

***The IRMACS Centre - A Year in Review
2008/2009
Table of Contents***

Welcome Message

The Celebration

The IRMACS Centre (Motto, Mission, Vision & Goals)

The Staff Team

The Management Committee

The SFU Canada Research Chairs Seminar Series

The Coast-2-Coast Seminar Series

Managing Research Activity Information & Looking to the Future

“The Mathematical Interests of Peter Borwein” Conference

The Project Leaders

The MoCSSy Program (Modelling of Complex Social Systems)

The Complex Systems Modelling Group

IRMACS in Numbers

Global Collaboration

Graduate Student Defenses

Words of Thanks



Welcome to the 4th Annual IRMACS Day and to our year in review. We'd like to take this opportunity to extend our thanks to all of the board members, external review committee members, management committee members, project leaders, members, students, collaborators, visitors and staff that have helped to make the IRMACS Centre such a success. Our vision of an interdisciplinary centre that facilitates and supports collaborative research activity within Simon Fraser and its greater community continues to exceed all expectations. Take a minute to look through this booklet and reflect on the highlights of the past year. Thank you for being part of the community and for making the success of the Centre possible. We invite you to enjoy the celebration, the presentations and the reception.

from the IRMACS staff

The Celebration

*1:30 - 1:40 Welcoming remarks by Peter Borwein,
Executive Director*

*1:40 - 2:30 "A 3D Google Earth Experience Starring SFU" by
Brian Corrie and Andy Gavel*

*2:30 - 3:30 "The Benefits of Laughter" by Sharon Jackson, Certified
Laughter Leader*

3:30 - 5:00 Reception

The IRMACS Centre

<http://www.irmacs.sfu.ca/about/home>

Our Motto

Memento audere semper! - Remember to always be daring!

Our Mission

By removing the traditional boundaries between scientific disciplines and physical boundaries due to distance, the IRMACS Centre nurtures interdisciplinary research, collaborative interaction, and creativity at regional, national and international levels; promotes sharing of its resources, laboratory space, seminar and discussion rooms, and a broad array of specialized equipment; provides researchers from diverse backgrounds with versatile, technologically sophisticated infrastructure and state-of-the-art computational, visualization and communication resources; fosters community involvement; serves as an open space for scientific and community events and, by providing inspiration and enlightenment, helps scientists from all walks of academic life to perform their research at the highest level.

Our Vision

- ◆ *The IRMACS Centre is designed to facilitate creative collaboration and the exchange of scientific ideas*
 - ◆ *The IRMACS Centre is committed to promoting new initiatives that challenge existing standards, expand current scientific boundaries, and create new benchmarks*
 - ◆ *The IRMACS Centre is dedicated to attracting and sustaining excellent researchers whose primary laboratory tool is the computer*
 - ◆ *The IRMACS Centre serves its members through first class technical and administrative support*
 - ◆ *The IRMACS Centre offers state-of-the-art facilities*
 - ◆ *The IRMACS Centre achieves its goals with the support of its dedicated members, staff and leaders*
-

Our Goals

- ◆ *To champion groundbreaking and interdisciplinary research*
- ◆ *To enable collaborative interaction - intellectually, physically and virtually*
- ◆ *To build a network of SFU researchers as well as short term and long term visitors from diverse disciplines*
- ◆ *To facilitate and host events that both promote leading-edge research as well as the bridging of science and art*
- ◆ *To establish long lasting connections with similar institutions across the world*
- ◆ *To be the hub for Simon Fraser University's research*



"I found IRMACS an encouraging, inspiring, friendly, and professional environment in which to pursue my research. I was initially surprised that I was not assigned a desk, as IRMACS pursued a policy of providing enough space + computers ..etc.. so as to accommodate those researchers who happened to be in the building at the time. By the time I left I was convinced that this was a very sensible, forward-thinking, and efficient way of organizing things - I never had a problem with access, nor was it ever remotely cramped. Moreover, by varying my place of work I had the opportunity to meet more people that I would have had I been stuck away in some office."

- Dr. Matthew G. Parker, Selmer Centre, Institute for Informatics, University of Bergen, Bergen, Norway

The Staff Team

<http://www.irmacs.sfu.ca/about/irmacsteam/staff-directory>

<i>Pam Borghardt</i>	<i>Managing Director</i>
<i>Peter Borwein</i>	<i>Executive Director</i>
<i>Brian Corrie</i>	<i>Technical Director</i>
<i>Maryam Elkaswani</i>	<i>Receptionist Research Assistant</i>
<i>Kelly Gardiner</i>	<i>Financial Research Assistant</i>
<i>Andy Gavel</i>	<i>AV Tech Support</i>
<i>Warren Hare</i>	<i>Special Projects & MoCCSy Program Director</i>
<i>Uwe Glässer</i>	<i>Co-Director</i>
<i>Veselin Jungic</i>	<i>Research Director</i>
<i>Corinna McDonald</i>	<i>Systems Administrator</i>
<i>Helen Zhai</i>	<i>Special Projects Research Assistant</i>

We would like to make special mention of our past staff members Dom, Glenn, Jonathan, Rob, Susan and Todd. You are an important part of our



The IRMACS community welcomes our newest staff members Helen, Maryam and Andy. Thanks for joining the team!

“Everyone on the staff was a pleasure to be around! They were extremely friendly and helpful - they acted like they were happy to have the conference-goers around all the time, rather than like we were a burden.”

*- Dr. Greg Martin, University of British Columbia,
Vancouver, BC*

The IRMACS Management Committee

<http://www.irmacs.sfu.ca/about/irmacsteam/management-committee>

The Management Committee is responsible for overseeing the operational direction of the IRMACS Centre, setting policy and making recommendations on the assignment of resources. Meeting on a quarterly basis, the management committee assesses and approves recommendations from the staff's Management Team. The Management Committee reports to the IRMACS Board of Trustees for oversight, particularly regarding University interests.



*Veselin Jungic, Uwe Glässer, Brian Corrie, Felix Breden, Les Vertesi, Ramo Gencay,
Ljiljana Trajkovic, Lionel Tolan, Peter Borwein and
Pam Borghardt*

“Over the past couple of years I have been enjoying the privilege of being actively involved in managing IRMACS -- a truly inspiring and rewarding experience in many ways. Above all, what has impressed me the most is the collegial spirit and the professional way in which even the most critical and pressing issues have been handled. Striving for excellence is very much a team effort and a most satisfying experience when working with such a well functioning team.”

- Dr. Uwe Glässer, School of Computing Science, Simon Fraser University, Burnaby, BC

SFU Canada Research Chair Seminar Series

<http://www.irmacs.sfu.ca/events/past-events/crc-seminars>

Since September 2008, the IRMACS Centre has been hosting the “SFU Canada Research Chairs Seminar Series.” The focus of the series is to provide an opportunity to the wider SFU community to learn more about the current research interests of the SFU Canada Research Chair holders.

We record all presentations and thus produce an archive of some aspects of the present state of research at SFU. The bi-weekly series hosts six presentations per semester. All talks have been held in the IRMACS Presentation Studio, on Thursdays between 11:30-12:20. Each talk is followed by a reception.



“Thanks once again for arranging the CRC Seminar Series and for inviting me to give a seminar. I was very happy for the opportunity to talk about my group’s research. Keep up the good work.”

- Dr. Randall M. Peterman, Professor and Canada Research Chair in Fisheries Risk Assessment and Management, School of Resource and Environmental Management, Simon Fraser University, Burnaby, BC

Coast -to-Coast Coast Seminar Series

<http://www.irmacs.sfu.ca/events/coast-coast-seminars>

For the last four years, the bi-weekly Coast-To-Coast Seminar Series has been running between the IRMACS Centre at SFU and D-Drive at Dalhousie University using Access Grid Technology. In 2008 the series organization and distribution expanded to include the Atlantic Computational Excellence Network, the Shared Hierarchical Academic Research Computational Network, and the Western Canada Research Grid.

The main goal of the series is to provide an opportunity to scientific communities from various Canadian universities to collaborate and share their interests. The secondary goal is to set the standard for these types of events and to explore further the possibilities of the use of the available technology.

The seminar's theme for Fall 2008 was "Computer Visualization and Image Processing" and for Spring 2009 was "Modelling and Differential Equations". The presentations came from Brock University, Dalhousie University, McMaster University, Memorial University, Simon Fraser University, the University of Alberta, the University of Calgary, and the University of New Brunswick. This past year some of the sessions were also attended by the University of Chile.

*The IRMACS Centre will host the first **Coast-To-Coast Retreat** on April 24-25, 2009. For more information please check out*

<http://conferences.irmacs.sfu.ca/c2c/index.html>.



"I am extremely proud to be a part of the Coast2Coast Seminar Series. Meeting the challenges of helping to technically produce a collaboration that involves 10 to 12 Universities across Canada on a biweekly basis has been both exciting and motivating. Its been a great experience watching as it has evolved into the success it is today.

- Todd Zimmerman, Westgrid Collaboration & Visualisation Specialist

Managing Research Activity Information & Looking to the IRMACS Future

<http://www.irmacs.sfu.ca>

Research activity has been prolific this past year. One of the key tasks of the IRMACS staff is to monitor and document it. This is critical for several reasons including: reporting on the successes of IRMACS to our funding agencies and to the University; providing us with data that we require to write grants proposals to maintain and upgrade the IRMACS infrastructure; and most importantly to inform you, the users, of the research activity that is occurring at the IRMACS Centre.

To this end, in the summer of 2008 we inflicted an extensive survey on our project leaders. Thank you all very much for taking the time to fill out this survey! This data is critical to IRMACS, as it provides us with the basis for the annual reports that we provide to our funders the Canada Foundation for Innovation, the BC Knowledge Development Fund, and Simon Fraser University. It also provided us with the data and information that was necessary to write the grant proposals that are so critical to sustaining the Centre.

Speaking of grants, it has been a busy year for the Centre. As most of you know, some of the IRMACS' researchers were successful in landing one of the University Community Trust Endowment Fund (CTEF) grants. The CTEF funded Modelling of Complex Social Systems (MoCSSy) Program has been operating since the summer of 2008. IRMACS also submitted two other large grant proposals in October of 2008. This included a CFI Leading Edge Fund proposal to renew and expand the IRMACS technical infrastructure and an NSERC Major Resource Support grant. Thanks to all of the SFU grant writers and budget facilitators that helped us so much! Special thanks to Brian, Pam and Warren for surviving all of the late nights and added stress. We wait in hope - keep your fingers crossed!

Another significant effort that IRMACS has undertaken over the last six months is the redesign of how we manage and communicate information about research activity at the Centre. Working with a web designer and developer, we have redesigned the IRMACS website. We hope you like the new look! Phase II of this effort includes a redesign of the IRMACS data management system. This, combined with the new website, will allow us to deliver information to the IRMACS research community in a much more effective and efficient manner. Have you checked out the "What's New" section lately or the "Research Project Spotlight" page? Odds are high you'll find your name there soon!

***“The Mathematical Interests of Peter Borwein”
Conference***

<http://conferences.irmacs.sfu.ca/borwein08>

In May 2008, we held an international conference celebrating Peter Borwein’s 55 birthday and his contributions to mathematics: the research and the community.



“The conference was excellent, in many ways. I greatly enjoyed the content that exhibited the many facets of Peter Borwein’s mathematical interests, and the spirit of collaboration that pervades his work and is clearly at the center of the IRMACS philosophy. The conference was extremely well-run ... Tech support was absolutely top - notch ... everything ran very smoothly at IRMACS ... speakers with particular need were also accommodated without any trouble at all.

-Dr. Michael Mossinghoff, Davidson College, Davidson, NC

IRMACS Project Leaders

<http://www.irmacs.sfu.ca/research/projects-abstracts>

<i>Tom Archibald</i>	<i>Department of Mathematics</i>
<i>Faisal Beg</i>	<i>School of Engineering Science</i>
<i>Lynne Bell</i>	<i>School of Criminology</i>
<i>Derek Bingham</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Patricia Brantingham</i>	<i>School of Criminology</i>
<i>Peter Borwein</i>	<i>Department of Mathematics</i>
<i>Felix Breden</i>	<i>Department of Biology</i>
<i>Fiona Brinkman</i>	<i>Department of Molecular Biology and Microbiology</i>
<i>Tom Brown</i>	<i>Department of Mathematics</i>
<i>Nils Bruin</i>	<i>Department of Mathematics</i>
<i>Stephen Campbell</i>	<i>Faculty of Education</i>
<i>Cedric Chauve</i>	<i>Department of Mathematics</i>
<i>Charles Chung</i>	<i>My Own Bits</i>
<i>Brian Corrie</i>	<i>IRMACS/WestGrid</i>
<i>Vahid Dabbaghian</i>	<i>Department of Mathematics/IRMACS</i>
<i>Henry Daniel</i>	<i>School of Contemporary Arts</i>
<i>Charmaine Dean</i>	<i>Department of Statistics and Actuarial Science</i>
<i>John Dill</i>	<i>School of Engineering Science</i>
<i>Brian Fisher</i>	<i>School of Interactive Arts and Technology</i>
<i>Ramo Gencay</i>	<i>Department of Economics</i>
<i>Uwe Glässer</i>	<i>School of Computing Science</i>
<i>Jinko Graham</i>	<i>Department of Statistics and Actuarial Science</i>
<i>William A. Gruver</i>	<i>School of Engineering Science</i>
<i>Warren Hare</i>	<i>Department of Mathematics/IRMACS/MoCSSy</i>
<i>Michael Hayes</i>	<i>Faculty of Health Sciences</i>
<i>Bret Heinrich</i>	<i>Department of Physics</i>
<i>Pavol Hell</i>	<i>School of Computing Science</i>
<i>Bob Hogg</i>	<i>Faculty of Health Sciences</i>
<i>Veselin Jungic</i>	<i>Department of Mathematics</i>
<i>Bozena Kaminska</i>	<i>School of Engineering Science</i>
<i>Petr Lisonek</i>	<i>Department of Mathematics</i>
<i>Brad McNeney</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Carlo Menon</i>	<i>School of Engineering Science</i>
<i>Bojan Mohar</i>	<i>Department of Mathematics</i>
<i>Arne Mooers</i>	<i>Department of Biology</i>

<i>David Muraki</i>	<i>Department of Mathematics</i>
<i>George Nicholas</i>	<i>Department of Archeology</i>
<i>Ash Parameswaran</i>	<i>School of Engineering Science</i>
<i>Gary Parker</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Shahram Payandeh</i>	<i>School of Engineering Science</i>
<i>Levon Pogosian</i>	<i>Department of Physics</i>
<i>Rick Routledge</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Sandy Rutherford</i>	<i>IRMACS/CSMG</i>
<i>Cenk Sahinalp</i>	<i>School of Computing Science</i>
<i>Carl Schwarz</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Tamon Stephen</i>	<i>Department of Mathematics</i>
<i>Steven Thompson</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Ljiljana Trajkovic</i>	<i>School of Engineering Science</i>
<i>Alexa van der Waall</i>	<i>IRMACS/CSMG</i>
<i>Krisztina Vasarhelyi</i>	<i>Faculty of Health Sciences</i>
<i>K.S. Viswanathan</i>	<i>Department of Physics</i>
<i>Rob Woodbury</i>	<i>School of Interactive Arts and Technology</i>
<i>Martin Zuckermann</i>	<i>Department of Physics</i>



“I now have active collaborations with faculty members in other departments and faculties at SFU (Borwein, Glässer and Brantingham) that I would not have had in the absence of IRMACS. It is a centrally important resource for me and several of my colleagues in the Faculty of Health Sciences.”

- Dr. Michael Hayes, Faculty of Health Sciences, Simon Fraser University, Burnaby, BC

Modelling of Complex Social Systems - MoCSSy Program

<http://mocssy.irmacs.sfu.ca>

The Community Trust Endowment Fund (CTEF) is an SFU initiative that contributes to the University's support of research, teaching and scholarship. In 2008 an IRMACS based project titled "Modelling of Complex Social Systems - MoCSSy" was granted the coveted CTEF award.

Research Team: *Dr. Peter Borwein, Mathematics/IRMACS, project leader; Dr. Patricia Brantingham, Criminology; Dr. Uwe Glässer, Computing Science, Dr. Michael Hayes, Health Sciences, Dr. Bob Hogg, Health Sciences, Dr. Nadine Schuurman, Geography; and Dr. Steve Thompson, Statistics and Actuarial Science.*

Overview: *Many of the social issues of the 21st century are captured in the studies of criminology (crime, safety, security, privacy), health science (harm reduction, disease spread, mental health, tractable public health care), and urban dynamics (homelessness, unemployment). Research into these areas will have a profound impact on the quality of life for everyone by reducing crime, reducing harm and addiction, enhancing safety and security while maintaining privacy, and improving health and welfare. Simon Fraser University is in a position to take a leading role nationally and internationally in the development of an innovative research program that addresses how these challenges can be understood and addressed through mathematical and computational modeling.*

For more information, contact Dr. Warren Hare, Program Director, at mocssy@irmacs.sfu.ca



Complex Systems Modelling Group

<http://csmg.irmacs.sfu.ca>

The IRMACS Centre's Complex Systems Modelling Group (CSMG) consists of about a dozen researchers of diverse academic backgrounds. These researchers are engaged in collaborative deliverable-based projects connecting the public service sector such as the Ministry of Health and the Ministry of Public Safety and the university. The mathematical and computational resources of the IRMACS Centre facilitate the group as they focus on modelling complex systems relevant to social welfare. The group's goal is to construct mathematical models for the complex real-world problems relevant to social welfare, generally proposed by external collaborators.

The IRMACS Centre's CSMG is a strong connection to an array of entities outside of academia with agencies and institutions that support research at a regional and national level. These include the B.C. Ministry of Health, the Fraser Health Authority, the B.C. Ministry of Attorney General, the B.C. Ministry of Public Safety and Solicitor General, the Royal Canadian Mounted Police (RCMP), Mathematics of Information Technology and Complex Systems (MITACS), and the Natural Sciences Engineering Research Council of Canada (NSERC).

For more information, contact Dr. Alexander Rutherford, Scientific Director, at csmg@irmacs.sfu.ca



IRMACS in Numbers

<http://irmacs.sfu.ca>

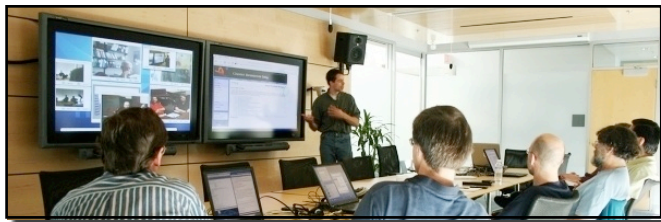
316 Research Project Meetings
 15 Conferences & Workshops
 450 Remote Collaboration Events
 19 Colloquiums
 141 Seminars

19 Thesis Defenses
 23 Outreach Events
 21 Community Events

650 Hours of Cleaning
 160 Catering Orders
 149,000 Copies Printed
 789 Posters Hung
 1716 Reservations
 8736 Hours of Use

300+ Researchers
 92 Workstations
 10 Meeting Rooms
 9 Plasmas
 11 staff

Emails, invitations and announcements - Countless!



“IRMACS hosts numerous research workshops and conferences, attended by a broad stream of researchers, both within mathematics and from outside areas collaborating with mathematicians at IRMACS and elsewhere. I have participated in several of these workshops in the last few years and I am always impressed by their high level of scholarship and by the expertise of the people attending.”

*- Dr. Michael P. Lamoureux , Department of Mathematics and Statistics,
University of Calgary, Calgary, AB*

Global Collaboration

<http://www.irmacs.sfu.ca/collaborations/global-research>

Scientific research is rapidly becoming a global endeavour. Today's complex computational problems not only require a wide range of technologies to solve them, but they also require a robust expertise. As scientific research becomes more multidisciplinary in nature, today's research collaborations often span campuses, cities, and even countries.

Thus, one of the key components of any advanced computational research environment is the ability for researchers to communicate and collaborate with colleagues at all levels. To meet the needs of collaborative scientific computing, the IRMACS Centre supports a range of collaboration technologies in its meeting rooms. In addition, the IRMACS Centre is working closely with a range of national partners including WestGrid and Compute Canada in supporting national and international scientific collaboration.

The IRMACS Centre hosted over 450 remote collaborations between institutions around the world in 2008. As well to date IRMACS has hosted 731 visiting researchers (see map below for their home locations).



"A major loss without IRMACS would be the collaboration tools. Undoubtedly, such a loss would have quite strongly negatively impacted my research, and the management of my forestry research team. It would also have impacted student training across Canada as well as the loss of the sharing of expertise in spatial statistics and other areas."

*- Dr. Charmaine Dean, Department of Statistics and Actuarial Science,
Simon Fraser University, Burnaby, BC*

**Graduate Students that defended in
2008 - 2009**

<i>Simon Bonner, Ph.D.,</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Emma Cohen, M.Sc.,</i>	<i>Faculty of Health Science</i>
<i>Michael Coons, Ph.D.,</i>	<i>Department of Mathematics</i>
<i>Richard Gibson, M.Sc.,</i>	<i>Department of Mathematics</i>
<i>Camille Jaggerauth, M.Eng.,</i>	<i>School of Engineering Science</i>
<i>Vinay Kotamraju, M.ENG.,</i>	<i>School of Engineering Science</i>
<i>Andrew C. Lang Ph.D.,</i>	<i>School of Kinesiology</i>
<i>Edward Leung, M.Sc.,</i>	<i>Department of Molecular Biology and Biochemistry</i>
<i>Luyao Lin, M.Sc.,</i>	<i>Department of Statistics and Actuarial Science</i>
<i>Victor Lundin, Ph.D.,</i>	<i>Department of Molecular Biology and Biochemistry</i>
<i>Behrang Nosrat Makouei,</i>	<i>MASc., School of Engineering Science</i>
<i>Alan Meichsner, Ph.D.,</i>	<i>Department of Mathematics</i>
<i>Heather Osachoff, M.Sc.,</i>	<i>Department of Biology</i>
<i>Pinar Pekcaglyian, M.Sc.,</i>	<i>Department of Mathematics</i>
<i>Philip Poon, Ph.D.,</i>	<i>Department of Mathematics</i>
<i>Joe Qranfal, Ph.D.,</i>	<i>Department of Mathematics</i>
<i>Badri Ratnam, M.Sc.,</i>	<i>Department of Mathematics</i>
<i>Simon Ruffleux, M.Eng.,</i>	<i>School of Engineering Science</i>
<i>Desiree Tomassi, M.Sc.,</i>	<i>Department of Statistics and Actuarial Science</i>



"I have been a part of the IRMACS community since coming to SFU in the fall of 2006 to pursue a PhD in mathematics. While here I have met colleagues and friends, and have become a mathematician. Thanks in large part to the research oriented environment of IRMACS, I will be graduating this spring. Thank you IRMACS and happy fourth birthday."

- Michael Coons, Simon Fraser University, Burnaby, BC

Words of Thanks

Thanks to CFI, BCKDF, the SFU Senior Administration Officers, and the Dean of Science for providing operating support to the IRMACS Centre.

Thanks to our wonderful grants facilitators who continually help us search for grant writing opportunities. You ladies are an important part of our community and we appreciate all of your long nights, your writing expertise, your guidance, your cheerleading and your patience!

Thanks to all the members of Facilities Management crew for keeping the heat running, the bulbs lit, the mail flowing, the leaks to a minimum and the floors shiny.

Thanks to the departmental & school administrative assistants for their patience, help and continual willingness to “spread the word” about all of the events that we host.

Thanks to the Office of Research Services for helping us “stick handle” through all the contract paperwork.

Thanks to all of the Financial Services staff and particularly to all of the Research Accountants who help keep our accounts straight.

Thanks to the Caterers who react with ease to our last minute needs, who keep us well fed and who always remember the lids!

Thanks to IT Services for letting us “play” so closely with you.

Thanks to SFU in its entirety. We love being your collaborative and open, interdisciplinary research centre. Looking forward to many years to come!

many regards from the IRMACS Community

April 2, 2009



www.irmacs.sfu.ca