AARMS

Atlantic Association for Research in the Mathematical Sciences

Annual Report

2024-25

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AARMS
Atlantic Association for Research in the Mathematical Sciences

2024/25 Annual Report

Table of Contents

1 Director's Message

This annual report provides many details on the work in our community. Here are a few highlights.

Two new collaborative research groups (CRG) were initiated following the summer 2025 competition. Ronald Haynes is leading the Advanced Simulation of Mathematical Models with Data Assimilation and Amy Hurford is leading the Atlantic Canada Center for Disease Ecology Modelling (ACCDMi). A report on the previous round of CRGs appears in section 3.1. These three CRGs supported an impressive array of activities from online seminars, conference sessions, workshops and numerous publications. More than 30 HQP were partially supported by these projects.

AARMS provided partial support for four continuing and four new post-doctoral fellows. AARMS support increased to $32,500 plus a travel allowance of $1500 for each PDF. You can read more about these accomplished scholars in section 3.2.

AARMS supported the Atlantic Topological Quantum Field Theory meeting at MUN and the IDMS (Increasing Diversity in Mathematical Sciences) workshop on Quantitative Molecular and Cellular Biology at the University of Manitoba (jointly with the other Canadian Mathematics Institutes.) We continue to sponsor the Simons Laufer Mathematical Sciences Institute Summer Schools and sent four students from Atlantic Canada to workshops organized by this Institute. Thirty-four workshops, conferences, and seminars (in-person and online) operated with AARMS support. Outreach continues to be an important part of our work, with ten year-long and individual activities across Atlantic Canada (see section 3.5 for details).

All of the activities were led by the excellent network of researchers who create the programming that AARMS supports. I am grateful for their creativity and enthusiasm for this important work.

Andrew Irwin
AARMS Director
October 2025

2 Report on Funding

The year we received the third installment of our 5-year NSERC Discovery Institutes Support Grant. We continue to receive support from AARMS Member Universities. An application was made in Fall 2024 to the Simons Foundation for a grant of $745k over three years but was not successful.

3 Report on Activities

3.1 AARMS Collaborative Research Groups (CRGs) Program

AARMS supported 3 Collaborative Research Groups in the 2024/25 academic year. Highlights from the reports from these groups are included below.

3.1.1 Advances in Statistical Modeling of Fisheries Data

3.1.1.1 Members

Academic Administrator: Asokan Mulayath Variyath, Memorial University

Researchers from AARMS Member Universities:

- Dr. Alwell Oyet, Professor of Statistics, Memorial University
- Dr. Tariq Hasan, University of New Brunswick
- Dr. Gary Sneddon, Mount Saint Vincent University
- Dr. Zhaozhi Fan, Memorial University
- Dr. Nan Zhang, Memorial University
- Dr. Rafiqul Chowdhury, Cape Breton University
- Dr. Asokan Mulayath Variyath, Memorial University
- Dr Hamid Hatefi, Memorial University
- Dr Jahrul Alam, Memorial University
- Dr. Kunasekaran Nirmakanna, Memorial University
- Dr. Noel Cardigan, Memorial University
- Dr. Hensely Hubert Mariathas, Memorial University

Other CRG Members:

- Dr. Divya Varkey, DFO

- Dr. Rajeev Kumar, DFOl
- Dr. Paul Regular, DFO
- Dr. Cameron Ainsworth, University of South Florida
- Dr. T.V. Sathianandan, Amrita Institute of Medical Sciences, India
- Dr. Eldho Varghese, Central Marine Fisheries Research Institute, India

3.1.1.2 Activities

Annual Meeting of CRG Members at Memorial University
The annual meeting of the CRG members (hybrid) was held on 17 July 2025 at Memorial University. More than 6 CRG members along with their students attended in person and several other members joined online. The research presentation session was chaired by Dr. Zhaozhi Fan and included 5 research presentations.

1. Recent and future advancements in assessment methodology for data-rich stocks by Noel G. Cadigan
2. Accounting for Movement in Spatial Surplus Production Models by Nan Zheng
3. Simulating Trawl Surveys by Length: A Hybrid Approach for Realistic Survey Sampling in SimSurvey by Kathleen Rebecca Donally
4. Marine Fish Landings in India: Data Collection and Estimation Framework by Eldho Varghese
5. Construction of Confidence Intervals when Data Contains Many Zeros: An Application to Fishery Trawl Surveys by Asokan Mulayath Variyath

Organization of SSC Annual Meeting Invited Session
An invited session was planned and organized to discuss new research in the area of non-linear mixed effect models in fisheries data analysis at the annual meeting of the Statistical Society of Canada 2025. Title of the Session: Statistical inference for nonlinear mixed-effects models in fisheries and ecological studies. Date: 27 May 2025

- Jonathan Babyn and Noel G. Cadigan - One-step ahead Forecast Residuals and Deletion Diagnostics for State-Space Assessment Models /
- Nan Zheng, Noel G. Cadigan and James T. Thorson - A Unified Theory for Conditional Akaike Information in Nonlinear Mixed-Effects Models
- Shajitha Shahul Hameed, Noel G.Cadigan andNan Zheng - Hidden Markov models with serial correlation for identifying stock-recruitment regime shifts

Seminar Series on Advances in Fisheries Data Analysis
A monthly series of seminars was organized online to disseminate the knowledge on various statistical analysis employed in fisheries data. A total of 7 seminars were conducted over the 2024-2025 academic year and various topics were discussed. Attendance for these seminars ranged from 20-30 participants. These seminars helped the CRG members on advances in statistical analysis in fisheries data and led to discussions on potential future research work.

Student Support:
Six graduate students were supported partially to undertake research.

Scientific Outcomes:
During this period the following conference presentations were reported:

- Construction of Confidence Intervals when Data Contains Many Zeros: An Application to Fishery Trawl Surveys by Asokan Mulayath Variyath at Symposium on Foundations of Statistical Science, Kunming, China 25-26 July 2025.

Seven theses and project reports were evaluated as part of the graduate program.

Additional works are ongoing, including preparation of two technical papers with plans to submit for publications. More work is being conducted with a great deal of potential for further publications.

3.1.2 Applications of Commutative Algebra

3.1.2.1 Members

Academic Administrator: Sara Faridi (Dalhousie University)

Researchers from AARMS Member Universities:

- Sara Faridi, Dalhousie University
- Dharm Veer, Dalhousie University

Other CRG Members:

- Susan Cooper, University of Manitoba
- Adam Van Tuyl, McMaster University
- Thai Nguyen, McMaster University

- Emanuela Maragone (Manitoba)
- Sasha Zotine (McMaster)

3.1.2.2 Activities

The CRG started a virtual seminar “Combinatorial Commutative Algebra in Canada” in 2023 which was very well attended. This seminar fills a gap in the research field, since people who work in this area are scattered around the world, and there is no seminar series which is dedicated to the developments in this field. This well subscribed seminar featured the following talks during its second season

- Selvi Kara, Assistant Professor, Bryn Mawr College. Title: Degree of h-polynomials of edge ideals
- Naoki Terai, Professor, Okayama University. Title: The local cohomology modules of Stanley–Reisner rings with low codimension
- Hop Nguyen, Tenured Researcher, Vietnam Academy of Science and Technology. Title: Asymptotic depth of invariant chains of edge ideals
- Amir Mafi, Professor, University of Kurdistan. Title: Polymatroidal ideals
- Somayeh Moradi, Associate Professor, Ilam University. Title: Ideals with (componentwise) linear powers
- Kamalesh Saha, Post-Doc Fellow, Chennai Mathematical Institute. Title: Current trends on the v-number
- Susan Morey, Professor, Texas State University. Title: Hilbert series of edge ideals, property P, and f-vectors

The CRG also organized or supported the following conferences and schools in 2024-2025:

- CRG member Sara Faridi co-organized a session at the “Mathematical Congress of the Americas” 2025 edition in Florida, and Susan Cooper, Thiago Holleben and collaborators attended and gave talks.
- Seminaire de Mathématiques Supérieures (SMS) 2025: An Introduction to Recent Trends in Commutative Algebra. Organized by: Sergio Da Silva (Virginia State), Federico Galetto (Cleveland State), Elena Guardo (Catania), Megumi Harada (McMaster), Patricia Klein (Texas A&M), Jenna Rajchgot (Mc□Master), Adam Van Tuyl (McMaster); CRG Instructor: Sara Faridi (Dalhousie). Fields Institute, Toronto,ON, Canada, June 2-13, 2025.

- Combinatorial Commutative Algebra meets Algebraic Combinatorics Organizers: S. Faridi, Selvi Kara, Rosa Orellana, Greg Smith, Mike Zabrocki, Toronto, Jan 24-26, 2025

Collaborations Developed over the Past Two Years

Over the past two years, the CRG has resulted in a number of new and ongoing collaborations. For example, Van Tuyl and Faridi had never worked together on a research project prior to this CRG. This CRG has also enabled Cooper (Manitoba) and Van Tuyl (McMaster) to work with PhD student Holleben (Dalhousie), and with post-doc Maragone (Manitoba) on a different project. Cooper and Faridi also used some of the resources provided by the CRG to cosupervise PhD student Hasan Mahmood, who has made excellent contributions to a multiyear project that Cooper, Faridi, and others have been collaborating on. Cooper and Faridi were able to continue their collaborations with El Khoury (American Univeristy, Beruit), Mayes-Tang (Toronto), Morey (Texas State), Sega (Missouri), and Spiroff (Mississippi). Additonally, all the principal organizers were able to work with Lisa Nicklasson (Malardalen University) an up-and-coming expert on Lefschetz properties.

Collaborations Among CRG Members

- Spheres and balls as independence complexes. S. M. Cooper, S. Faridi, T. Holleben, L. Nicklasson, A. Van Tuyl, Preprint (2025) arXiv:2503.18490.
- 2. Simplicial Resolutions of the Quadratic Power of Monomial Ideals. S. M. Cooper, S. Faridi, H. Mahmood, Preprint (2025) arXiv:2505.06751 .
- 3. The weak Lefschetz property of whiskered graphs, Susan M. Cooper, Sara Faridi, Thiago Holleben, Lisa Nick□lasson, Adam Van Tuyl, Lefschetz Properties: Current and New Directions, Springer INdAM series (2024), 97-110.
- 4. Simplicial resolutions of powers of square-free monomial ideals, Susan M. Cooper, Sabine El Khoury, Sara Faridi, Sarah Mayes-Tang, Susan Morey, Liana M. Sega, Sandra Spiroff, Algebraic Combinatorics, Volume 7 (2024) no. 1, pp. 77-107.
- 5. D-Extremal ideals, Susan M. Cooper, Sabine El Khoury, Sara Faridi, Susan Morey, Liana M. Sega, Sandra Spiroff, in progress.

3.1.3 Games & Graph Searching in Atlantic Canada

3.1.3.1 Members

Academic Administrator: Danielle Cox, Mount Saint Vincent University

CRG Steering Committee Members:
Dr. Danielle Cox, Mount Saint Vincent University, NS (Primary Applicant), Chair
Dr. Melissa Huggan, Vancouver Island University, BC (adjunct Memorial University of NL)
Dr. Svenja Huntemann, Mount Saint Vincent University, NS, Co-chair
Dr. Shannon Fitzpatrick, University of Prince Edward Island, PEI
Dr. Rebecca Milley, Memorial University of Newfoundland Grenfell Campus, NL

Additional CRG Members
Dr. Andrea Burgess, University of New Brunswick Saint John, NB
Dr. Nancy Clarke, Acadia University, NS
Dr. Danny Dyer, Memorial University of Newfoundland, NL
Dr. Stephen Finbow, St. Francis Xavier University, NS
Dr. Margaret-Ellen Messinger, Mount Allison University, NB

National Collaborators:
Dr. David Pike, Memorial University of Newfoundland, NL
Dr. Iain Beaton, Acadia University, NS
Dr. Art Finbow, Saint Mary's University, NS
Dr. Richard Nowakowski, Dalhousie University, NS
Dr. Jeannette Janssen, Dalhousie University, NS
Dr. Gena Hahn, Université de Montréal, QC
Dr. Ben Seamone, Dawson College, QC
Dr. Pawel Pralat, Toronto Metropolitan University, ON
Dr. Karen Gunderson, University of Manitoba, MB
Dr. Gary MacGillivray, University of Victoria, BC

International Collaborators:
Dr. Kyle Burke, Florida Southern College, Florida, USA
Dr. Oznur Yasar Diner, Kadir Has University, Istanbul, Turkey
Dr. Jessica Enright, University of Glasgow, Dept of Computing Science, Glasgow, Scotland
Dr. Michael Fisher, West Chester University, Pennsylvania, USA
Dr. Bill Kinnersley, Rhode Island University, South Kingstown, USA
Dr. Kerry Ojakian, The City University of New York, New York, USA
Dr. Craig Tennenhouse, University of New England, Maine, USA

3.1.3.2 Activities

In the 2024-2025 year the GGSAC was very active running seminars and hosting research meetings, and had great success in supporting HQP at the high school, undergraduate and graduate level. The CRG also forged many new collaborations which will result in an advancement in the field.

Online Seminars
The Atlantic Graph Theory Seminar was organized by international collaborator, Dr. Jeannette Janssen. There were 17 speakers from September 2024 to February 2025. The speakers ranged from undergraduate students to well-established researchers, national and international.

The Virtual Combinatorial Games Seminar was a monthly online seminar organized by steering committee members Melissa Huggan and Svenja Huntemann and collaborator Richard Nowakowski. From September 2024 to May 2025 there were seven main speakers, including undergraduate and graduate students, faculty members, and industry researchers, from Canada, the USA, and Europe.

Winter GSAC research meeting
The 2025 Virtual GGSAC Winter Research Meeting was held over two weeks in March: invited talks were given on March 13th and 20th, student lightning talks were given on March 20th, and breakout sessions occurred on March 15th and 22nd. There were three invited speakers: Dr. R. Milley (MUN - Grenfell), Dr. D. Pike (MUN), Dr. S.Huntemann (MSVU). There were 19 people in attendance for the March 13th talks and 17 people in attendance for the March 20th talks. The event was organized by A. Burgess, N. Clarke, N. McKay, M. Messinger, and D. Dyer.

GRASCan
The 2025 Graph Searching in Canada workshop took place May 24-25 at University of Ottawa. It was co-organized by Anthony Bonato and GGSAC member Melissa Huggan. The plenary speakers were GGSAC members, Dr. Danielle Cox (MSVU) and Dr. Danny Dyer (MUN). The GGSAC CRG supported student travel to this event.

Introduction to Research in Graph Searching & Games Summer School
This one-day workshop was held on July 15 at the University of New Brunswick, Fredericton, prior to the East Coast Combinatorics Conference. In the morning Dr. Svenja Huntemann ran a session called Introduction to Combinatorial Games and in the afternoon Dr. Danielle Cox ran a

session called Introduction to Graph Searching and Dr. Iain Beaton ran a session called Introduction to Eternal Domination. We had 11 students (undergraduate and graduate) attend the event.

Research Events

- CanaDAM 2025: Combinatorial Game Theory mini-symposium co-organized by Melissa Huggananand Svenja Huntemann, GGSAC students invited to speak
- CanaDAM 2025: Pursuit-Evasion Games on Graphs mini-symposium– GGSAC invited speakers.

Summer Student Research Seminar & Workshop

During Summer 2025 a GGSAC Summer Student Research Seminar and Workshop ran. Meetings were held online every two weeks with 10-12 students from all the Atlantic Provinces were in attendance. Most students were studying Game Theory and/or Graph Searching, but other graph theory summer research students were also invited to attend. The other professional development sessions alsoincluded how to read a mathematics paper, how to write an abstract, how to use arXiv, how tocreate a presentation.

Teaching Seminar

On May 9, 2025 an in-person teaching workshop, The 6th Annual Calculus Instruction in Atlantic Canada workshop took place at Mount Saint Vincent University. We had 39 attendees from all provinces in the Atlantic Region It is a workshop aimed at university and high school educators who teach upper level mathematics. As part of this event the GGSAC ran a session led by Dr. Danielle Cox & Dr. Svenja Huntemann on problem solving. The attendees consisted of university instructors and high school educators.

Outreach

A collaboration took place with MSVU Science Circles Circles and a talk was given by some of our committee members and their research students. As well a workshop for junior high African Nova Scotian students which took place at Mount Saint Vincent University. Two schools brought classes to attend.

HQP supported

Twenty-six HQP received direct support from the CRG.

3.2 AARMS Postdoctoral Fellowship Program

Each year AARMS conducts a competition to award Postdoctoral Fellowships to highly qualified personnel who received their PhD within the last 4 years. AARMS provides a portion of the funding for these positions, which must be at least matched by other research funding from the host university. The program is successful in attracting highly qualified young researchers to universities in the Atlantic region. AARMS also makes available a travel grant of $1,500/year for each postdoc.

3.2.1 Postdoctoral Fellow Biographies

The following postdoctoral fellows have been supported by AARMS in the 2024/25 fiscal year:

Shanwei Ding completed his Ph.D. in 2024 under the supervision of Professor Guanghan Li at Wuhan University. His primary research focused on using curvature flows to prove geometric inequalities in the space form and to establish the existence and uniqueness of solutions to prescribed curvature measure or area measure problems. In September 2024, Shanwei Ding joined Memorial University of Newfoundland as an AARMS Postdoctoral Fellow under the supervision of Professors Deping Ye and Professor Nguyen Hoang Lam. His current research interests include curvature flows and their applications, convex geometry, and optimal transport. He aims to explore the connections between PDE and these problems, and to attack these problems.

Hansol Park completed his Ph.D. in 2021 under the supervision of Professor Seung-Yeal Ha at Seoul National University. After that, He worked at Simon Fraser University as a PIMS postdoctoral Fellow under the supervision of Professor Razvan Fetecau from January 2021 to August 2024. During this period, he studied long-time behavior of dynamical systems and energy minimization problems on Riemannian manifolds. In September 2024, Hansol Park joined Dalhousie University as an AARMS Postdoctoral Fellow under the supervision of Professor Theodore

Kolokolnikov. His current research interests include the stability of dynamical systems on periodic domains.

Luuk Stehouwer completed his PhD at the Max Planck Institute for Mathematics in Bonn in 2024 under the supervision of Peter Teichner. His research is at the boundary between physics and mathematics, mostly in topological quantum field theory, algebraic topology, and higher category theory. His thesis work was about the application of dagger categories to unitary topological quantum field theory and contains a proof of the spin-statistics theorem. He also works on the mathematics of symmetry-protected topological phases of matter, using bordism groups and K-theory. For his AARMS postdoc at Dalhousie University, he has been mentored by Theo Johnson-Freyd.

Dharm Veer completed his PhD at Chennai Mathematical Institute, India in 2023 under the supervision of Professor Manoj Kummini. His PhD thesis is on the intersection of commutative algebra with combinatorics. In his thesis, he has made a detailed study on the graded minimal free resolution of Hibi rings, and Hilbert series of algebras associated with polyominoes. Until December 2023, he was a postdoctoral fellow at Indian institute of technology Gandhinagar, India. He has been working at Dalhousie university under the supervision of Professor Sara Faridi on the problems related to minimal free resolution of binomial ideals.

3.2.2 Incoming Postdoctoral Fellows

We held our annual postdoctoral fellowship competition in the autumn of 2024. Four new postdoctoral fellows were appointed to start in the autumn of 2025: **Sebastiano Argenti**, who will work at Memorial University under the supervision of Mikhail Kotchetov and Yuri Bhaturin; **Seth K. Asante**, who will work under the supervision of the Gravity Group at UNB; Denys Bulavka, who will work under the supervision of Sara Faridi at Dalhousie; and **Yuri Salmaniw**, who will work at Cape Breton University under the supervision of Scott Rodney and Shaohua Chen.

Postdoctoral fellowships which started in the autumn of 2024 were funded by AARMS at the level of $30,000/year. Matching funds were provided by their supervisor and host university. AARMS also makes available a travel fund of $1500/year for each postdoc. From September 2025, the AARMS allocation for a postdoctoral fellow goes up to $32,500/year.

3.3 Summer Schools

In the summer of 2024 the Summer School program consisted of 3 separate activities:

The Atlantic Topological Quantum Field Theory Spring School focused on Topological Quantum FieldTheory (TQFT), an area of mathematics with significant implications in topology and theoretical physics. TQFT can be studied from many perspectives such as differential geometry and mathematical physics, but the school focused on the viewpoint of category theory and algebraic topology. The event provided a structured environment for participants to explore various TQFT-related topics, which included modular operads, skein theory, symmetry-protected topological phases and manifold invariants.

The event was held from May 20 to May 25 at Memorial University, organized by Theo Johnson-Freyd (Dalhousie) and Luuk Stehouwer (AARMS postdoctoral fellow at Dalhousie). There were 28 student participants, 26 were doctoral students and 2 were Master students. The long afternoon breaks and evening exercise classes resulted in significant discussion between students. The challenging exercises forced students to work together in groups and a natural dynamic arose in which strong students explained solutions to other students.

The target audience was PhD students and the instructors were postdocs, leading to an informal environment centered around junior researchers.

The **Diversity in the Mathematical Sciences Summer School** was held at Dalhousie University from July 29 to August 2. The goals of the summer school were two-fold. First, to introduce students to research level mathematics and second, to encourage more female and female-identifying students to pursue graduate school in the mathematical sciences. We aimed to give students the tools and the support structure that will enable them to thrive in graduate school by introducing advanced mathematics in a supportive and engaging environment. During this period, we hosted 25 undergraduate female identifying undergraduate students at Dalhousie.

The research theme of the summer school was Combinatorial Commutative Algebra. The program was attended by 25 undergraduate students and was delivered by the following faculty members from across the US and Canada:

Dr. Selvi Kara, Bryn Mawr College [ECR]
Dr. Susan Morey, Texas State University
Dr. Nasrin Altafi , Queen's University [PDF]
Dr. Sara Mayes-Tang, University of Toronto
Dr. Mayada Shahada, University of Calgary [ECR]

The **Simons Laufer Mathematical Sciences Institute Summer Schools.** Through our sponsorship of SL Math, AARMS sent four students from the Atlantic region to attend summer schools in selected topics in the United States. All local expenses and a portion of the travel costs were covered for each student. Summer school places were awarded to the following students on the basis of a competitive application process:

- Madhushika Madduwe Hewalage (Dalhousie) attended “Introduction to the Theory of Algebraic Curves”
- Chengjun Yue (Memorial) attended “Analysis of Partial Differential Equations”
- Zhen Shuang (Memorial) attended “Analysis of Partial Differential Equations”
- Doyeon Kim (UNB) attended “Stochastic Quantization”

3.4 Workshops and Conferences

In 2024-25 AARMS sponsored the following list of events:

Atlantic Graph Theory Seminar
Online via Zoom
March 26, 2025 @ 3:30 pm - 4:30 pm

Mini course “Vertex operator algebras and their representations”
Memorial University (St. John’s Campus)
March 24, 2025 - March 28, 2025

STFX Integration Challenge

Atlantic Graph Theory Seminar
Online via Zoom
March 19, 2025 @ 3:30 pm - 4:30 pm

Integration Tournament for UPEI students 2025
University of Prince Edward Island
March 14, 2025

Atlantic Graph Theory Seminar
Online via Zoom
March 12, 2025 @ 3:30 pm - 4:30 pm

Atlantic Canada Data Science Tour
Online via Zoom
March 7, 2025 @ 12:00 pm - 1:00 pm

Atlantic Graph Theory Seminar
Online via Zoom
February 26, 2025 @ 3:30 pm - 4:30 pm

Graph Searching in Atlantic Canada

2025 Integration Competition
Saint Francis Xavier University
February 26, 2025

Girls STEM Up Conference 2025: Connect and Conquer
Delta Hotels by Mariott Fredericton
February 15, 2025

Atlantic Graph Theory Seminar
Online via Zoom
February 12, 2025 @ 3:30 pm - 4:30 pm

Atlantic Graph Theory Seminar
Online via Zoom
February 5, 2025 @ 3:30 pm - 4:30 pm

CRG Seminar: Modelling Fish Stock Biomass Dynamics in a Multi-gear Fishery and Determining the Stock Status
online via webex
January 31, 2025 @ 12:00 pm - 1:00 pm

Atlantic Graph Theory Seminar
Online via Zoom
January 29, 2025 @ 3:30 pm - 4:30 pm

Combinatorial Algebra meets Algebraic Combinatorics 22nd annual workshop
York University
January 24, 2025 - January 26, 2025

Atlantic Graph Theory Seminar
Online via Zoom
January 22, 2025 @ 3:30 pm - 4:30 pm

Atlantic Graph Theory Seminar
Online via Zoom
January 15, 2025 @ 3:30 pm - 4:30 pm

AARMS Doctoral Thesis Award Winner Seminar
Online via Zoom
December 19, 2024 @ 1:30 pm - 2:30 pm


Minicourse in Vertex Operator Algebras

University of New Brunswick Data Challenge 2024
University of New Brunswick (Fredericton Campus)
November 29, 2024

Atlantic Graph Theory Seminar
Online via Zoom
November 27, 2024 @ 3:30 pm - 4:30 pm

Atlantic Graph Theory Seminar
Online via Zoom
November 6, 2024 @ 3:30 pm - 4:30 pm

Atlantic Graph Theory Seminar
Online via Zoom
October 30, 2024 @ 3:30 pm - 4:30 pm

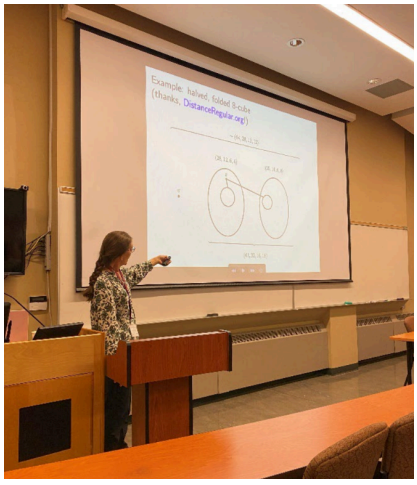
Atlantic Graph Theory Seminar
Online via Zoom
October 23, 2024 @ 3:30 pm - 4:30 pm

2024 Science Atlantic Mathematics Statistics and Computer Science Undergraduate Student Conference
Acadia University
October 4, 2024 - October 5, 2024

Atlantic Graph Theory Seminar
Online via Zoom
October 2, 2024 @ 3:30 pm - 4:30 pm

Atlantic Graph Theory Seminar
Online via Zoom
September 25, 2024 @ 3:00 pm - 4:30 pm

Atlantic Graph Theory Seminar
Zoom seminar
September 18, 2024 @ 3:30 pm - 4:30 pm



East Coast Combinatorics Conference

Graph Searching in Canada Workshop 2024
Dalhousie University
August 7, 2024 - August 9, 2024

Diversity in the Mathematical Sciences 2024
Dalhousie University
July 29, 2024 - August 2, 2024

Atlantic General Relativity Conference
University of New Brunswick (Fredericton Campus)
June 18, 2024 - June 20, 2024

Women in Commutative Algebra III
Mexico
June 2, 2024 - June 7, 2024

Atlantic Topological Quantum Field Theory Spring School

Canadian Statistics Student Conference 2024
Memorial University (St. John's Campus)
June 1, 2024

5th Annual Calculus Instruction in Atlantic Canada Conference
Mount Saint Vincent University
May 24, 2024

Atlantic Topological Quantum Field Theory Spring School 2024
Memorial University (St. John's Campus)
May 20, 2024 - May 24, 2024

16th East Coast Combinatorics Conference
Memorial University (Grenfell Campus)
May 13, 2024 - May 14, 2024

3.5 Outreach

3.5.1 Ongoing Activities

In 2024-25 AARMS sponsored a number of activities which involved extended relationships between mathematicians and their communities over a pattern of multiple interactions. These are listed below.

Connecting Math to Our Lives and Communities.
Show Me Your Math: Connecting Math to Our Lives and Communities (CMTOLC) is a focused in-community mathematics outreach program serving Mi'kmaw and African Nova Scotian youth in Eastern Nova Scotia, organized by Lisa Lunney-Borden (STFX). CMTOLC is supported by both local and national stakeholders and is run in partnership with local Mi'kmaw and African Nova Scotian communities to engage youth in meaningful, relevant, hands-on investigations of mathematics. In total, youth participated in sessions 251 times across 4 communities. 86 youth attended CMTOLC sessions in communities this year, with most youth attending more than one session. Around 30 youth attended our final celebration day.

The 2024-2025 year for Connecting Math to Our Lives and Communities (CMTOLC) began in Spring of 2024 with 5 students being hired to run summer programs for our community partners. One additional student was hired by the John Jerome Paul Chair to support and document the program.

Summer 2024 modules included Games, Crafts, Cooking, CMTOLC Olympics, Nature, and Slime making. Each module encouraged youth to explore the mathematics within each activity. These modules were delivered in the communities of Pictou Landing, Paqtnkek, We'koqma'q, and Antigonish.

In mid-July, CMTOLC partnered with X-Project and delivered an additional module (egg drop activity) to participants of X-Project's STEM Camp. The STEM Camp took place on StFX campus with youth visiting sessions hosted by CMTOLC, X-Oceans, and X-Chem.

AV Middle School Outreach
This program consisted of monthly visits to 2 local schools in the Annapolis Valley: Evangeline Middle School and Wolfville School. In total there were 11 1-hour sessions with 8 - 17 participants for each session. We had 1 Acadia faculty begin the program at each of the schools with the assistance of 3 Acadia student helpers. After sufficient training, the 3 Acadia student helpers either led or co-led subsequent sessions.

Dalhousie Math Challenge Club
The Dalhousie Math Challenge Club is a weekly after school activity which has two levels: the junior club for grades 5-7 and the senior club for older children. The club is led by Dr Dorette Pronk from Dalhousie University and facilitated by a group of enthusiastic undergraduate and graduate students. It engages in fun and challenging math problems and participates in competitions offered by the Canadian Math Society and also some international competitions. The club seeks to foster community among the students, help students learn to solve problems together and also help those who are interested in competing internationally in training to solve Olympiad-level problems.

Mathematical Outreach in New Brunswick
This program, led by Dr. John Grant McLoughlin, takes place in schools and community settings across New Brunswick. Particular focus is given to outreach in First Nation schools and rural communities. An effort is made to bring mathematical games, ideas, and activities to elementary, middle and secondary school classrooms. Special events such as a mathematical day, recreational math exhibits (e.g. at STEAM Expo), and sharing of games in community settings such as libraries will figure into the outreach plans.

3.5.2 Outreach Events

In 2024-25 AARMS also sponsored a number of discrete outreach events:

Girls STEM Up Conference 2025: Connect and Conquer
Delta Hotels by Mariott Fredericton
February 15, 2025

All SySTEMs GO
Memorial University
November 22-23, 2024

Dalhousie Math Camp 2024
Dalhousie University
July 21, 2024 - July 25, 2024

Junior Math and Computer Science Camp
Acadia University
July 8, 2024 - July 12, 2024

All SySTEMs GO

Black Educators' Association – Dalhousie Math Camp
Dalhousie University
July 7, 2024 - July 12, 2024

Indigenous Math Camp
Dalhousie University
June 23, 2024 - June 28, 2024

UNB CMS Math Camp
University of New Brunswick (Fredericton Campus)
May 24, 2024 - May 26, 2024

Blundon Seminar Math Camp
Memorial University (St. John's Campus)
May 23, 2024

Blundon Seminar Camp

CMS-UPEI-AARMS Regional Math Camp
University of Prince Edward Island
May 10, 2024 - May 12, 2024

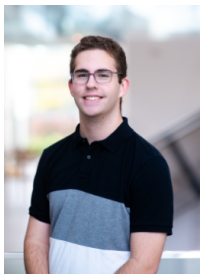
39th Annual New Brunswick Mathematics Competition
5 Locations in New Brunswick
May 10, 2024

3.6 Scholarships and Awards

3.6.1 Graduate Student Scholarship

These scholarships aim to provide extra incentive to attract excellent students to Atlantic Canada, and will contribute to a healthy exchange of students and ideas between universities across Canada. In 2024 we awarded two prizes of $5,000 each to:

Thiago Holleben is a PhD student at Dalhousie University under the supervision of Sara Faridi. He began his studies at the Federal University of Rio de Janeiro, where he completed his undergraduate degree and obtained a master's degree. His research interests lie at the intersection of algebra, combinatorics, and topology. He focuses on algebraic methods for proving positivity results in combinatorics and on applying combinatorial techniques to problems in commutative algebra.



Logan Pipes is a Master's student at Memorial University supervised by Drs. Danny Dyer and Melissa Huggan. He studies pursuit/evasion problems on graphs; in particular the game of cops and robbers and its variants. He is also interested in graph theory more generally, and has previous research experience in quantum information theory and matrix algebra. Before attending Memorial University Logan graduated from Mount Allison University with first class honours in his Bachelor of Science degree in mathematics. He also serves as a general member on the CMS Student Committee.

3.6.2 Doctoral Thesis Award

There were two winners of the Doctoral Thesis Award in 2024-25, each receiving a cash prize of $2500::

Dr. Jonathan Babyn received his PhD from Dalhousie University in November 2023, under the supervision of Dr. Joanna Mills Flemming, for a thesis entitled, "Counting all the Imaginary Fish and More".

Dr. Marcello Lanfranchi received his PhD from Dalhousie University in October 2024 under the supervision of Dr. Geoffrey Crutwell and Dr. Dorette Pronk for a thesis entitled "A tangent category approach to operadic geometry".

3.7 Junior Researcher Travel Support

In 2024/25 we continued the Junior Researcher Travel Support Program with a budget of $20,000 to support graduate students and postdocs traveling to attend national and international conferences and workshops. The program has been well subscribed, helping HQP meet peers and find opportunities for collaboration and professional networking.

3.8 Undergraduate Student Research Awards

In 2024-25 Plans were made to introduce a new program to offer undergraduate student research awards. This program aims to provide support specifically for research activities at the smaller undergraduate universities in the AARMS region. The first awards were made for projects in the summer of 2025, which will be included in the 2025-26 Annual Report.

3.9 Equity, Diversity and Inclusion

AARMS aims to promote and celebrate diversity in the broadest sense, supporting a community that is welcoming and engaging for persons from a wide range of personal and professional backgrounds. These are essential elements for achieving excellence in mathematical sciences research and dissemination. Furthermore, we are committed to positively encouraging and supporting the participation of persons from underrepresented groups including, but not limited to, indigeneity, race, nationality, ethnicity, gender identity, sexual orientation, ability, neurodiversity, socio-economic status, and religion, in all aspects of AARMS activities. An EDI committee meets throughout the year to provide diverse input, criticism and fresh ideas into the achievement of these goals. AARMS is also collecting statistics on the representation of underrepresented groups in the AARMS community. These statistics are displayed on our website at https://aarms.math.ca/about/edi/ .

4 Governance and Administration

On July 1, 2024 the AARMS Board appointed Dr. Andrew Irwin of Dalhousie University to the position of AARMS Director, for a 3 year term. Dr. Irwin will oversee the next application of AARMS to the NSERC DIS program.

5 Accounts

See the following page.

Income and Expenditure Account
April 1, 2024 - March 31, 2025

		2023-24
Income		
Carried forward from previous year	112,340	151,815
NSERC DIS	372,819	372,819
Universities	76,000	77,000
Provinces	0	0
Other Revenue	20,999	10,180
	469,818	459,999
Total Income	**582,158**	**611,814**
Expenditure		
Summer School	21,350	44,664
Workshops and Events	47,623	59,401
General Scientific Activity	0	7,000
Outreach	28,538	24,457
PDF Program	155,420	171,010
Collaborative Research Groups	92,947	100,000
IPSW	0	0
Graduate Scholarships	10,000	10,000
Doctoral Thesis Award	5,000	0
Jr. Researcher Travel	10,986	21,190
Administration, travel and overheads	58,014	61,752
Total Expenditure	**429,878**	**499,474**
Surplus:	**152,280**	**112,340**