



**Atlantic Association for
Research in the
Mathematical Sciences**

Annual Report

2009

Preface

AARMS achieved an important milestone in 2009 that places it on a firmer financial footing for at least a few years. AARMS was able to secure the provincial funding that last year was committed conditionally on successful NSERC funding. This provides an additional \$50,000 per year each from the Governments of New Brunswick and Nova Scotia for a five year period. I would like to express my gratitude to Greg Kealey (VP-Research at UNB) and Richard Wood at Dalhousie for their assistance with this effort, and to CRM, Fields and PIMS whose support continues to be a very helpful pivot for such efforts.

An application to obtain the same amount from the Government of Newfoundland and Labrador is presently being prepared for submission to NL's Research Development Corporation, an avenue suggested to AARMS by MUN's VP(R). This proposal seeks both a continuation of Memorial's contribution to AARMS and a new provincial commitment. I am grateful to Hermann Brunner and Sherry Mantyka for their assistance with this application.

On the scientific front AARMS continued with its successful summer school and pdf program, and provided support for eleven activities throughout the region. The season's focus of the Coast to Coast Seminar Series, run in collaboration with IRMACS at SFU, was on Artificial Intelligence. The Summer School will complete its third and final year at UNB in 2010 under the direction of Barry Monson. I am grateful to him for this service to AARMS. Discussions are underway for the next location, which could be Acadia, or Memorial where the School was initiated in 2002.

It is worth noting that in last Fall's pdf competition AARMS received twenty applications, nearly double the number of previous years, with several of very high quality. This is evidence of AARMS' increasing international visibility. The Executive Committee recommended five awards (twice the usual) based on the ranking provided by the Scientific Review Panel. These will be funded partly by the new provincial contributions, which are designated for use within the awarding province.

In closing, I would like to thank David Langstroth once again for his outstanding service to AARMS as administrator, and to the members of the Executive and the Scientific Review Panel for all their work over the past year.

Viqar Husain
AARMS Director
March, 2010

Report on Activities

NSERC MRS Program

On March 24, 2009 AARMS received notice from NSERC that our proposal for funding under the Major Resources Support Program was not approved. Citing a significant reduction in funding for the MRS program NSERC chose to “focus on resources that are unique on a national or international scale.” It also decided to allocate no new funds for resources it considered to be 'regional'. Due to this change in emphasis, which took place well after the start of the competition, AARMS' proposal was not funded.

AARMS launched an appeal to this decision on May 28th. The appeal was based on two grounds: 1) that NSERC changed the rules after the initiation of the competition and failed to provide numerical metrics or other guidelines for distinguishing regional from national or international, and 2) that AARMS is in fact a national and international resource (detailed evidence of this point was included with the appeal). On June 18th NSERC responded to let us know that our appeal was unsuccessful. Since that time a discussion has been initiated between AARMS, BIRS, CRM, Fields and PIMS concerning the future landscape for funding of research in the mathematical sciences in Canada. That discussion is ongoing.

Provincial Funding

One very positive outcome of the NSERC MRS process was the dialogue which was initiated between AARMS and provincial governments in our region. This has led to agreements with the Province of New Brunswick and the Province of Nova Scotia for funding over a five year period. The New Brunswick Department of Post-Secondary Education, Training and Labour has committed \$50,000 per year for five years. The Nova Scotia Government has committed an equivalent amount from the Department of Labour and Workforce Development, the Office of Economic Development and the Department of Education. Conversations about funding with the provinces of Newfoundland and Labrador and Prince Edward Island are in progress or will begin shortly.

AARMS Summer School

The eighth annual AARMS Summer School took place at the University of New Brunswick in Fredericton from Sunday, July 12 to Saturday, August 8, 2009. As usual, four courses at the beginning graduate level were offered:

- **Introduction to Quantum Computing** - David Kribs and Rajesh Pereira (Guelph)
- **Cryptography** - Mike Jacobson (Calgary)
- **Algebraic Topology** - Gustavo Granja (Instituto Superior Técnico, Lisbon)
- **Topological Combinatorics** - Daniel Matei (Romanian Academy, Bucharest)

Altogether, 21 students enrolled in courses, typically two each and each course met 7.5 hours per week, for a total of 30 contact hours. About half the students were from Canadian universities, including three each from UNB and Dalhousie University. Otherwise we had representatives from Mexico, the USA, Switzerland, Turkey and Serbia. A few additional students merely audited courses. This is a reduction from last year's enrollment of 30 students and we will be addressing the need to increase enrollment in 2010.

The ninth annual Summer School will run July 13 to August 7, 2010 at UNB in Fredericton. We be offering the following courses:

- **Biostatistics** - Christian Boudreau (Waterloo) and June Lim (Saskatchewan)
- **Noncommutative Geometry** - Masoud Khalkhali, (UWO)
- **Noncommutative Algebraic Geometry** - Michael Wemyss (Oxford)
- **Riemannian Geometry** - Eric Woolgar (Alberta)

AARMS Postdoctoral Fellowship Program

In the 2009 competition, two Postdoctoral Fellowships were awarded: Evgeny Chibrikov, who received his PhD at Novosibirsk State University (Russia) took up his fellowship at Memorial University under the Supervision of Yuri Bahturin; and Alin Ciuperca (Phd – University of Toronto) took up his fellowship at the University of New Brunswick (Fredericton) under the supervision of Andrew Dean and Dan Kucerovsky. Daniel Horsley's Fellowship at Memorial University was renewed for a second year, following a positive interim report by his supervisor, David Pike.

AARMS Distinguished Lecturer

In the summer of 2009 AARMS welcomed the visit of Hans-Jürgen Schneider from the University of Stuttgart (Germany) as part of our Distinguished Lecturer Series. Dr. Schneider visited Memorial University, giving two different talks on Hopf Algebras and Root Systems. He also presented a seminar at Dalhousie and Saint Mary's Universities on Nichols Algebras and a talk on “New Developments in the Theory of Pointed Hopf Algebras” at Mount Allison University.

Scientific Activities

The following conferences, workshops and scientific activities were funded or co-funded by AARMS in 2008:

- **APICS Math/Stats/CS conference 2009**
Local Organizers: David Iron, Richard Nowakowski, Art Sedgewick
Location: Dalhousie University
Date: October 23-25, 2009
- **Bluenose Numerical Analysis Days 2009**
Local Organizers: Ronald Haynes, Richard Karsten, Paul Muir, Patrick Keast
Location: Acadia University
Date: July 10, 2009
- **International Conference on Nielsen Theory**
Local Organizer: Philip Heath
Location: Memorial University, St. John's
Date: June 9-13, 2009
- **Mathematics Education: special session, CMS summer meeting**
Organizer: Sherry Mantyka
Location: Memorial University, St. John's
Date: June 6-8, 2009
- **Graph Searching: special session, CMS summer meeting**
Organizer: Anthony Bonato
Location: Memorial University, St. John's
Date: June 6-8, 2009
- **International Workshop/Special session of 2009 Summer CMS meeting: Groups and Hopf Algebras**
Local Organizer: Atlantic Algebra Centre
Location: Memorial University, St. John's
Date: June 3-8, 2009
- **Theory Canada 5**
Local Organizer: Viqar Husain
Location: University of New Brunswick, Fredericton
Date: June 3-6, 2009
- **Fifth Annual East Coast Combinatorics Conference**
Organizer: Tim Alderson
Location: University of New Brunswick, St. John
Date: April 30 - May 1, 2009
- **Workshop on Mathematical Biology**
Organizers: James Watmough, Sina Adl
Location: Dalhousie University, Halifax
Date: April 27, 2009

- **Atlantic General Relativity Meeting**
Organizers: Jack Gegenberg, Viqar Husain
Location: University of New Brunswick, Fredericton
Date: April 25-26, 2009
- **Combinatorial Algebra Meets Algebraic Combinatorics: Sixth Annual Meeting**
Organizers: Yur Bahturin, Nantel Bergeron, Sara Faridi, Tony Geramita, Mikhail Kotchetov
Location: Memorial University, St. John's
Date: January 16-18, 2009

In addition to the above conferences and workshops, AARMS was pleased to participate in the MITACS annual meeting held at Fredericton May 31- June 5, 2009 by supporting the AARMS-MITACS public lecture. AARMS also provided support for the New Brunswick Grade 12 Mathematics Examination Workshop Project, led by Maureen Tingley, which was active throughout 2009.

AARMS Collaborative Groups

In 2009 there was one active AARMS-sponsored collaborative group, the Atlantic Algebra Centre (AAC) at Memorial University under the direction of Yuri Bahturin. As well as organizing the Groups and Hopf Algebras Meeting, the Combinatorial Algebra Meeting and the visit of the AARMS Distinguished Lecturer (all described above), the AAC organized the following events:

- AAC mini course “Algebraic Coding Theory” by Professor Sergio R. Lopez-Permouth, Ohio University, USA, March 30 - April 4, 2009
- AAC mini course “Composition Algebras and Their Gradings” by Professor Alberto Elduque, University of Zaragoza, Spain, May 3 - 9, 2009
- AAC mini course “Representations of finite-dimensional associative algebras” by Professor Vlastimil Dlab, Carleton University, Ottawa, October 4—10, 2009
- AAC Undergraduate Algebra Competition, March 3 -10, 2009
- AAC Colloquium Talk "Group Algebras in Coding Theory" by Professor Cesar Polcino Milies, University of Sao Paulo, Brazil, May 29, 2009

It is our intention to expand the collaborative group program in the near future.



Income and Expenditure Account 2009

<u>Income</u> ¹	\$	\$	<u>2008</u>
Carried forward from previous year		55,657	38,631
Mathematical Institutes		90,000	90,000
Universities		115,000	122,000
Provinces		100,000	-
Other Revenue (1)		9,410	10,662
		<hr/>	<hr/>
Total Income		370,067	261,293
 <u>Expenditure</u>			
Summer School			
Instructors (2)	32,145		30,109
Students (3)	21,901		31,024
Other (4)	10,055		10,227
	<hr/>		<hr/>
	64,101	64,101	71,360
Workshops and Events (5)		74,613	51,718
PDF Program (6)		43,750	59,165
Distinguished Lecturer Series		2,500	-
Book Series		1,934	217
Administrator Salary		15,813	18,385
AARMS Online system development		7,822	
Travel		4,113	352
Office Expenses		2,753	4,438
		<hr/>	<hr/>
Total Expenditure		217,400	205,636
		<hr/> <hr/>	<hr/> <hr/>
Surplus: Income Less Expenditure		152,667.54	55,657

Notes

1. For a breakdown see Appendix 1
2. Travel, Accommodation and stipends of \$5,000 each
3. Residence and Meals
4. Texts and course materials, promotion, secretarial, computing , hospitality and Director's stipend
5. See Appendix 2
6. See Appendix 3



Balance Sheet

31/12/2009

Assets

	\$	\$
Surplus from Operations (Income less expenditure)		152,668
Accounts Receivable ¹		
CRM	30,000	
Fields	30,000	
PIMS	30,000	
MITACS	5,000	
Acadia	5,000	
Cape Breton	1,000	
Dalhousie	30,000	
Memorial	30,000	
Moncton	1,000	
Mount Allison	1,000	
Saint Francis Xavier	1,000	
Saint Mary's	1,000	
UNB	30,000	
UPEI	1,000	
Province of Nova Scotia	50,000	
Province of New Brunswick	50,000	
	<u>296,000</u>	
Total Assets		448,668

Liabilities

Accounts Payable ²		
Summer School	70,000	
Postdoctoral Fellowships	87,500	
Scientific Activities ³	73,340	
AARMS Book Series	5,000	
Administrator Salary ⁴	27,500	
Administrator Bonus 2009	4,000	
Distinguished Lecturers	2,500	
AARMS Poster	2,000	
Travel and Office expenses	10,000	
	<u>281,840</u>	
Unallocated funds - for AARMS activities		<u>166,828</u>
Total Liabilities		448,668

Notes

1. Fees due to be collected in 2010
2. Funding Commitments in 2010
3. Workshops, Conferences, Meetings, Atlantic Algebra Centre
4. Pending Board Approval



Annual Accounts 2009

Appendix 1

Revenue Breakdown

Mathematical Institutes		
CRM	37,500	
Fields	22,500	
PIMS	30,000	
	<hr/>	90,000
Universities		
Acadia	5,000	
Cape Breton	1,000	
Dalhousie	30,000	
Memorial	37,500	
Moncton	0	
Mount Allison	1,000	
Saint Francis Xavier	1,000	
Saint Mary's	1,000	
UNB	37,500	
UPEI	1,000	
	<hr/>	115,000
Other Revenue		
MITACS (for summer school)	5,000	
UNB VP (for summer school)	250	
Adjustment to 2008 SS accounts	4120	
Sales of Bonato Book	40	
	<hr/>	9,410
total		214,410



Annual Accounts 2009

Appendix 2

Workshops and Scientific Events

APICS 2008 in Moncton	2,650
East Coast Combinatorial Conference 2008	2,982
Combinatorial Algebra meets Algebraic Combinatorics	5,249
Centre for Operator Algebra at UNB	6,283
Cdn Hopf Algebras and noncommutative Geometry Meeting	8,077
Atlantic General Relativity Conference	1,315
Groups, Rings, Lie and Hopf Algebras	5,000
Workshop on Mathematical Biology	3,000
Theory Canada V Conference	2,994
East Coast Combinatorial Conference 2009	3,614
CMS Summer meeting: Special session on Math Education	4,282
Bluenose Numerical Analysis Day	568
Nielsen Theory Conference	11,000
ASCI project	6,599
Atlantic Algebra Centre	11,000

total

74,613

Appendix 3

Postdoctoral Fellowships

AARMS Director's PDF	17,500
Daniel Horsley	8,750
Rebecca Hammond	8,750
Alin Ciuperca	8,750

total

43,750