



Newsletter

Winter 2011

AARMS Summer School 2011

The 10th annual AARMS Summer School will take place in June 2-29, 2011 at the Department of Mathematics and Statistics (www.mun.ca/math/home/), Memorial University of Newfoundland in St. John's. The summer school is intended for graduate students and promising undergraduate students from all parts of the world. Without charge each participant is expected to register for two of the courses. Each course consists of five ninety-minute lecture sessions each week. These are graduate courses approved by MUN and we will facilitate transfer credit to the extent possible. Although students are responsible for their own travel expenses, they will be provided with free residence and meals during the summer school period. In the 2011 AARMS Summer School, the following four courses will be offered:

- **Analysis and Geometry of Partial Differential Equations** (Math 6160 - Partial Differential Equations) taught by Robert J. McCann (University of Toronto) & Andrea Colesanti (University of Firenze)
- **Harmonic Analysis** (Math 6319 - Special Topics in Analysis, Harmonic Analysis) taught by Yongsheng Han (Auburn University)
- **Numerical Solution to Partial Differential Equations** (Math 6210 - Numerical Solution of Differential Equations or Math 6201 - Numerical Methods for Partial Differential Equations) taught by Weizhang Huang (University of Kansas)
- **Mathematical Biology** (Math 6102 - Special Topics in Applied Mathematics, Mathematical Biology) taught by Troy Day (Queen's University) & Abba Gumel (University of Manitoba)

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Atlantic Algebra Centre: Summer 2010 to Winter 2011

The main event at the Atlantic Algebra Centre (AAC) in Summer 2010 was the International workshop "Infinite Dimensional Lie Algebras" held at Bonne Bay Marine Station July 19 - 23. The Organizing Committee included Yuri Bahturin (MUN), Vyacheslav Futorny (São Paulo), Mikhail Kotchetov (MUN) and Ivan Penkov (Jacobs University of Bremen). We had 15 international participants and 10 Canadians (8 from Atlantic Canada). The main emphasis of the workshop was on locally finite Lie algebras. The first workshop on this topic, organized by Yuri Bahturin, was held in 2003 at Banff International Research Centre. Locally finite Lie algebras is a relatively new area of Lie Theory with many exciting results and even more intriguing open problems. One of them is the classification of simple locally finite Lie algebras.

The participants of the workshop embraced several generations of researchers working on this subject. One of the lectures was delivered by a "patriarch" in this area, one of creators of the Classification Theory of Simple Modular Lie Algebras, the author of a three-volume monograph on the topic, Professor Helmut Strade from Germany. Other lectures were given by well-known specialists, including Alexander Baranov from UK, Georgia Benkart and Vera Serganova from US, Matej Brešar from Slovenia, Vyacheslav Futorny from Brazil, Ivan Penkov and his recent doctorate Siarhei Markouski from Germany, Antonio Fernandez Lopez from Spain, Yuly Billig, Ivan Dimitrov and Mikhail Kotchetov from Canada. Dr Zhuang Niu from Memorial delivered two interesting lectures on C^* -algebras, an area having potentially strong connections with Locally Finite Algebras. The total number of lectures and shorter talks was 24. The tight schedule still left some time for the sightseeing in the neighborhood of Bonne Bay Marine Station which is surrounded by Gros Morne National Park. Most people took part in the famous West Brook Pond boat tour.

Among other summer events was the successful oral defence (with distinction) of a Ph D Thesis by Jason McGraw "Group Gradings on Simple Lie Algebras of Cartan and Melikyan Type". It is remarkable that one of the examiners was famous Professor Hayk Melikyan from North Carolina, who

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Atlantic Algebra Centre: (continued)

also delivered an AAC Colloquium Talk on one of the days following the defence.

In Fall 2010 AAC organized a mini course "Computing in Commutative Algebra" by Professor Dr Gerhard Pfister (University of Kaiserslautern, Germany), one of the authors of famous SINGULAR package and several monographs, including a Springer monograph Gert-Martin Greuel, Gerhard Pfister "A Singular Introduction to Commutative Algebra". The material of the course was used in a graduate course "Advanced Linear Algebra". As usual, the notes of the course are available at AAC web site <http://www.mun.ca/aac>.

In January 2011 our AAC colleague Dr Hugh Thomas (UNB – Fredericton) spent three days in St John's and gave an AAC Colloquium Talk "Garside structures for braid groups".

Our next plans in 2011 include an Atlantic Canada Undergraduate Algebra Competition, two mini courses and an International Workshop "Polynomial Identities. II" to be held in St. John's on September 2 – 6, 2011. A partial support has been approved by AARMS. The workshop is organized by AAC jointly with colleagues from Bulgaria, Israel, Italy and Russia. The first workshop on the same topic was held in St. John's in 2002.

- Yuri Bahturin, AAC Director



Professor Pfister in Manuels, NL, during his visit as AAC mini course lecturer in October 2010

Sage Days at Acadia in May

On May 9-13, at Acadia University, mathematicians from the Atlantic region and beyond will have the opportunity to learn Sage, and to participate in the process of Sage development. Sage is an open-source mathematics software package developed by and for the mathematical community. Its long

term goal is to replicate and extend the functionality of commercial packages such as Mathematica and Maple.

The week will begin with tutorials for those who are new to Sage. Participants will also have the opportunity to learn about Sage development, and will be encouraged to contribute to the specific development goals of the workshop in the areas of combinatorics and number theory.

Software development can be engaged in by mathematicians from undergraduate students to faculty members. The workshop activities will be planned to suit participants with a variety of mathematical backgrounds, including advanced undergraduates. This will be an excellent opportunity for students who will be holding an NSERC USRA and working on a computational project to learn valuable skills and to meet other students from Atlantic Canada. Limited funding is available to support student participants.

Leading the workshop will be Florent Hivert (Marne-La-Vallée), Franco Saliola (UQAM), Nicolas Thiéry (Paris Sud), and (supported by the AARMS Distinguished Lecturer program) Anne Schilling (UC Davis). The workshop is also co-sponsored by AARMS, and is being organized by Eva Curry (eva.curry@acadiau.ca) and Hugh Thomas (hthomas@unb.ca). For more information, see <http://wiki.sagemath.org/days30>.

Enhancing Appreciation of Mathematics through Intentional Community Outreach

Recently AARMS provided \$1000 to pilot outreach activities in the Fredericton area. The idea was that local events could potentially provide a foundation for broader outreach, particularly within the province of New Brunswick. Much is happening with respect to this initiative and an effort is made here to provide a glimpse into recent developments. Approximately 500 students and teachers have participated in events at local schools including Devon Middle School, George Street Middle School, Keswick Valley Memorial School, and Kingsclear Consolidated School. The relationship with the latter school has extended to regular visits with Grades 4 and 5 students, along with professional development and school-wide activities. The pilot largely was framed around an inaugural event on a Saturday afternoon at the Fredericton Public Library. Almost 100 people of all ages appeared on a Saturday afternoon to engage with mathematical puzzles, games, and challenges. Quoting the early 2011 library newsletter:

"The library's partnership with John McLoughlin of UNB was so successful in December - Math Games was crowded with people and kids of all ages, right up until closing time – that Professor McLoughlin and his intrepid graduate students will do it again, this time January 29. This session is called Figuring Out Math: Playing with Numbers and Shapes; it will run from 1 to 4 pm on Saturday afternoon. It's a chance to develop an appreciation of the fun side of Mathematics. Families are

particularly encouraged to attend as there will be games and puzzles for everyone from age 7 to 100. We've put Figuring Out Math on the roster to mark Family Literacy Day 2011; it fits the theme perfectly!"

The outreach has been successfully largely due to the cast of volunteers, in particular, B.Ed. students from UNB, as well as Leslie Cockburn, Matt McGuire, and Randi Phillips. Further events are planned. For more information, contact John Grant McLoughlin via email (mathplay@unb.ca) or phone (506) 453-4792.

- John Grant McLoughlin, UNB



A New Brunswick student displays his work

Reports from Recent Events

The following are a few of the many scientific events recently supported by AARMS:

The Sixth East Coast Combinatorial Conference was held at Saint Mary's University April 29-30 and was attended by close to 40 participants from the Atlantic provinces. Invited talks were given by Frank Bennett, Mount Saint Vincent University, Gary MacGillivray, University of Victoria and Matt Walsh of Indiana Purdue University at Fort Wayne. There were also about a dozen contributed talks. Both of the invited speakers from outside the Atlantic provinces spent extra time in the area and either continued or began collaborations with participants.

The second Atlantic Mathematical Biology Workshop was held at the University of New Brunswick in June 2009 with 31 participants. The workshop consisted of 14 short talks and 3 plenary lectures, covering a wide range of topics in mathematical biology. Abstracts for the talks and a list of participants can be found on the workshop website (<http://www.unb.ca/bid/AtMathBio2010>). The topics covered included applications to invasive species, spread in heterogeneous environments, population dynamics and control, honey bees and disease transmission. In the opening plenary talk, Gerda de Vries of the University of Alberta's Centre for Mathematical Biology emphasized the mathematical and experimental similarities

between spatial models in ecology and models for movement at molecular scales. New methods developed for tracking large molecules on a cell surface are analogous to methods used in ecology to track animals and analyze range and habitat use. The second plenary talk, delivered by Andrea Locke of Fisheries and Oceans Canada, gave an informative overview of aquatic invasive species and their impact in Atlantic Canada. The final plenary talk, given by Abba Gumel of the University of Manitoba, covered a mathematical model for the transmission dynamics of chlamydia. Interspersed between the three plenary lectures were many excellent presentations on mathematical and statistical analyses and applications to biological problems.

The CMS Satellite Workshop in Noncommutative Geometry took place on June 7-9, at the Forestry Complex, UNB, Fredericton. The workshop focused on index theory and contained five graduate courses on Local Index Theory in NCG, K-Theory, Baum-Connes Conjecture, Atiyah-Singer Index Theory, and Chern- Galois Character, which were taught respectively by the leading experts in the field who are Henri Moscovici (Ohio State), Max Karoubi (Universite Denis Diderot-Paris VII), Paul Baum (Pennsylvania State), Erik van Erp, (Dartmouth College), and Piotr M. Hajac, (IMPAN/ University of Warsaw). In total we had 15 hours lectures and 9 hours discussions. The workshop attracted quite a number of people such as graduate students and professors from Canada, States, and Europe. We had seven graduate students and more than fifteen professors attending the workshop.

The 38th Canadian Operator Algebra Symposium was held in Fredericton, New Brunswick, on June 7-11, and was attended by 31 people from 3 countries. Seventeen people were from Canada, and the rest were international. The main activity was in the form of talks. The keynote speaker was Paul Baum. There were 9 plenary talks and 15 contributed talks. There were 10 talks by graduate students or postdocs, and all of these were subsidized by the conference. There were 3 female participants, 2 of whom gave talks, and there were minority speakers. Andrew Toms (York) was awarded the Halperin prize.

The 2010 Category Theory "Octoberfest" Workshop was held in the Department of Mathematics and Statistics at Dalhousie University from October 23-24, 2010. It is an annual workshop, traditionally held in October, bringing together researchers in category theory and its applications. This year's workshop was organized by Dorette Pronk and Peter Selinger (Dalhousie). The scientific program consisted of an invited lecture by André Joyal (UQAM), as well as a day and a half of research talks. There was also a special mini-session on categorical models of dependent type theory, consisting of talks by Steve Awodey (CMU), Chris Kapulkin (U.Pittsburgh), Peter LeFanu Lumsdains (Dalhousie, AARMS PDF), and Michael A. Warren (Dalhousie, AARMS PDF). In total, the workshop consisted of 17 talks. The workshop had 30 participants, including 7 graduate students and 5 postdocs.

AARMS Call for Proposals

Our next deadline for submission of proposals will be May 15, 2011

Recent and Upcoming Events

2011 East Coast Combinatorial Conference

Organizers: Nancy Clarke, Jim Diamond
Acadia University, May 4-5, 2011
Contact Nancy Clarke (nancy.clarke@acadiau.ca)

Sage Days at Acadia

Organizers: Eva Curry, Hugh Thomas
Acadia University, May 9-13, 2011
Contact Eva Curry (eva.curry@acadiau.ca)

Black Holes VIII

Organizer: Robert Mann
Niagara Falls, May 10-14, 2011
Contact Robert Mann (rbmann@sciborg.uwaterloo.ca)

W. J. Blundon Seminar

Organizer: Margo Kondratieva
Memorial University, May 19-21, 2011
Contact Margo Kondratieva (mkondra@mun.ca)

Theory Canada 6 and Atlantic General Relativity Meeting

Organizers: Aleksandrs Aleksejevs, Svetlana Barkanova, Rainer Dick, Ivan Booth
Memorial University, Corner Brook, June 10-12, 2011
Contact Aleksandrs Aleksejevs (aaleksejevs@swgc.mun.ca)

CMESG - Annual Conference of Canadian Mathematics Education Study Group

Organizers: Margo Kondratieva and Mary Stordy
Memorial University, Saint John's, June 10-14, 2011
Contact Margo Kondratieva (mkondra@mun.ca)

Canadian Undergraduate Mathematics Conference 2011

Organizers: A. Papillon, A. Deschenes, L. Pelletier, D. Maheux, F. Gourdeau
Laval University, June 15-19, 2011
Contact Dominique Maheux (dominique.maheux.1@ulaval.ca)

23rd Canadian Conference on Computational Geometry

Organizers: Greg Aloupis and David Bremner
Fields Institute, August 9-12, 2011
Contact Greg Aloupis (aloupis.greg@gmail.com)

Polynomial Identities in Algebras II

Organizer: Yuri Bahturin
Memorial University, September 2-6, 2011
Contact Yuri Bahturin (bahturin@mun.ca)

24th Canadian Conference on Computational Geometry

Organizers: Greg Aloupis and David Bremner
Memorial University, August, 2012
Contact Greg Aloupis (aloupis.greg@gmail.com)

Coast to Coast Seminar Series (Winter Theme - Economics)

Marina Adshade (Dal) - Feb 1, 2011
Vijay Vishwakarma (STFX) - Feb 15, 2011
Adam Metzler (Western Ontario) - March 1, 2011
Peter Forsyth (Waterloo) - March 15, 2011
Ramazan Gençay and Daniele Signori (SFU) - March 29, 2011

All Seminars take place at 3:30pm (Atlantic Time). For connection details: (Scott.Wilson@Dal.ca)

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If you think dogs can't count, try putting three dog biscuits in your pocket and then giving Fido only two of them. ~Phil Pastoreta