Banff International Research Station

for Mathematical Innovation and Discovery

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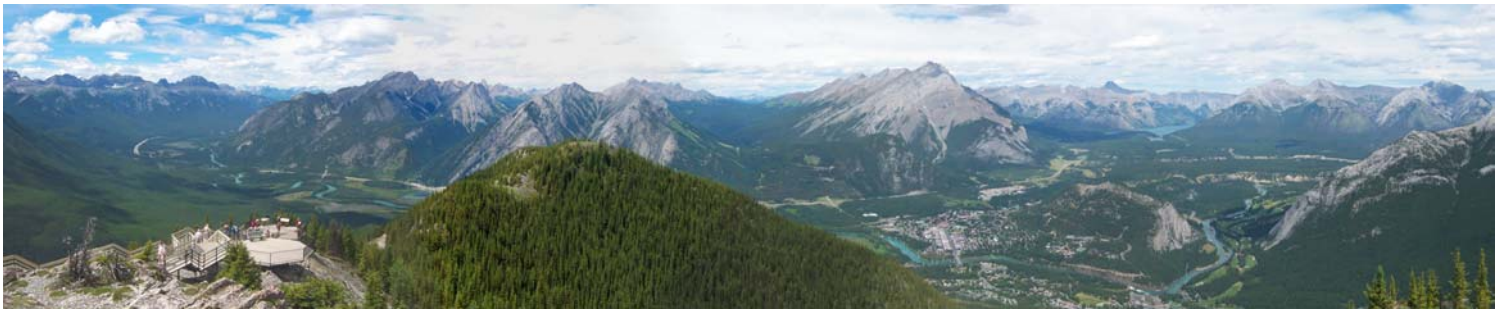
Alberta INNOVATION AND SCIENCE



BIRS Scientific Advisory Board

Nassif Ghoussoub (Chair) (University of British Columbia) - Non-linear Analysis, Partial Differential Equations

Alejandro Adem (University of British Columbia) - Algebraic Topology, Group Cohomology and Related Areas

Raymundo Bautista (Universidad Nacional Autonoma de Mexico) - Representation Theory, Lie Theory

Karoly Bezdek (University of Calgary) - Combinatorial, Convex and Discrete Geometry

Vladimir Chernousov (University of Alberta) - Algebraic Groups

Octav Cornea (Universite de Montreal) - Algebraic/Symplectic Topology

Jaksa Cvitanic (California Institute of Technology) - Mathematical Finance

Darrell Duffie (Stanford University) - Mathematical Economics

Yakov Eliashberg (Stanford University) - Symplectic geometry, Topology, Several Complex Variables

Daniel Freed (University of Texas at Austin) - Geometry, Math Physics

Gerhard Huisken (Max-Planck-Institute for Gravitational Physics) - Analysis and Differential Geometry

Lisa Jeffrey (University of Toronto) - Symplectic Geometry

Carlos Kenig (University of Chicago) - Analysis

Leah Keshet (University of British Columbia) - Mathematical Biology

Thomas G. Kurtz (University of Wisconsin, Madison) - Probability and Statistics

Rachel Kuske (University of British Columbia) - Applied Partial Differential Equations

Robert Lazarsfeld (University of Michigan) - Algebraic Geometry

Mary Pugh (University of Toronto) - Applied Partial Differential Equations

Alexander Razborov (Institute for Advanced Study) - Combinatorics, Theoretical Computer Science

Gadiel Seroussi (Hewlett-Packard Laboratories) - Information Theory

Gordon Slade (University of British Columbia) - Probability, Statistical Mechanics

Karen Smith (University of Michigan) - Commutative Algebras

Panagiotis Souganidis (University of Texas at Austin) - Nonlinear Partial Differential Equations

Douglas Stinson (University of Waterloo) - Computer Science, Cryptography

Elizabeth Thompson (University of Washington) - Statistics

Nicole Tomczak-Jaegermann (University of Alberta) - Asymptotic Geometric Analysis

Jianhong Wu (York University) - Applied Mathematics, Mathematical Biology

BIRS and the world scientific community is grateful to the following panelists who have contributed to the success of BIRS in the first 4 years of its existence.

Douglas Arnold (University of Minnesota)

James Arthur (University of Toronto)

Jean Bellissard (Georgia Institute of Technology)

David Brydges (University of British Columbia)

Jennifer Chayes (Microsoft Research)

Richard Cleve (University of Calgary)

Ronald Coifman (Yale University)

Henri Darmon (McGill University)

Kenneth Davidson (University of Waterloo)

David Eisenbud (University of California, Berkeley)

Ivar Ekeland (Pacific Institute for the Mathematical Sciences)

Lawrence C. Evans (University of California, Berkeley)

John Friedlander (University of Toronto)

David Gross (University of California, Santa Barbara)

Arvind Gupta (Simon Fraser University)

Peter Guttorp (University of Washington)

Helmut Hofer (New York University)

Craig Huneke (University of Kansas)

Jacques Hurtubise (McGill University)

Nancy Kopell (Boston University)

Mark Lewis (University of Alberta)

Laszlo Lovasz (Microsoft Research)

Jitendra Malik (University of California, Berkeley)

Dusa McDuff (Stony Brook University, Stony Brook)

Robert Moody (University of Alberta) CHAIR

David Mumford (Brown University)

Robert Myers (McGill University)

Ed Perkins (University of British Columbia)

Nicholas Pippenger (Princeton University)

Ian Putnam (University of Victoria)

Nancy Reid (University of Toronto)

Gang Tian (Massachusetts Institute of Technology)

Robert Tibshirani (Stanford University)

Michael Waterman (University of Southern California)

Peter Winkler (Dartmouth College)

Margaret Wright (New York University)

Efim Zelmanov (University of California, San Diego)

What's new at BIRS?

by Nassif Ghoussoub (BIRS Scientific Director)

(Left to Right) Arvind Gupta (MITACS), Alejandro Adem (PIMS), Ivar Ekeland (PIMS), Nassif Ghoussoub (BIRS), David Eisenbud (MSRI), missing - José Antonio de la Peña (IM-UNAM)

BIRS is now a collaborative Canada-US-Mexico venture that provides an environment for creative interaction and the exchange of ideas, knowledge, and methods within the Mathematical Sciences and with related sciences and industry. As such, BIRS is unique and substantially different from any other North American scientific initiative, since it is a multi-national operation that is jointly managed, reviewed, evaluated and funded by several government agencies with similar stakes in the project. From the very beginning, BIRS has also been conceived as a major infrastructural resource for the world mathematical science community and its institutions.

BIRS is located on the site of the world-renowned Banff Centre in Alberta. It has its own building (Corbett Hall) and facilities which allow mathematical scientists a secluded environment, complete with accommodation and board and the necessary facilities for uninterrupted research activities in a variety of formats, all in a magnificent mountain setting. On September 24, 2001, in joint international ceremonies held simultaneously in Washington, D.C. and at the Banff Centre, funding for BIRS was announced by the President of the Natural Science and Engineering Research Council of Canada (NSERC), the Director of the US National Science Foundation (NSF) and the Chairman of the Alberta Science Research Authority (ASRA). This was the fulfillment of a remarkable effort led by the Pacific Institute for the Mathematical Sciences (PIMS) on the Canadian side and the Mathematical Sciences Research Institute (MSRI) on the American side, along with the help and participation of the Mathematics of Information Technology and Complex Systems Network of Centres of Excellence (MITACS). BIRS opened its doors to the world scientific community in March 2003.

In 2006, BIRS expanded its programme to 44 weeks and will be aiming for a 48-week programme every year beginning in 2007. The decision to expand the BIRS opportunities is a result of a thorough joint multi-national review of the station held in March 2005 by NSERC, NSF, ASRA in collaboration with the new BIRS sponsor, Mexico's National Council for Science and Technology (CONACYT).

Full funding for BIRS by Canada, Alberta, the US and Mexico

In July 2005, the Alberta Minister of Innovation and Science Victor Doerksen —at the recommendation of the Alberta Science Research Authority (ASRA)— announced his decision to award $3,325,000 in support of the scientific activities of BIRS for a period of five years starting in 2006. In August 2005, the National Science Foundation also announced its decision for the funding ($US 2,641,500) of BIRS for the next 5 years. NSERC's decision to award BIRS $2,875,000 for the period 2006-2010 followed on March 24, 2006. These are the full amounts requested in the BIRS proposal from the three agencies. We also have a pledge of support from the Director General of Mexico's CONACYT for this groundbreaking North American collaboration. Moreover, the Boards of Directors of PIMS and of the MITACS network have officially approved the full amounts that BIRS had requested in the proposal from the two organizations: $990,000 for MITACS and over $1,000,000 in cash and in-kind support by PIMS for the period 2006-2010.

These amounts are in addition to the travel support that the various partnering institutions have pledged over the period 2006-2010. The MITACS network has pledged $500,000 for travel to BIRS' industrially oriented workshops and schools. PIMS has committed $500,000 for Canadian participants with no research grants. MSRI has pledged $250,000 for US participants, while CONACYT has provided $250,000 for the support of Mexican participants travel to BIRS. Moreover, $125,000 was provided by the Vice-Rector-Research at IM-UNAM to pay for the travel expenses to BIRS for that university's students and faculty members.

The principle BIRS activities are the five-day workshops, but there are also provisions for two-day events, suitable for promoting industry-academic collaborations, and for Research in Teams/Focused Research Groups to live and to do research together in a non-workshop/non-conference style setting at BIRS for periods of 1 to 2 weeks. In addition, BIRS hosts summer schools and graduate training camps.

The BIRS mandate is to embrace all aspects of the mathematical, computational and statistical sciences from the most fundamental challenges of pure and applied mathematics, theoretical and applied computer science, statistics, and mathematical physics, to financial and industrial mathematics, as well as the mathematics of information technology, and the life sciences.

Continued on page 2

Implementation of changes in the scientific management

In terms of the scientific management of the station, the following changes have been implemented in conjunction with the recommendations of the joint site visit panel by the four funding agencies.

1. All programmes are to be reviewed and adjudicated by the BIRS Scientific Advisory Board (SAB). This body is the only one given the authority to accept or reject proposals for scientific activities, be it workshops, summer schools or hot topics. No input or recommendation will be solicited from either the PIMS or the MSRI scientific panels, breaking away from the modus operandi of the first 3 years of the Station, where the PIMS (resp., MSRI) scientific panel had the option to recommend 12 (resp., 6) workshops per year to the BIRS scientific panel. The Program Committee – a subset of the SAB– will stress scientific excellence while seeking to ensure adequate representation of all areas of mathematical sciences, as well as an appropriate geographic balance among organizers.
2. The Executive Committee, consisting of the directors of BIRS, PIMS, MSRI, MITACS and IM-UNAM, now forms a separate body dealing solely with issues pertaining to management. The Scientific Director of BIRS is the liaison between this committee and the SAB. No institute director will be serving on the BIRS Scientific Advisory Board. The PIMS Board of Directors continues to be the body that assumes the fiscal responsibility for BIRS. It is however important to emphasize that the new modus operandi for the scientific activities of BIRS is totally independent from the PIMS operation.
3. BIRS is coordinating its activities with those of other mathematical institutes around the world. BIRS has made agreements with two sister research facilities, the MFO (in Oberwolfach) and the AIM (American Institute for Mathematics in Palo Alto) to coordinate their programmes so as to avoid duplication and to maximize opportunities. The 2007 programme was developed in total coordination with the MFO and the AIM.
4. The requirement to have a Canadian and American organizer for each 5-day workshop has been removed. The competition will be open to all, excellence will be the primary criterion, seeking to have diversity among the organizers so that a broad spectrum of mathematical sciences will be represented at BIRS.

The main goal in implementing these changes is to ensure the existence of a transparent and uniform governance structure, that will enable BIRS to attract the best proposals from all over the world.

My hope is that every one of you active research mathematical scientist from any country in the world will have a chance to visit and work at BIRS in the very near future. I am confident that you will find your stay most stimulating for your research programme, and once you get up here, I urge you not to miss the opportunity to explore the splendor of the precious Banff National Park where the station is located, as well as the Banff Centre's lively artistic and intellectual community.

Community, Academic and Scientific Leaders in Support of BIRS

A proposal for the renewal of the BIRS funding was submitted to NSERC, ASRA, CONACYT and the NSF on January 21, 2005. Representing their governments, the four granting institutions joined hands in an unprecedented collaborative effort to evaluate the scientific impact of the station and to decide in tandem about the renewal of their funding of BIRS. This culminated in a site visit to BIRS on March 21, 2005 by a committee of experts representing the four foundations. The following academic and scientific leaders actively participated in making the case for BIRS during the site visit:

Nassif Ghoussoub (BIRS Scientific Director), Alejandro Adem (PIMS Deputy Director), Shelley Alvarado (BIRS Managing Director), Don Brooks (Associate VP Research, UBC), Hermann Brunner (AARMS Director, Memorial U.), David Brydges (UBC), Eddy Campbell (Provost, Memorial U. and CMS President), James Carlson (President Clay Institute), Bob Church (Chair Emeritus of the Board of ASRA), José Antonio de la Peña (IM-UNAM), René Drucker Colin (VP Research, UNAM, Mexico), David Eisenbud (MSRI Director), Ivar Ekeland (PIMS Director), Randy Goebel (iCORE Director), Mark Green (Director, IPAM, Los Angeles), Arvind Gupta (MITACS Scientific Director), Helmut Hofer (Courant Institute), Mary Hofstetter (President and CEO of Banff Conference Centre), Ken Jackson (President of CAIMS), Gary Kachanoski (VP Research, U. Alberta), Barbara Keyfitz (Director, Fields Institute, Toronto), Maria Klawe (Dean of Engineering, Princeton), Rachel Kuske (UBC), Francois Lalonde (Director, CRM, Montreal), Mark Lewis (U. Alberta), John McKenna (Ballard Corporation), Robert Miura (NJIT), Charles Neuman (Courant Institute,Director), Michael Plischke (Dean of Science, SFU), Keith Promislow (Michigan State U.), Nancy Reid (President, SSC, U. Toronto), Dennis R. Salahub (VP Research, Calgary), Martin Taylor (VP Research, U. Victoria), Selim Tuncell (Head of Math, U. Washington).

The world scientific community also came out in strength to support the station as a unique international resource, as more than 600 letters of testimonials in support of BIRS were received from all over the world. The book of testimonials is available online at www.pims.math.ca/birs/publications/testimonials/.

Highlights of changes in the mission of the station

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

BIRS Common Lounge

1. The expansion of the North American partnership by involving the Mexican mathematical community in the scientific management of BIRS and in its operations. The director of IM-UNAM is already a full-fledged member of the BIRS executive committee.
2. 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.
3. The coordination of a global effort to secure travel support to the Station for its invited participants.
4. 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.
5. 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.
6. Improvement of the dissemination of all research and educational material developed at BIRS. Video streaming has been moved to the Vancouver office where more staffing is available, and is now more rapidly accessible on the web.
7. Development of a more robust evaluation and assessment system for the impact of BIRS. The need for a series of well-defined benchmarks which will help establish the degree of success of the BIRS programmes has been recognized.
8. 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. It will help determine whether or not there is an adequate involvement by students, postdocs and young researchers, as well as to ensure the presence of traditionally underrepresented groups.
9. BIRS is currently developing a suitable exit survey on the quality of the workshops, facilities and service at the Station.
10. 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.
11. An external review of BIRS by an international panel of distinguished mathematical scientists will be commissioned during the third year of this grant. The panel will be asked to produce a comprehensive report, which will be shared with the funding agencies. Any corrective measure and adjustment prompted by this review will be implemented.
12. 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.

Max Bell 159 - Main Lecture Room

The Review Process: Ensuring High Calibre Research

The key to the success of BIRS is its ability to attract top scientific proposals and to rely on a selection process by peer review at international standards, free from bias, and balanced across all areas of the mathematical sciences. To represent the mathematical sciences in their entirety, the Scientific Advisory Board consists of 30 internationally recognized experts representing as broad a spectrum of the mathematical sciences community as possible.

A quick look at the people on the SAB for its first four years shows the exceptional quality that BIRS has been able to attract. It is enormously gratifying to see how many scientists have been willing to offer their time and energies into evaluating BIRS proposals.

How does the review process work? Every year, an international call is made soliciting proposals for workshops and organizers from every field of the mathematical sciences and its applications. Proposals consist of a summary of the present state of the field, a discussion of the leading questions that motivate the proposal, and a justification for the timeliness and appropriateness for the workshop. A preliminary list of participants is also requested.

Proposals can be submitted easily online and are accompanied by a list of preferred and impossible dates for the event. Over the 4 cycles, (for the years 2003-2006) the proposals have outnumbered the available spots by a ratio of 3:1 (with no sign of let-up, in fact quite the reverse) so the competition has been healthy and the committees never short of good proposals to select from.

All proposals are placed in a single data file —the Book of Proposals— that is made available to the members of the SAB who then make their comments on line. In addition, the Scientific Director solicits additional reviews for particular proposals by outside experts, so that at the end of the process each proposal has 3 to 5 reviews. This leads to a second book — the Book of Evaluations — that is made available to all members of the Scientific Advisory Board. At the end of this, the Programme Committee of BIRS meets in camera and makes its final selections.

The committee passes though each category, linearly ranking the proposals within it. At the end, the proposals are selected by running across the categories, taking into account the selections already made by the previous committees. In this way, uniform distribution across all the mathematical sciences is maintained, to the extent that there are first-rate proposals in those areas. It should be pointed out that the BIRS Programme Committee ranks proposals by scientific excellence alone, without regard for the geographical origin of the proposal. Finally, a Monte-Carlo type program is used to slot the proposals into specific weeks, using the information supplied by applicants about preferred and impossible dates.

BIRS Executive Committee

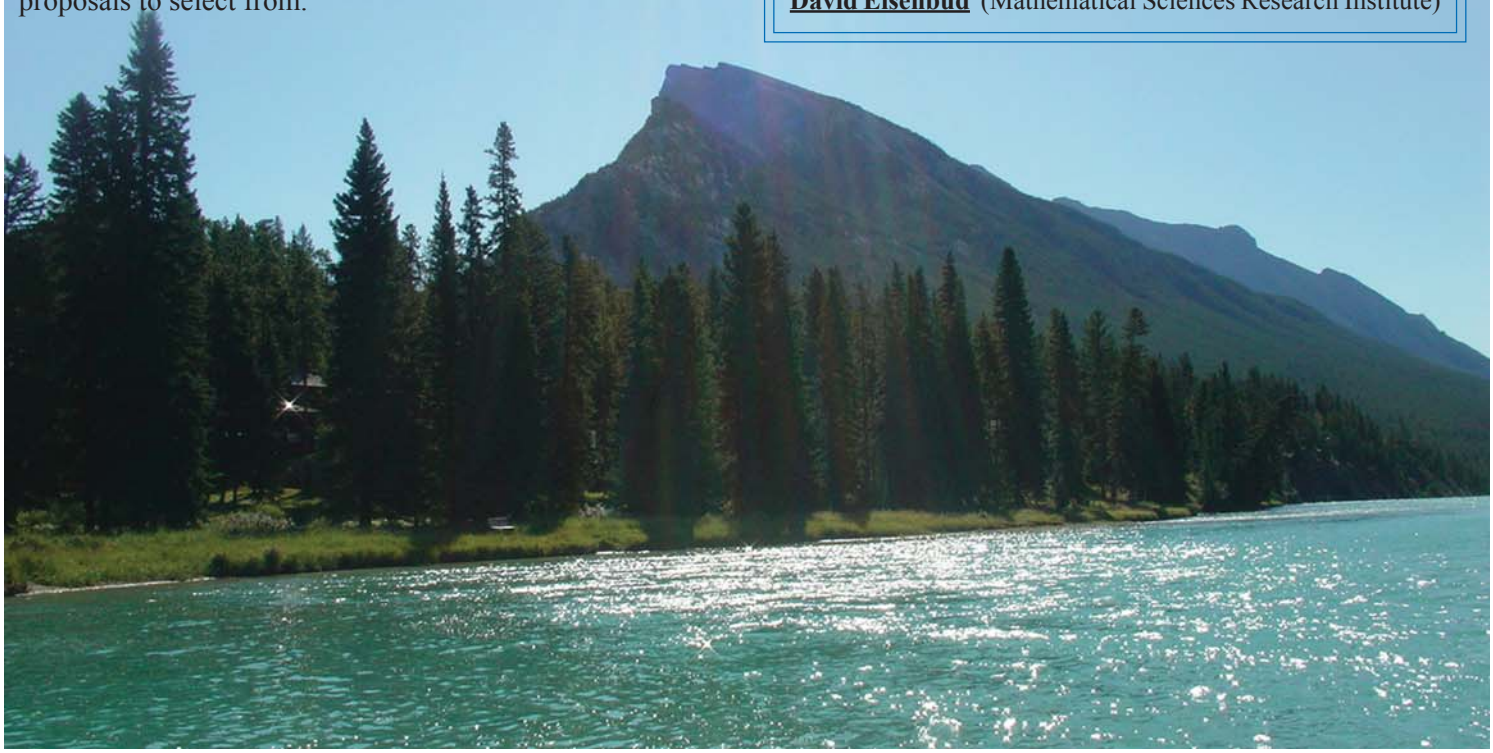
Ivar Ekeland (Chair) (Pacific Institute for the Mathematical Sciences)

José Antonio de la Peña (Instituto de Matemáticas - Universidad Nacional Autónoma de México)

Nassif Ghoussoub (Banff International Research Station)

Arvind Gupta (Mathematics of Information Technology and Complex Systems)

David Eisenbud (Mathematical Sciences Research Institute)



The BIRS Team

Office of the Scientific Director @ UBC, Vancouver

Nassif Ghoussoub

Scientific Director

♦Responsible for overall functioning of the station ♦Ensures that all scientific activities are run at the standards and with the integrity expected by its sponsors and granting councils and foundations ♦Acts as an ambassador and public representative of BIRS ♦Chairs the Scientific Advisory Board and the Programme Committee

Zia Virani

Administrator

♦Manages human resources, budgeting and all financial matters to ensure the continued smooth operation of BIRS scientific activities

Scientific Programme Assistant

♦Administrative and programme support to Scientific Director ♦Website maintenance ♦Compiles BIRS publications and scientific reports from workshops

Danny Fan

Scientific Programme Coordinator

♦Responsible for all administrative aspects of scientific programmes, workshop organization and invitations ♦Communicates with participants and organizers prior and after workshops ♦Supports the proposal review process

Kathryn Wood

Banff International Research Station @ the Banff Centre

Brenda Shakotko

Station Manager

♦Responsible for all logistical issues for onsite participants and day-to-day support of all scientific events at BIRS

Andrea Lundquist

Station Facilitator

♦Assists both the Station Manager and the Programme Coordinator in an administrative capacity ♦Providing onsite coverage for the Station Manager

Brent Kearney

Systems Analyst

♦Manages all aspects of the BIRS IT systems, provides technical support as needed for BIRS participants ♦Develops and supports custom software for use by the BIRS administrative staff

❒If you are a BIRS organizer or participant with **workshop, programme or proposal related** questions, the BIRS Scientific Programme Coordinator is the person to contact.

❒Any **comments about the website** or **general enquiries**, please email the BIRS Scientific Programme Assistant.

❒If you are an **onsite participant**, the BIRS Station Manager is there to assist you. For **onsite computer** help, our Systems Analyst can help.

❒These are suggested first points of contact only. In any case, all of us in the BIRS Team should be able to redirect you —if need be— to someone who can provide support.

Contact information is at the back.

Contact Us

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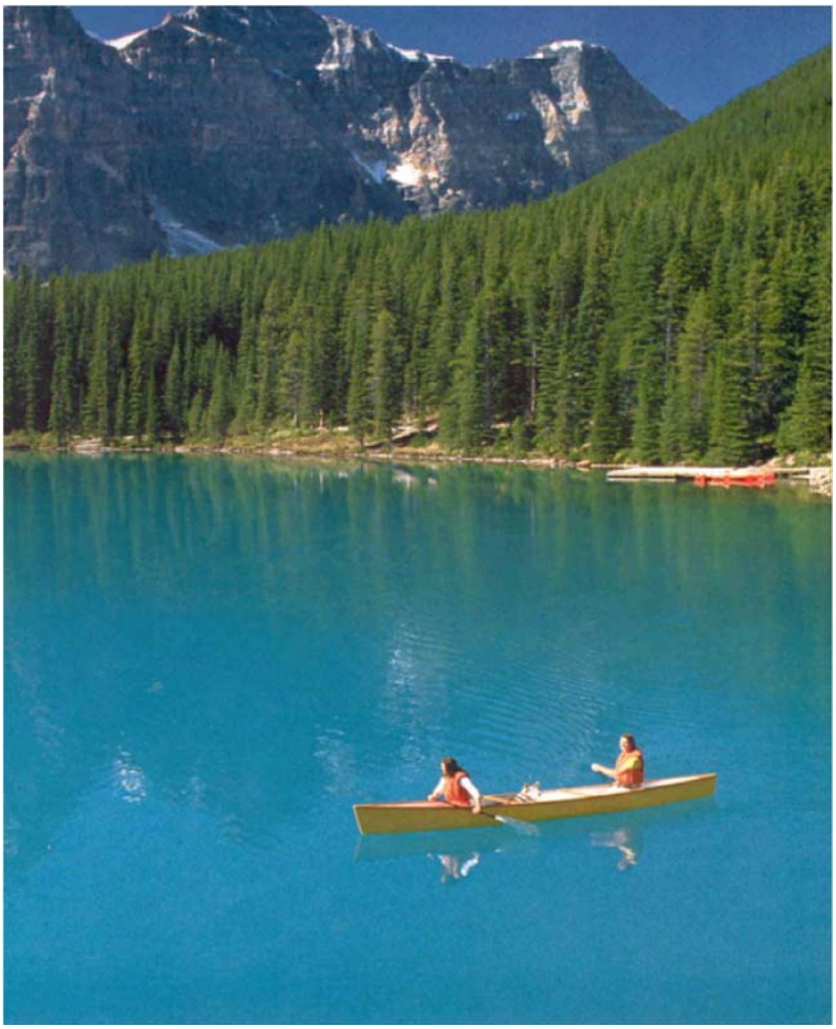

Moraine Lake, Banff National park

Call for Proposals:

Please see the detachable insert in the centre of this brochure.

New BIRS Website Launched

The Banff International Research Station (BIRS) launched its new website in May 2005

http://www.pims.math.ca/birs

We hope you find the website useful and informative. If you have any suggestions to help make it better, please contact us at birs-secretary@pims.math.ca.

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Danny Fan - p. 4

Editors: Nassif Ghoussoub and Danny Fan
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The Mathematics of Information Technology and Complex Systems Network (MITACS)
The Mathematical Science Research Institute, Berkeley (MSRI)
The Instituto de Matemáticas - Universidad Nacional Autónoma de México (IM-UNAM)