Two Years of the Atlantic Algebra Centre

Atlantic Algebra Centre (AAC) came to existence on September 1, 2006. Since then AAC organized two International Workshops attended by 60 participants, including renowned specialists from 12 countries, four minicourses by prominent professors from Israel, United Kingdom, Germany, and Argentina. In addition to our Algebra Seminar, we maintained a series of AAC Colloquiums talks given by our visitors, including our colleagues from the universities of Atlantic Canada. Our visitors gave several Distinguished Colloquium Talks at Department of Mathematics and Statistics of Memorial University. AAC supported the research work of two postdoctoral fellows and three graduate students and organized two Undergraduate Algebra Competitions for the students of the universities of Atlantic Canada. The Proceedings of our first International workshop will appear in the Journal "Acta Applicandae Matematicae".

Our objectives and governance

The main objective of the Atlantic Algebra Centre (AAC) is the promotion of the research and study in Algebra and its applications at participating universities of Atlantic Canada. At its start, AAC enjoys the support of the Atlantic Association for Research in the Mathematical Sciences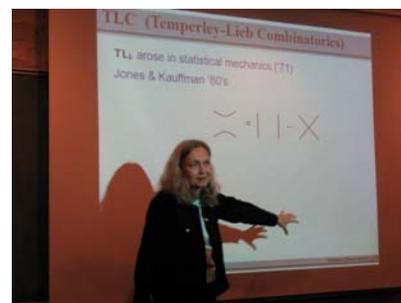 (AARMS) and Memorial University of Newfoundland (MUN). Algebra traditionally has been a strong point at the Department of Mathematics and Statistics of MUN. The algebraists of MUN maintain strong ties with their research colleagues at various universities of Canada and throughout the world. Our Advisory Board includes Yuri Manin (Max Planck Institute and Northwestern University), Sudarshan Sehgal (University of Alberta), and Efim Zelmanov (University of San Diego). AAC is governed by the Board of Directors, currently: Yuri Bahturin (Coordinator), Edgar Goodaire, Mike Parmenter, and Yiqiang Zhou. Core members of AAC include Eddy Campbell and Mikhail Kochetov.

October 2006: visit by Director of Fields Institute Barbara Keyfitz

International Workshops

Graded Algebras & Superalgebras
August 29 - September 2, 2008

The conference was held at Memorial University of Newfoundland in St. John's, Newfoundland. The total number of participants was 25, from 10 different countries. The two-lecture series were delivered by prominent people in the entitled areas: Georgia Benkart (University of Wisconsin-Madison, USA), Vesselin Drensky (Bulgarian Academy of Sciences), Dimitry Leites (University of Stockholm, Sweden) and Ivan Shestakov (University of Sao Paulo, Brazil).

The opening lecture of the workshop by Georgia Benkart

Titles of talks

Eli Aljadeff
Technion, Israel
On G-fine gradings on matrix algebras and their polynomial identities

Georgia Benkart
University of Wisconsin - Madison, USA
1. Weyl-like algebras and their modules
2. Centralizers of Groups of Matrices

Matej Bresar
University of Maribor, Slovenia
Functional identities and their application
to graded algebras

Eddy Campbell and Jianjun Chuai
Memorial University of Newfoundland
Invariant Theory for Sub-representations

Deanna Caveney
College of Charleston, USA
Universal Imbeddings of Jordan systems
into graded Lie algebras

Participants of "Graded Algebras and Superalgebras" after Gatherall's Whale and
Puffin Boat Tour in Bay Bulls, NL

Cristina Draper
University of Malaga, Spain
Some features and techniques on the gradings on exceptional Lie algebras

Vesselin Drensky
Bulgarian Academy of Sciences
1. Computing with multiple symmetric functions and
   graded cocharacters of graded PI-algebras
2. Graded algebra structure of the centralizer of a matrix

Alberto Elduque
University of Zaragoza, Spain
Gradings on composition algebras

Mikhail Kochetov
Memorial University of Newfoundland
Formal group actions and gradings by p-groups
in characteristic p

Pitcher plant, one of the symbols of Newfoundland

Plamen Koshlukov
University of Campinas, Brazil
Identities in graded tensor products
of PI algebras

Dimitry Leites
Stockholm University, Sweden, also ASSMS, HEC, Lahore
1. Classification of simple finite dimensional modular Lie superalgebras with Cartan matrix
2. Towards classification of simple finite dimensional modular Lie superalgebras

Jason McGraw
Memorial University of Newfoundland
Gradings on simple Lie algebras of Cartan type

Vincenzo Nardozza
University of Bari, Italy
Graded algebras and tensor product theorems

Michael Natapov
Indiana University - Bloomington, USA
On graded polynomial identities of matrices

Erhard Neher
University of Ottawa
Universal central extensions of graded Lie algebras

Ivan Shestakov
University of Sao Paulo, Brazil
1. The Coordinatization Theorem for Jordan Algebras and Superalgebras
2. The skew-symmetric identities of octonions

Oleg Smirnov
College of Charleston, USA
On Classification of simple Kantor pairs

Marina Tvalavadze
University of Saskatchewan
On varieties parameterizing graded complex
Lie algebras

Yoji Yoshii
Akita National College of Technology, Japan
Locally affine root systems and locally affine Lie algebras

Groups, Rings, Lie and Hopf Algebras. II
August 13-17, 2007

The workshop was held at the Bonne Bay Marine Station
on Newfoundland's West Coast, which is surrounded by
Gros Morne National Park. There were 34 participants
from five countries. One-hour plenary talks were given by
Eric Jespers (Free University of Brussels), Mikhail
Kotchetov (MUN), Michael Lau (University of Windsor),

Bonne Bay Marine Station of MUN in Norris Point, NL

Dmitry Nikshych (University of New Hampshire), Erhard Neher (University of Ottawa), David Radford (University of Illinois, Chicago), Sudarshan Sehgal (University of Alberta), and Vera Serganova (University of California, Berkeley).

Titles of talks

Yuri Bahturin
Memorial University of Newfoundland.
Some thoughts on the gradings of simple Lie and Jordan algebras

Margaret Beattie
Mount Allison University.
Co-Frobenius Hopf Algebras

Group picture on the Western Brook Pond's boat tour

Ivan Dimitrov
Queens University
Cup Product on Homogeneous Varieties and Generalized PRV Components

Allen Herman
University of Regina
Equivalence of Central Simple G-algebras

Kris Janssen
Free University of Brussels
Group Corings

Eric Jespers
Free University of Brussels
Primes of Height One and a Class of Noetherian
Finitely Presented Algebras

Yevgenia Kashina
DePaul University
Groups of Grouplike Elements of a Semisimple
Hopf Algebra and its Dual

Mikhail Kochetov
Memorial University of Newfoundland
Group gradings on simple Lie algebras

Michael Lau
University of Windsor
Thin Coverings of Modules

Yuanlin Li
Brock University
Strongly Clean Matrix Rings

Mitja Mastnak
University of Waterloo
Bialgebra Cohomology, Pointed Hopf Algebras,
and Deformations

Erhard Neher
University of Ottawa
Lie Tori

Dmitry Nikshych
University of New Hampshire
Modular Categories, Their Group-Theoretical Properties, and Categorification of Manin Pairs

Mike Parmenter
Memorial University of Newfoundland
Group Gradings and Graded Reversibility in Integral Group Rings

Kenneth Price
University of Wisconsin
A Domain Test for Lie Color Algebras

David Radford
University of Illinois
Pointed Hopf algebras from enveloping algebras to quantum groups and beyond

Sudarshan Sehgal
University of Alberta
Hartleys conjecture and problems arising therefrom

Vera Serganova
University of California
On weight representations of sl(n) (joint work with D. Grantcharov)

Western Brook Pond, NL

Marina Tvalavadze
University of Western Ontario
Group gradings on superalgebras (joint work with T. Tvalavadze)

Teymuraz Tvalavadze
Carleton University
Representations of toroidal Lie algebras and superalgebras

Joost Vercruysse
Free University of Brussels
On Generalizations of Hopf-Galois Theory: A Unifying Approach

Xiande Yang
Memorial University of Newfoundland
On Strongly Clean Matrix Rings

Mikhail Zaicev
Moscow State University
Numerical invariants of algebras with polynomial identities

Alexandre Zalesski
University of East Anglia
On eigenvalues of groups elements in representations of simple algebraic groups

AAC Mini Courses

The fourth mini course was given by Professor Nicolás Andruskiewitsch from the University of Cordoba, Argentina. He visited Atlantic Algebra Centre from May 17 to May 24, 2008. The title of the mini course was *Introduction to Pointed Hopf Algebras.*

Nicolás Andruskiewitsch in Flat Rock, NL

The third mini course was given by Professor Otto Kegel from Freiburg University, Germany. He visited the Atlantic Algebra Centre from October 10 to October 16, 2007. The title of the mini course was *Constricted Symmetric Groups and Some Derivates.*
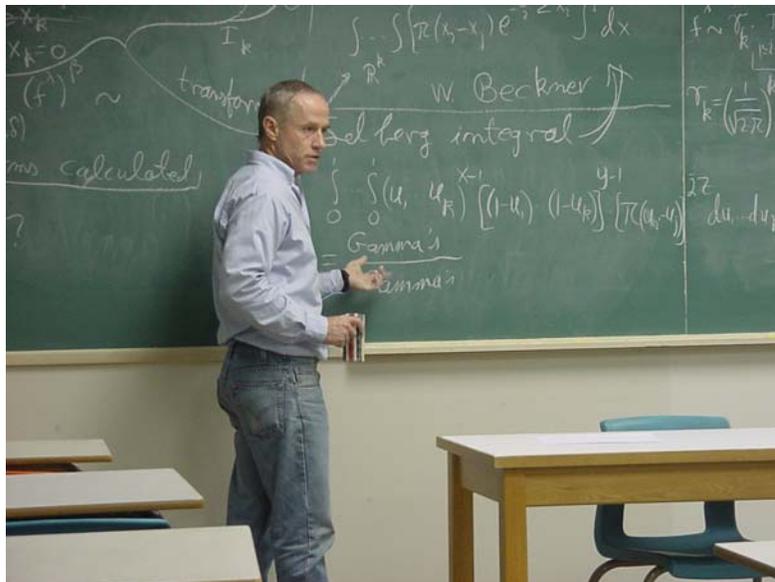

Yuri Bahturin, Ros English, and Otto Kegel after mini course lectures and before… Halloween

The second mini course was given by Professor Alexander Premet from the University of Manchester, UK. He visited the Atlantic Algebra Centre from May 19 to May 27, 2007. The title of the mini course was *Coadjoint Action of Algebraic Groups and Modular Representation Theory.*

A group of participants of the mini course by Alexander Premet (second right) received by the Head of Department of Mathematics and Statistics Chris Radford (first right)

The first mini course was given by Professor Amitai Regev from Weizmann Institute of Science, Israel. He visited the Atlantic Algebra Centre from September 26 to October 6, 2006. The title of the mini course was *Representation of the Symmetric Group and Related Topics of Analysis and Combinatorics.*

The last lecture of the mini course by Amitai Regev

AAC Colloquium Series

Alexander Zalesski
in Middle Cove, NL

On May 21, 2008, an AAC Colloquium Talk *Hopf Algebras: from Hyperalgebras to Quantum Groups* was given by Professor Nicolas Andruskiewitsch of University of Cordoba, Argentina.

On November 2, 2007, an AAC Colloquium Talk *Counting Factorizations of Permutations into Star Transpositions* was given by Professor John Irving of St. Marys University.

On August 20, 2007, an AAC Colloquium Talk *Hurwitz groups: The classification problem* was given by Professor Alexandre Zalesski of University of East Anglia, UK .

Our second mini course lecturer Professor Alexander Premet gave a talk *Classification of the finite-dimensional simple Lie algebras of characteristic p>3* in the Distinguished Colloquium Series of the Department of Mathematics and Statistics of Memorial University of Newfoundland on May 23, 2007.

On February 22, 2007, an AAC Colloquium Talk *Classical Invariant Theory Revisited* was given by Professor Roman Smirnov of Dalhousie University. He was visiting us from February 21 to February 23, 2007.

Our Atlantic Algebra colleague, Professor Margaret Beattie of Mount Allison University visited AAC from November 29 to December 2, 2006. On November 30 she gave a talk *Coalgebras and Bilinear Forms* in our AAC Colloquium Series.

From October 27 November 6, 2006, we had a visitor, Professor Vladislav Kharchenko of UNAM (National University of Mexico). He gave a Departmental Colloquium talk **Lie algebras and their generalizations** on November 1, 2006.

On October 4, 2006 our first mini course speaker Amitai Regev gave a Distinguished Colloquium Talk under the title **On asymptotic growth in PI algebras.**

Algebra Seminar

The general classification problem for Hopf algebras,
Margaret Beattie, Mount Allison University, May 20, 2008

Group gradings on algebras of finitary linear transformations,
Yuri Bahturin, MUN, January 30, 2008.

Simple Lie algebras over a field of positive characteristic II,
Jason McGraw, MUN, January 23, 2008.

Simple Lie algebras over a field of positive Characteristic,.
Jason McGraw, MUN, November 28, 2007.

Modules of covariants of a finite linear group,
Jianjun Chuai,MUN, October 31, 2007.

Classification of semisimple Hopf algebras,
Yevgenia Kashina, DePaul University, August 8, 2007

Quasi-morphic Rings,
Keith Nicholson, University of Calgary, August 6, 2007

Group gradings on superinvolution simple superalgebras,
Marina Tvalavadze MUN, May 29,2007.

Normal Complements and the Number Two,
Heather McIntosh MUN, April 25, 2007

The isomorphism theorem for simple algebraic groups,
Jason McGraw MUN, April 18, 2007

Classical invariant theory revisited,
Roman Smirnov Dalhousie, February 22, 2007

A theorem on unit regular rings,
Yiqiang Zhou MUN, February 15, 2007

Reversible and graded reversible group rings,
Mike Parmenter MUN, February 7, 2007

Strongly clean matrices,
Xiande Yang MUN, December 6, 2006

Coalgebras and bilinear forms,
Margaret Beattie Mount Allison, November 30, 2006

On Burnside problems,
Yuri Bahturin MUN, November 22, 2006

Margaret Beattie iceberg watching with Mikhail Kochetov during one of her many visits to the AAC

Roman Smirnov after his AAC Colloquium talk in stormy Middle Cove, NL

Group gradings and actions of Hopf algebras,
Mikhail Kochetov MUN, November 15, 2006

Lie algebras and their generalizations,
Vladislav Kharchenko, UNAM, November 1, 2006

Braided version of Shirshov-Witt theorem,
Vladislav Kharchenko UNAM, October 30, 2006

Finite-dimensional theory of Jordan algebras
and superalgebras,
Marina Tvalavadze, MUN, October 12, 2006

On asymptotic growth in PI-algebras,
Amitai Regev Weizmann Institute, October 4, 2006

Gradings of D_4,
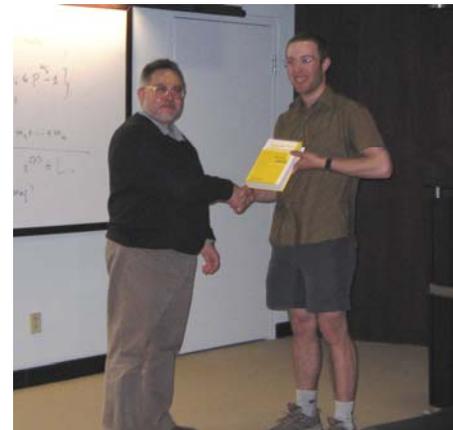Jason McGraw MUN, September 20, 2006

Professor Kharchenko and his wife in Flat Rock, NL

Undergraduate Algebra Competition

The Atlantic Algebra Centre invited all undergraduate students from universities of Atlantic Canada to partici-pate in the second Undergraduate Algebra Competition this past winter. The first Undergraduate Algebra Competition was held in winter 2007.

The winner of the first Undergraduate Algebra Competition was **Andrew Stewart** from the *Memorial University of Newfoundland.* The winner of the second Undergraduate Algebra Competition was **Matthew Fiset** from the *University of New Brunswick.*

Professor Premet awarding the book prize to Andrew Stewart, the winner of the first AAC Undergraduate Algebra Competition

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