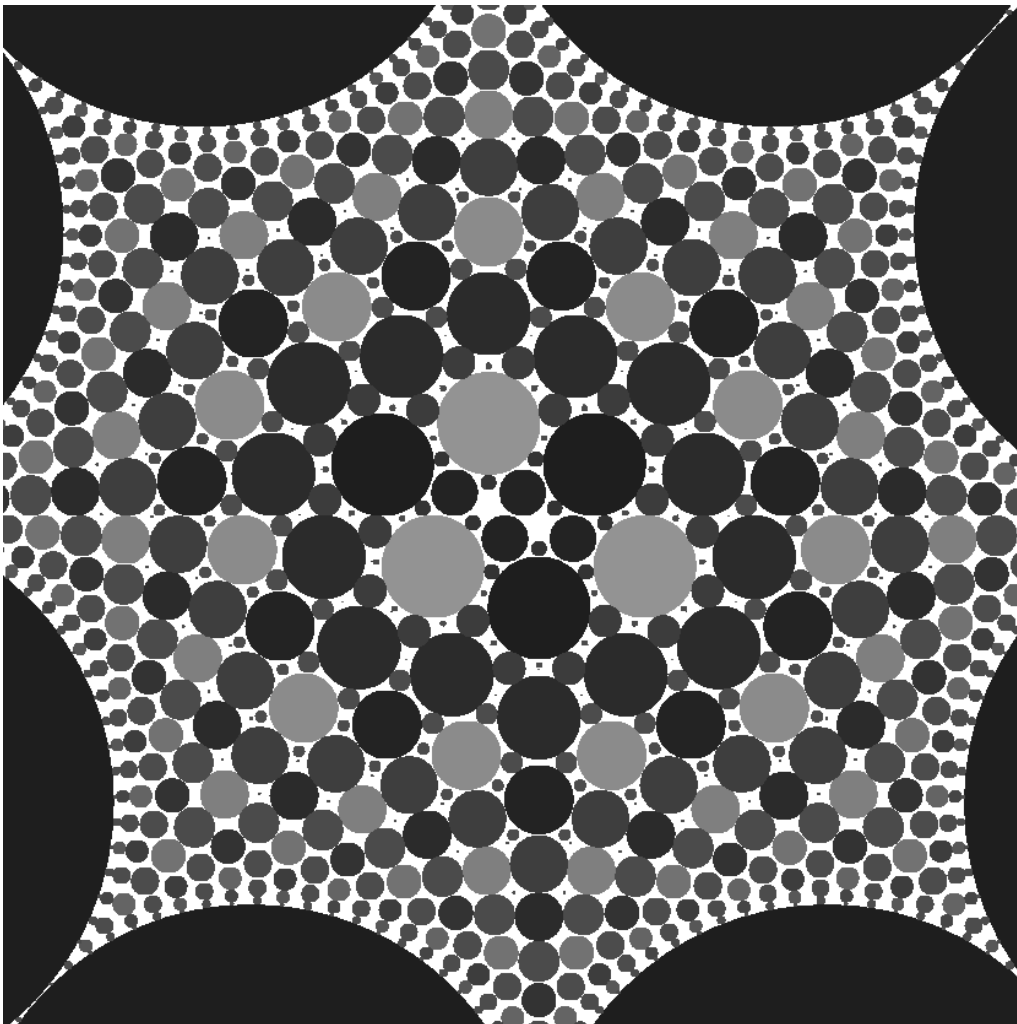
News from the Math Institutes

- Building a model of the physical processes extant within non-thermal plasma for an alternative energy company
- Developing mathematical models to incorporate tumour growth, as well as the effects of chemotherapeutic treatments and surgical interventions, in ovarian cancer for a hospital
- Using analyses designed for relatively short, multivariate, non-stationary time series to analyze trends in abundance of stock units of redfish *Sebastes* spp. in Canadian waters off the Northwest Atlantic for a federal Ministry

NEW THIS YEAR!

MITACS, in partnership with NSERC, is now offering joint funding for 2–3 years as part of the NSERC Industrial Postgraduate Scholarship Program. This joint initiative supports graduate students so they can undertake mathematical research with an eligible partner organization. For more information or to apply, visit www.nserc-crsng.gc.ca and click on “For Students and Fellows”.

For more information on the MITACS Internship Program, including detailed case studies of intern research projects, visit www.mitacsinternships.ca. Applications are currently being accepted.



Periodic points of a 2-D discrete dynamical system

News from Banff International Research Station (BIRS)

by Danny Fan

The following objectives are being implemented for the upcoming phase of BIRS:

- The expansion of the North American partnership by involving the Mexican mathematical community in the scientific management of BIRS and in its operations.
- The increase of BIRS opportunities: We have extended the 2006 programme from 40 to 44 weeks in 2006 and to 48 weeks per year beginning in 2007. This expansion has been well received by the community since we have received over 120 proposals for workshops and summer schools for 2007 alone.
- The coordination of a global effort to secure travel support to the Station for its invited participants.
- The strengthening of BIRS commitment to Women in Mathematics and other underrepresented groups by providing continued support to their initiatives and their organizations. The BIRS scientific panel has already assigned—for the 2006 programme—a full workshop for Women in Mathematics, and a half-workshop on First Nations; Mathematics and Science Education. Moreover, a full week has been approved for a coordinated effort between the Women in Mathematics and Mentoring for Engineering Academia initiatives in 2007.
- Intensifying the involvement of BIRS in K-14 education, including teachers training. The 2006 and 2007 programmes already include workshops for high school teachers as well as for special training camps to prepare the Canadian team for the International Math Olympiad.
- Improvement of the dissemination of all research and educational material developed at BIRS.
- Development of a more robust evaluation and assessment system for the impact of BIRS.
- The collection of relevant data on all BIRS participants which can be easily stored and processed. This will constitute a valuable tool for measuring the diversity of the BIRS programme as well as its impact across the global mathematical community.
- Reports from organizers will continue to be solicited in a timely and efficient way. These reports describe the main accomplishments of their workshops, pointing to specific results and publications. The reports are made available to the public on the BIRS webpage.
- A guideline for “best practices” based on experiences at BIRS as well as at similar institutions around the world is being developed. By sharing information and past experiences, BIRS will seek to work closely with others to further develop its expertise.

For more information about BIRS, please visit <http://www.pims.math.ca/birs/>.

**News from the Atlantic
Association for Research in the
Mathematical Sciences
by David Longstroth**



It has been a busy year in AARMS. On January 1, 2006 Hermann Brunner at Memorial University stepped down as Director of AARMS and was succeeded by Jonathan Borwein at Dalhousie. The AARMS community recognized Hermann's achievements at a lunch in his honour and Jon Borwein laid out his vision for the future: to take AARMS forward to the point of becoming a recognized national and international institute.

Change and growth have thus been a feature of the 2005-2006 year. We welcomed three more Atlantic universities into the AARMS community: UPEI, Mount Allison, Saint Mary's and are expecting to make announcements on two others in the coming months. We have also been doing some structural re-organization, setting up regional committees in Nova Scotia, New Brunswick/PEI and Newfoundland each with their own small discretionary budget to support activities in their respective provinces. And we have made contact with colleagues in Australia and New Zealand, forming informal affiliations with the New Zealand Institute of Mathematics and its Applications (NZIMA) and the Australian Mathematical Sciences Institute (AMSI) with a view to working out reciprocal relationships concerning our summer schools.

We have redesigned our website (www.aarms.math.ca), produced the first annual AARMS poster and enhanced our newsletter, with three issues per year. In the midst of all this growth and change we have maintained a schedule of high quality scientific events, including single day activities and 2-3 day events. The full list can be found at www.aarms.math.ca/events. One of these events, the Coast to Coast miniconference on Mathematical Computation was held jointly with Simon Fraser using the collaborative technology of the D-Drive lab (www.cs.dal.ca/ddrive), which offers AARMS huge potential for outreach and other collaborative ventures. We also ran a successful competition for Postdoctoral Fellowships and awarded PDF support to two promising young mathematicians, one at Dalhousie and one at St. Francis Xavier. And our annual four-week summer school was attended by 38 graduate students from around the world who took courses in Cryptography, Internet Mathematics, Algebraic Geometry and Wavelet Theory. We have also been busy making plans for future activities, which will include an AARMS book series, based on the specialist topics of our Summer School and a pilot project for delivering shared graduate math courses between three universities in Atlantic Canada using collaborative technology. We are also planning an annual conference on math education and an annual week long summer workshop on parallel computation co-hosted by ACEnet (www.ace-net.ca), the regional HPC consortium. It's been a busy year, but a productive one and we hope to have much more good news by this time next year.