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Dr. Alyssa Sankey

Correspondence language: English
Sex: Female
Date of Birth: 2/12

Contact Information

The primary information is denoted by (*)

Address

Home	Primary Affiliation (*)
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Personal	https://www.unb.ca/faculty-staff/directory/science-fr-math/sankey-alyssa.html

Dr. Alyssa <u>Sankey</u>

Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
French	Yes	Yes	Yes	Yes	No

Degrees

Doctorate, PhD, Algebra and combinatorics, University of Michigan
Thesis Title: Regular weights on strongly regular graphs

Master's non-Thesis, Algebra and combinatorics, University of Michigan

Bachelor's Honours, Mathematics, Vassar College

User Profile

Researcher Status: Researcher

Research Specialization Keywords: algebraic graph theory, coherent configurations, association schemes

Disciplines Trained In: Pure Mathematics

Research Disciplines: Pure Mathematics

Areas of Research: Algebra, Combinatorial

Fields of Application: Communication and Information Technologies

Employment

2010/7	Senior Teaching Associate Mathematics & Statistics, University of New Brunswick Full-time Tenure Status: Tenure
2006/8 - 2010/6	Senior Instructor Mathematics & Statistics, University of New Brunswick Full-time Tenure Status: Tenure Track
2004/8 - 2006/6	Assistant Professor Faculty of Business, Saint John campus, University of New Brunswick Full-time, Term, Assistant Professor Tenure Status: Non Tenure Track

2001/2 - 2003/10	Software Verification Lead
	Software Verification Lead, Kinek Technologies, Inc.
	Supervised functional testing of software; wrote successful grant application (Industrial Research Application Program).
1997/7 - 2001/6	Associate Professor
	Mathematics, Slippery Rock University
	Full-time, Associate Professor
	Tenure Status: Tenure
1992/7 - 1997/6	Assistant Professor
	Mathematics, Slippery Rock University
	Full-time, Assistant Professor
	Tenure Status: Tenure Track

Affiliations

The primary affiliation is denoted by (*)

| (*) 2006/8 | Senior Teaching Associate (Professor, teaching stream), Mathematics and Statistics, University of New Brunswick |

Leaves of Absence and Impact on Research

2020/7 - 2021/6	Sabbatical, University of New Brunswick
	Full year sabbatical in Toronto, ON.
2012/7 - 2013/6	Sabbatical, University of New Brunswick
	Full year sabbatical spent at Tilburg University, in Tilburg, Netherlands, at the Tilburg School of Economics and Management: Department of Econometrics and Operations Research.
2006/1 - 2006/7	Parental, University of New Brunswick

Courses Taught

2020/01/06 - 2020/04/24	Instructor and Course Coordinator
	Course Title: Introduction to Calculus II
	Course Code: Math 1013
	Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications.
	Section: *Here and below, enrolment is estimated.
	Number of Students: 180
2020/01/06 - 2020/04/24	Instructor
	Course Title: Group Theory
	Course Code: Math 3033
	Course Topic: Fundamentals of group theory: Lagrange's theorem, normal subgroups, finite Abelian groups.
	Number of Students: 22

2020/01/06 - 2020/04/24	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 120
2019/09/04 - 2019/12/19	Instructor Course Title: Elementary Number Theory Course Code: Math 3093 Course Topic: Primes, unique factorization, congruences, Diophantine equations, basic number theoretic functions. Number of Students: 17
2019/09/04 - 2019/12/19	Instructor and Course Coordinator Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 350
2019/09/04 - 2019/12/19	Instructor and Course Coordinator Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2019/01/02 - 2019/04/20	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 80
2019/01/02 - 2019/04/20	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2018/09/01 - 2018/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30
2018/09/01 - 2018/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200

2018/09/01 - 2018/12/22	Instructor Course Title: Discrete Mathematics Course Code: Math 2203 Course Topic: A first course in proofs: logic, sets, mathematical induction. Number of Students: 28
2018/01/02 - 2018/04/22	Instructor Course Title: Networks and Graphs Course Code: Math 3343 Course Topic: Introductory graph theory: connectivity, trees, factorization, planarity, graph colouring. Number of Students: 30
2018/01/02 - 2018/04/22	Instructor Course Title: Pre-Calculus Course Code: Math 0863 Course Topic: Algebra, trigonometry, functions. Number of Students: 30
2018/01/02 - 2018/04/22	Instructor Course Title: Introduction to Calculus II Course Code: Math 1013 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 200
2018/01/02 - 2018/04/22	Instructor Course Title: Advanced Algebra Course Code: Math 4043 Course Topic: Independent study on rings, fields, Galois theory. Number of Students: 3
2017/09/01 - 2017/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2017/09/01 - 2017/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30
2017/01/02 - 2017/04/22	Instructor Course Title: Networks and Graphs Course Code: Math 3343 Course Topic: Introductory graph theory: connectivity, trees, factorization, planarity, graph colouring. Number of Students: 30

2017/01/02 - 2017/04/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 350
2016/09/01 - 2016/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2016/09/01 - 2016/12/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2016/09/01 - 2016/12/22	Instructor Course Title: Elementary Number Theory Course Code: Math 3093 Course Topic: Primes, unique factorization, congruences, Diophantine equations, basic number theoretic functions. Number of Students: 30
2016/05/01 - 2016/06/30	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 15
2016/01/02 - 2016/04/22	Instructor Course Title: Enriched Introduction to Calculus II Course Code: Math 1063 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 18
2016/01/02 - 2016/04/22	Instructor Course Title: Networks and Graphs Course Code: Math 3343 Course Topic: Introductory graph theory: connectivity, trees, factorization, planarity, graph colouring. Number of Students: 32
2015/09/01 - 2015/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200

2015/09/01 - 2015/12/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2015/09/01 - 2015/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30
2015/01/02 - 2015/04/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2015/01/02 - 2015/04/22	Instructor Course Title: Introduction to Calculus II Course Code: Math 1013 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 200
2014/09/01 - 2014/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2014/09/01 - 2014/12/22	Instructor Course Title: Elementary Number Theory Course Code: Math 3093 Course Topic: Primes, unique factorization, congruences, Diophantine equations, basic number theoretic functions. Number of Students: 30
2014/09/01 - 2014/12/22	Instructor Course Title: Linear Algebra II Course Code: Math 3213 Course Topic: Vector spaces, linear transformations, diagonalization, Gram-Schmidt orthogonalization. Number of Students: 36
2014/01/02 - 2014/04/22	Instructor Course Title: Differential Equations for Engineers Course Code: Math 3503 Course Topic: Nonhomogeneous differential equations, systems of ODEs, Laplace transforms, Fourier series. Number of Students: 180

2014/01/02 - 2014/04/22	Instructor Course Title: Introduction to Mathematical Thinking Course Code: Math 2623 Course Topic: Topics vary: illustrations of the beauty of mathematics for the non-expert. Number of Students: 15
2014/01/02 - 2014/04/22	Instructor Course Title: Enriched Introduction to Calculus II Course Code: Math 1063 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 18
2013/09/01 - 2013/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30
2013/09/01 - 2013/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2012/05/01 - 2012/06/30	Instructor Course Title: Introduction to Calculus II Course Code: Math 1013 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 25
2012/01/02 - 2012/04/22	Instructor Course Title: Introduction to Mathematical Thinking Course Code: Math 2623 Course Topic: Topics vary: illustrations of the beauty of mathematics for the non-expert. Number of Students: 18
2012/01/02 - 2012/04/22	Instructor Course Title: Group Theory Course Code: Math 3033 Course Topic: Fundamentals of group theory: Lagrange's theorem, normal subgroups, finite Abelian groups. Number of Students: 28
2011/09/01 - 2011/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30

2011/09/01 - 2011/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2011/01/02 - 2011/04/22	Instructor Course Title: Introduction to Calculus II Course Code: Math 1013 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 150
2011/01/02 - 2011/04/22	Instructor Course Title: Networks and Graphs Course Code: Math 3343 Course Topic: Introductory graph theory: connectivity, trees, factorization, planarity, graph colouring. Number of Students: 25
2010/09/01 - 2010/12/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2010/09/01 - 2010/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 200
2010/09/01 - 2010/12/22	Instructor Course Title: Elementary Number Theory Course Code: Math 3093 Course Topic: Primes, unique factorization, congruences, Diophantine equations, basic number theoretic functions. Number of Students: 25
2010/01/02 - 2010/04/22	Instructor Course Title: Calculus for Management Sciences Course Code: Math 1823 Course Topic: Differential and integral calculus with emphasis on business applications. Number of Students: 60
2010/01/02 - 2010/04/22	Instructor Course Title: Introduction to Mathematical Thinking Course Code: Math 2623 Course Topic: Topics vary: illustrations of the beauty of mathematics for the non-expert. Number of Students: 18

2009/09/01 - 2009/12/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2009/09/01 - 2009/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 90
2009/09/01 - 2009/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30
2009/09/01 - 2009/04/22	Instructor Course Title: Linear Algebra I Course Code: Math 2213 Course Topic: Real vector spaces, systems of equations, matrix algebra, subspaces, eigenvectors, diagonalization. Number of Students: 42
2009/01/02 - 2009/04/22	Instructor Course Title: Enriched Introduction to Calculus II Course Code: Math 1063 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 22
2008/09/01 - 2008/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 90
2008/09/01 - 2008/12/22	Instructor Course Title: Combinatorial Theory Course Code: Math 3333 Course Topic: Permutations and combinations, inclusion-exclusion, generating functions, combinatorial designs. Number of Students: 30
2008/09/01 - 2008/12/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90

2008/01/02 - 2008/04/22	Instructor Course Title: Linear Algebra I Course Code: Math 2213 Course Topic: Real vector spaces, systems of equations, matrix algebra, subspaces, eigenvectors, diagonalization. Number of Students: 35
2008/01/02 - 2008/04/22	Instructor Course Title: Introduction to Calculus II Course Code: Math 1013 Course Topic: Integral calculus: Fundamental Theorem of Calculus, integration techniques, applications. Number of Students: 90
2007/09/01 - 2007/12/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2007/09/01 - 2007/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 90
2007/05/01 - 2007/06/30	Instructor Course Title: Calculus for Management Sciences Course Code: Math 1823 Course Topic: Differential and integral calculus with emphasis on business applications. Number of Students: 20
2007/01/02 - 2007/04/22	Instructor Course Title: Introduction to Linear Algebra Course Code: Math 1503 Course Topic: Vectors, lines, planes, systems of linear equations, matrix algebra, eigenvalues and eigenvectors. Number of Students: 90
2007/01/02 - 2007/04/22	Instructor Course Title: Linear Algebra I Course Code: Math 2213 Course Topic: Real vector spaces, systems of equations, matrix algebra, subspaces, eigenvectors, diagonalization. Number of Students: 40
2007/01/02 - 2007/04/22	Instructor Course Title: Networks and Graphs Course Code: Math 3343 Course Topic: Introductory graph theory: connectivity, trees, factorization, planarity, graph colouring. Number of Students: 30

2006/09/01 - 2006/12/22	Instructor Course Title: Introduction to Calculus I Course Code: Math 1003 Course Topic: Differential calculus: limits, definition of the derivative, derivative rules, applications. Number of Students: 90
2006/09/01 - 2006/12/22	Instructor Course Title: Elementary Number Theory Course Code: Math 3093 Course Topic: Primes, unique factorization, congruences, Diophantine equations, basic number theoretic functions. Number of Students: 30
2005/09/01 - 2005/12/22	Instructor, Faculty of Business Course Title: Operations Research Course Code: BA 3623 Course Topic: Introduction to operations research: simplex method, sensitivity analysis. Number of Students: 40
2005/09/01 - 2005/12/22	Instructor, Faculty of Business Course Title: Business Statistics Course Code: BA 1605 Course Topic: Elementary statistics: mean, median, mode; normal distributions. Number of Students: 40
2005/01/02 - 2005/04/22	Instructor, Faculty of Business Course Title: Operations Research Course Code: BA 3623 Course Topic: Introduction to operations research: simplex method, sensitivity analysis. Number of Students: 40
2005/01/02 - 2005/04/22	Instructor, Faculty of Business Course Title: Business Statistics Course Code: BA 1605 Course Topic: Elementary statistics: mean, median, mode; normal distributions. Number of Students: 40
2004/09/01 - 2004/12/22	Instructor, Faculty of Business Course Title: Operations Research Course Code: BA 3623 Course Topic: Introduction to operations research: simplex method, sensitivity analysis. Number of Students: 40

Course Development

2010/1	Creator, Mathematics and Statistics, University of New Brunswick Course Title: Introduction to Mathematical Thinking Course Level: Undergraduate An introduction to mathematical thinking. Content varies, and is focused on presenting mathematics as a living, creative discipline. A sample of topics: patterns and symmetry, tiling, non-Euclidean geometry, chaos and fractals, planetary motion, binary numerals, prime numbers, Fibonacci numbers, voting systems, the calendar. Not available for credit to students with a Major in Mathematics/Statistics.

1997/9	Co-creator, Mathematics, Slippery Rock University
	Course Title: Mathematics as a Liberal Art
	Course Level: Undergraduate
	An introduction to the discipline for the non-major via a wide variety of topics. The development of ideas from initial experiments -- or inductive reasoning -- to explanations and ultimately proofs -- deductive reasoning -- is emphasized.

Student/Postdoctoral Supervision

Bachelor's Honours [n=4]

2017/9 - 2018/4 Co-Supervisor	Joshua Gunter (Completed) , University of New Brunswick
	Degree Name: MSc
	Specialization: Combinatorics and Optimization
	Student Degree Received Date: 2018/5
	Student Canadian Residency Status: Canadian Citizen
	Thesis/Project Title: Constructing a family of cometric association schemes
	Project Description: Association schemes are mathematical structures within the field of algebraic combinatorics, with applications found in coding theory, block designs, and algebraic graph theory. Association schemes may be classified metric or not; cometric or not; with schemes that are both cometric and not metric being very rare in comparison to metric types. In this project, we give an overview of the theory of association schemes, and apply a method of constructing cometric schemes from hemisystems of generalized quadrangles, a type of incidence structure, to a new family of hemisystems recently investigated by Bamberg, Lee, Momihara, and Xiang.
	Present Position: Graduate student, University of Waterloo
	Student Country of Citizenship: Canada
	Other Supervisors: Co-Supervisor - Bremner, David
	Research Disciplines: Computer Science, Pure Mathematics
	Areas of Research: Combinatorial, Algebra
	Fields of Application: Communication and Information Technologies
2017/1 - 2017/4 Principal Supervisor	Alex Sharp (Completed) , University of New Brunswick
	Student Degree Received Date: 2017/5
	Student Canadian Residency Status: Canadian Citizen
	Thesis/Project Title: Demonstrating the existence of mixed affine-based and bent-based bent sequences
	Project Description: In this paper an analysis of a conjecture posed by Adams and Tavares in generating bent sequences is undertaken. The conjecture posits that the set of all bent sequences can be partitioned by the set of all bent-based bent sequences and all affine-based bent sequences. This project analyzes the conjecture and aims to prove it is false, by establishing bent sequences of mixed type.
	Present Position: Graduate student, University of Waterloo
	Student Country of Citizenship: Canada
	Research Disciplines: Pure Mathematics
	Areas of Research: Algebra, Combinatorial
	Fields of Application: Communication and Information Technologies

2015/9 - 2016/4 Principal Supervisor	Patrick McIntyre (Completed) , University of New Brunswick Student Degree Received Date: 2016/5 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: The parameters and spectra of strongly regular graphs Project Description: This project is to study parameter conditions for strongly regular graphs and to develop in detail several families of examples. Of particular interest are graphs that are cospectral but not isomorphic. Present Position: Mathematics Teacher, Rothesay High School Student Country of Citizenship: Canada Research Disciplines: Pure Mathematics Areas of Research: Combinatorial, Algebra Fields of Application: Communication and Information Technologies
2014/6 - 2015/4 Principal Supervisor	Ayesha Noel (Completed) , University of New Brunswick Student Degree Received Date: 2015/5 Student Canadian Residency Status: Permanent Resident Thesis/Project Title: The sporadic group M_24 Project Description: A simple group is defined as one that has no nontrivial normal subgroups. These simple groups act as building blocks for all other finite groups and can be classified into 18 countably infinite families, in addition to 26 others.These 26 exceptions, which are in many ways the most interesting of the finite simple groups, are known as the sporadic groups. The main focus of this project is the construction of the Mathieu group M_24, a 5-transitive permutation group on 24 objects, first introduced by Emile Mathieu in 1861. Present Position: Senior Economist, Government of New Brunswick Student Country of Citizenship: Trinidad and Tobago Research Disciplines: Pure Mathematics Areas of Research: Algebra, Combinatorial Fields of Application: Communication and Information Technologies

Staff Supervision

Event Administration

2021/2 - 2021/5	Organizer, Coherent configurations with few fibers, Workshop, 2021/5 - 2021/5 Organized mini-symposium at CanaDAM 2021.
2014/1 - 2019/5	Co-organizer, UNB-CMS Math Camp, Workshop, 2014/5 - 2019/5 Annual co-organization of a Canadian Math Society affiliated math camp. The camp runs for three days and involves 25 to 30 students from New Brunswick high schools.

Journal Review Activities

2017/9	Referree,Transactions on Combinatorics Number of Works Reviewed / Refereed: 1
2015/9	Reviewer,Mathematical Reviews Number of Works Reviewed / Refereed: 11
2015/9	Referree,Special Matrices

Graduate Examination Activities

2018/9 - 2018/12	Examiner, Matthew Lewis, University of New Brunswick
2018/4 - 2018/5	Examiner, Jhendong Sha, University of New Brunswick
2018/4 - 2018/5	Master's Oral Exam Chair, Joshua Koncovy, University of New Brunswick
2016/6 - 2016/7	Examiner, Rasha Almohammadi, University of New Brunswick
2016/1 - 2016/5	Committee Member, Michael Freeze, University of New Brunswick
2009/11 - 2009/12	Committee Member, Henry Bediako-Asare, University of New Brunswick

Event Participation

Participant, Pension Bootcamp and Pension Forum, Workshop, 2016/12 - 2016/12

Participant, East Coast Combinatorics, Conference, 2015/7 - 2015/7

Participant, Combinatorial Algebra Meets Algebraic Combinatorics, Conference, 2014/1 - 2014/1

Participant, Calculus Instruction in Atlantic Canada, Conference, 2019/5 - 2019/5

Participant, ACENET Parallel Computing School, Course, 2020/6 - 2020/7
Course moved to online live instruction, twelve two-hour sessions.

Participant, Finite Geometry Workshop, Canadian Mathematical Society summer meeting, Workshop, 2019/6 - 2019/6

Participant, 2021 CMS 75th+1 Anniversary Summer Meeting, Conference, 2021/6 - 2021/6

Participant, CAUT Equity Conference -- Mobilizing Intersections, Conference, 2018/4 - 2018/4

Participant, CanaDAM, Conference, 2017/6 - 2017/6

Participant, American Mathematical Society spring eastern section meeting, Conference, 2009/4 - 2009/4

Participant, Modern Trends in Algebraic Graph Theory, Conference, 2014/6 - 2014/6
International, invitation-only conference.

Participant, Canadian Mathematical Society winter meeting, Conference, 2007/12 - 2007/12

Participant, Algebraic Combinatorics: Spectral Graph Theory, Erdos-Ko-Rado Theorems and Quantum Information Theory (a conference to celebrate the work of Chris Godsil), Conference, 2014/6 - 2014/6

Participant, Canadian Mathematical Society winter meeting, Conference, 2010/12 - 2010/12

Participant, 2020 CMS Winter Meeting (virtual), Conference, 2020/12 - 2020/12

Participant, ACENET Programming With Python, Workshop, 2020/3 - 2020/4
Workshop moved online, given in two four-hour sessions.

Participant, Algebraic Graph Theory, Banff International Research Station, Workshop, 2011/4 - 2011/4

Participant, Canadian Mathematical Society winter meeting, Conference, 2011/12 - 2011/12

Participant, Canadian Mathematical Society winter meeting, Conference, 2009/12 - 2009/12

Participant, AMS Fall Western Sectional meeting (virtual), Conference, 2020/10 - 2020/10

Participant, East Coast Combinatorics, Conference, 2017/7 - 2017/7

Participant, Canadian Mathematical Society summer meeting, Conference, 2016/6 - 2016/6

Participant, Canadian Mathematical Society summer meeting, Conference, 2018/6 - 2018/6

Community and Volunteer Activities

2018/5	Speaker, AARMS-Girl Guides camp Presented *Calendar mathematics and the date of Easter.*
2017/6	Speaker, University of New Brunswick Presented *The four-colour theorem* in UNB Worlds Unbound Canada 150 camp.
2015/5	Speaker, UNB-CMS Presented *The tree of all fractions* to UNB-CMS math camp.
2014/5	Speaker, UNB-CMS Presented *A graphical solution to the Instant Insanity puzzle* to UNB-CMS math camp.
2013/7	Facilitator, Shad Valley Facilitated workshop on *Inductive reasoning with billiards* to Shad Valley Program on Leadership, Science and Technology, and Entrepreneurship.
2010/10	Speaker, University of New Brunswick Presented *The wine in the water puzzle* to NB teachers as part of professional development day activities hosted at UNB.
2010/6	Speaker, Fredericton High School Presented *The tree of all fractions* as outreach activity.
2010/5	Speaker, UNB-CMS Presented *Instant Insanity* to UNB-CMS math camp.
2009/12	Speaker, Fredericton High School Presented *The global positioning system* as outreach activity.
2008/5	Speaker, UNB-CMS Presented *Instant Insanity* to UNB-CMS math camp.
2017/9 - 2018/6	Member, nominating committee, Unitarian Fellowship of Fredericton
2017/7 - 2018/6	Member, adult RE committee, Unitarian Fellowship of Fredericton
2015/7 - 2018/6	Chair, hospitality committee, Unitarian Fellowship of Fredericton
2015/7 - 2016/6	Member, board of governors, Unitarian Fellowship of Fredericton
2010/6 - 2011/7	Member, children's RE committee, Unitarian Fellowship of Fredericton
2009/7 - 2010/6	Member, adult RE committee, Unitarian Fellowship of Fredericton
2004/7 - 2006/6	Member, board of trustees, UUCSJ
2003/7 - 2006/6	Member, children's RE committee, UUCSJ
2005/9 - 2006/5	Member, annual conference meeting host committee, UUCSJ

Knowledge and Technology Translation

2009/9 - 2016/5   Member, Curriculum Development Advisory Council, Consultation Service
Group/Organization/Business Serviced: NB Department of Education
Target Stakeholder: Government Personnel
Outcome / Deliverable: New mathematics curriculum documents for New Brunswick at the
grade 9 through grade 12 level, anglophone stream.
Evidence of Uptake/Impact: Curriculum was adopted in 2014-2015 and remains in use.
Activity Description: Participated as a representative of UNB on the curriculum committee
which developed and revised the anglophone curriculum now in use throughout the
province for mathematics in grades 9 through 12. The curriculum was phased in gradually
from 2011 through 2015, with some revisions and consultation extending through 2016.

Committee Memberships

2018/7   Committee Member, Departmental Curriculum Committee

2018/5   Committee Member, AUNBT Working Group on CPP Expansion
Study and negotiate UNB's response to the changes in the Canada Pension Plan.

2017/9   Committee Member, Senate Academic Policy and Procedures Committee

2016/5   Committee Member, AUNBT Communications Committee

2014/7   Committee Member, Board of Directors: UNB academic employee pension plan
One of five trustees for the pension plan that are appointed by the faculty organization
(AUNBT). Duties are to oversee implementation of the plan and funding policy, in
consultation with actuarial, financial, and legal advisors.

2018/10 - 2020/2   Committee Member, Strategic planning steering committee
University committee charged with developing a new strategic plan for the university.
The committee met regularly for 18 months and managed a fact-finding phase, a long
consultation phase, and culminated with a strategic planning document.

2013/7 - 2019/6   Co-chair, Associate Department Chair, Mathematics and Statistics

2018/9 - 2019/4   Co-chair, Ad-hoc teaching load policy group
Departmental committee charged with developing a clear policy governing teaching
assignments.

2017/7 - 2018/6   Chair, Departmental assessment committee

2017/7 - 2018/6   Chair, Departmental Contract Academic Assessment Committee

2013/7 - 2018/6   Chair, Timetable Coordinator

2018/1 - 2018/5   Chair, Search committee

2017/5 - 2018/5   Committee Member, AUNBT Personnel Committee
Undertaking performance reviews and negotiating new contracts for association staff.

2017/1 - 2018/5   Committee Member, Secretary, AUNBT Executive Committee

2015/9 - 2018/5   Committee Member, UNB Fredericton Senate
Elected Faculty of Science representative on the university senate which overseas all
academic matters.

2015/5 - 2018/5   Committee Member, AUNBT Executive Committee
Executive committee of the faculty association. Monthly meetings overseeing all business
of the association.

2015/7 - 2016/6	Committee Member, Search Committee for Department Chair, Mathematics and Statistics
2013/9 - 2016/6	Committee Member, Departmental Assessment Committee
2013/7 - 2015/6	Committee Member, Departmental Contract Academic Instructor Assessment Committee
2011/5 - 2015/5	Committee Member, AUNBT Pension Committee This committee worked intensively from 2011 through 2013 to study, negotiate, and implement the transition to the Shared Risk Plan in July 2013, and to perform follow-up activities through 2015.
2013/11 - 2014/6	Committee Member, Search Committee for Department Chair, Economics
2013/5 - 2014/5	Committee Member, AUNBT Executive Committee Executive committee of the faculty association. Monthly meetings overseeing all business of the association.
2013/11 - 2014/1	Committee Member, AUNBT Contingency Planning Finance Committee
2010/7 - 2012/6	Committee Member, Faculty of Science Curriculum Committee
2009/7 - 2012/6	Committee Member, UNB Fredericton Senate Elected Faculty of Science representative on the university senate which overseas all academic matters.
2011/5 - 2012/5	Committee Member, Treasurer, AUNBT Executive Committee Responsible for ongoing finances of the association, monthly reports, budgeting, chairing the Investments sub-committee.
2010/5 - 2012/5	Committee Member, AUNBT Executive Committee Executive committee of the faculty association. Monthly meetings overseeing all business of the association.
2010/9 - 2011/6	Committee Member, Departmental Assessment Committee
2010/9 - 2011/5	Committee Member, Ad hoc Committee on Large Classes This committee was struck in response to the doubling of some class sizes, in order to address the challenges of balancing workloads.
2009/5 - 2010/12	Committee Member, AUNBT Collective Bargaining Council
2009/7 - 2010/6	Committee Member, Undergraduate Committee
2009/7 - 2010/6	Committee Member, Search Committee, Dean of Arts
2008/7 - 2009/6	Committee Member, Departmental Seminar Committee
2008/7 - 2009/6	Committee Member, Nominating Committee
2007/8 - 2008/7	Chair, Interim Director, Math Help Centre (now Math Learning Centre) Supervised all tutoring and workshop activities throughout the academic year, in support of first and second year mathematics courses. Responsible for training of graduate student tutors, scheduling, record-keeping, annual report.
2008/5 - 2008/6	Committee Member, Departmental Assessment Committee
2007/7 - 2008/6	Committee Member, Undergraduate Committee
2006/8 - 2006/12	Chair, Interim Director, Math Help Centre (now Math Learning Centre) Supervised all tutoring and workshop activities throughout the term, in support of first and second year mathematics courses. Responsible for training of graduate student tutors, scheduling, record-keeping, annual report.
2005/5 - 2005/12	Committee Member, AUNBT Collective Bargaining Council

Other Memberships

2019/5 - 2019/5	Judge, Canada Wide Science Fair
2016/6 - 2016/6	Judge, Canadian Mathematical Society
2015/5 - 2015/5	Judge, Canada Wide Science Fair

Presentations

1. (2021). Strongly regular designs admitting fusion to strongly regular decomposition. CanaDAM 2021, mini-symposium on coherent configurations with few fibers, Virtual,
Main Audience: Researcher
Description / Contribution Value: A strongly regular decomposition of a strongly regular graph is a partition of the vertex set into two parts on which the induced subgraphs are strongly regular. Strongly regular designs are coherent configurations of rank 10 with two fibres in which the configuration on each fibre is a strongly regular graph. Haemers and Higman proved the equivalence between strongly regular decompositions, excluding special cases, and strongly regular designs with certain parameter conditions. In this talk we examine the SRDs that admit a fusion to SRG, and discuss parameter conditions, known families and (non)existence results.

2. (2018). Variations on some themes in the work of Donald G. Higman. Pilsen WL50: Symmetry vs. Regularity: First 50 years since Weisfeiler-Leman stabilization, Pilsen, Czech Republic
Main Audience: Researcher
Invited?: Yes
Description / Contribution Value: There is a comprehensive account of Don Higman's work in a 2009 paper of Bannai, Griess, Praeger, and Scott which also includes many personal stories. After touching on some of the highlights therein, this talk will focus on work from '88 through '95 on strongly regular designs (of the first and second kind), strongly regular decompositions (with Haemers), imprimitive rank 5 schemes, weights and t-graphs, and uniform schemes (unpublished and later fully developed by van Dam, Martin, and Muzychuk). Generally speaking, this work involves analysis of coherent configurations with small rank, and the problem of classifying imprimitive association schemes. Some themes that arise are methods of producing new coherent configurations from old: fusion, refinement, restriction to -- and quotients by -- parabolics, and Weisfeiler-Leman stabilization.

3. (2017). Covering configurations derived from weighted coherent configurations. International Linear Algebra Society: Linear Algebra Aspects of Association Schemes session, Iowa State University, Ames, United States
Main Audience: Researcher
Invited?: Yes
Description / Contribution Value: The Seidel matrix of a graph Γ may be viewed as a weight on the complete graph: edges of Γ are weighted (-1) and non-edges (+1). If Γ is strongly regular with $n=2(2k-\lambda-\mu)$, it lies in the switching class of a regular two-graph and we call the weight, analogously, regular on K_n. Generalizations of this result include the extended Q-bipartite double of a cometric association scheme of Martin, Muzychuk and Williford and the regular t-graphs of D.G. Higman, further investigated by Kalmanovich in the t=3 case. In this talk we extend this idea to coherent configurations with regular weights taking values in the group of tth roots of unity. We define the covering configuration induced by the weight -- that is, a CC constructed from the weight via a t-fold cover. We describe an infinite family of regular 4-graphs on 2^n vertices whose covering configurations are non-symmetric schemes of order $2^{(n+2)}$.

4. (2016). Covering configurations and regular 4-graphs derived from weighted Hamming schemes. East Coast Combinatorics Conference, Mount Saint Vincent University, Canada
Main Audience: Researcher
Description / Contribution Value: Beginning with the distance graphs of the Hamming scheme H(n,2), we apply edge weights with values ±1, ±i and certain regularity properties to obtain an infinite family of regular weights on these schemes, and also an infinite family of regular 4-graphs on 2^n vertices. This construction produces non-symmetric association schemes ("covering configurations") on 2^(n+2) vertices and illustrates a generalization of the equivalence between regular two-graphs and antipodal double covers of complete graphs. The weight construction is due to Ada Chan.

5. (2015). On association schemes constructed from t-fold covers of schemes. Canadian Mathematical Society Summer Meeting: Graphs, Designs and Hypergraphs session, University of PEI, Canada
Main Audience: Researcher
Invited?: Yes
Description / Contribution Value: The Seidel matrix of a graph Γ may be viewed as a weight on the complete graph: edges of Γ are weighted (-1) and non-edges (+1). If Γ is strongly regular with n=2(2k-λ-μ), it lies in the switching class of a regular two-graph and we call the weight, analogously, regular on K_n. Generalizations of this result include the extended Q-bipartite double of a cometric association scheme of Martin, Muzychuk and Williford and the regular t-graphs of D.G. Higman, further investigated by Kalmanovich in the t=3 case. In this talk we describe construction of a CC from a weighted CC, via a t-fold cover.

6. (2014). Weighted strongly regular graphs with minimal closure. American Mathematical Society Southeastern Spring Sectional Meeting: Algebraic Methods in Graph Theory session, University of Tennessee, United States
Main Audience: Researcher
Invited?: Yes
Description / Contribution Value: A weighted association scheme is a scheme with an edge weight function, which for our purposes will take values ±1. When the scheme has a coherent fusion – a merging of classes resulting in another association scheme – the edge weights on the fusion scheme are inherited. The reverse process involves the coherent closure of a weighted scheme: the smallest coherent algebra containing the weighted adjacency matrices. In this talk we present two main objects of study: minimal rank coherent closures of strongly regular graphs with regular weights, with emphasis on closures of rank 4; and regular weights on strongly regular graphs obtained as fusions of association schemes with trivial regular weights. Both of these extend work of Taylor on regular two-graphs and their interactions with strongly regular graphs.

7. (2011). Type-II matrices associated with 2-graphs and weighted strongly regular graphs. Canadian Discrete and Algorithmic Mathematics Conference, University of Victoria, Canada
Main Audience: Researcher
Invited?: Yes
Description / Contribution Value: Spin models are matrices with nonzero complex entries satisfying certain conditions related to the Reidemeister moves in knot theory. Matrices satisfying the Type-II condition form a larger class, and have been found in connection with symmetric designs, sets of equiangular lines, strongly regular graphs, and some distance regular graphs. We investigate certain weighted strongly regular graphs, and find that Type-II matrices arise in this context as well.

8. (2010). Rank 5 association schemes with weighted rank 3 mergings. East Coast Combinatorics Conference, Saint Mary's University, Canada
   Main Audience: Researcher
   Description / Contribution Value: It is well known that some association schemes admit mergings, or fusions, that produce association schemes of lower rank. Here we consider schemes of 2r classes with mergings to r-class schemes. Under certain conditions, the higher rank scheme may be recovered through a certain closure operation applied to a weighted version of the r-class scheme. We illustrate this process using the 4-cube and its fusion to the Clebsch graph. We give conditions under which the closure of a weighted r-class scheme will be a 2r-class scheme, extending a result on regular 2-graphs whose switching class contains a strongly regular graph.

9. (2009). Type-II matrices associated with 2-graphs and weighted strongly regular graphs. East Coast Combinatorics Conference, University of New Brunswick-Saint John, Canada
   Main Audience: Researcher
   Description / Contribution Value: Spin models are matrices with nonzero complex entries satisfying certain conditions related to the Reidemeister moves in knot theory. Matrices satisfying the Type-II condition form a larger class, and have been found in connection with symmetric designs, sets of equiangular lines, strongly regular graphs, and some distance regular graphs. We investigate certain weighted strongly regular graphs, and find that Type-II matrices arise in this context as well.

10. (2009). Weighted strongly regular graphs associated with $S_4(q)$. Canadian Mathematical Society Summer Meeting, Algebraic Combinatorics session, Memorial University, Canada
    Main Audience: Researcher
    Description / Contribution Value: We construct a family of weighted strongly regular graphs using the rank 3 action of the projective symplectic group on the totally isotropic lines of the symplectic geometry. From the weighted srg's we obtain line systems with two intersection angles, some of which realise known bounds on the number of such lines. There are also type-II matrices associated with these weighted srg's, thus they illustrate nicely the connections between weighted srg's, line systems with two angles, and type-II matrices.

11. (2008). Type-II matrices and weighted Bose-Mesner algebras of rank 3. Algebraic Aspects of Association Schemes and Scheme Rings, University of Regina, Canada
    Main Audience: Researcher
    Invited?: Yes
    Description / Contribution Value: Spin models are matrices with nonzero complex entries satisfying certain conditions related to the Reidemeister moves in knot theory. Matrices satisfying the Type-II condition form a larger class, and have been found in connection with symmetric designs, sets of equiangular lines, strongly regular graphs, and some distance regular graphs. We investigate weighted strongly regular graphs -- srg's with edges weighted such that the weighted adjacency matrices span a matrix algebra -- and show that Type-II matrices arise in this setting as well.

12. (2000). Coherent closures. Com2MaC Conference on Association Schemes, Designs and Codes, Pohang, Korea, Republic of
    Main Audience: Researcher
    Invited?: Yes
    Description / Contribution Value: We provide an overview of the method of Weisfeiler-Leman stabilization for coherent configurations, and introduce software written to perform this algorithm on a set of input matrices.

13. (1998). Quotients of coherent configurations. Combinatorics seminar, Colorado State University, United States
    Main Audience: Researcher
    Invited?: Yes
    Description / Contribution Value: A result of C. D. Godsil and W. J. Martin [Quotients of association schemes, J. Combin. Theory Ser. A 69 (1995), 185--199] gives conditions under which a partition of the vertex set of an association scheme induces a quotient association scheme. This work extends that result to coherent configurations. We provide a concrete description of the basic relations of the quotient scheme, and a characterization of its parameters. Equivalent conditions to those of Godsil and Martin are determined.

14. (1998). Quotients of coherent configurations. American Mathematical Society Fall Sectional Meeting, Chicago, United States
    Main Audience: Researcher
    Invited?: Yes
    Description / Contribution Value: A result of C. D. Godsil and W. J. Martin [Quotients of association schemes, J. Combin. Theory Ser. A 69 (1995), 185--199] gives conditions under which a partition of the vertex set of an association scheme induces a quotient association scheme. This work extends that result to coherent configurations. We provide a concrete description of the basic relations of the quotient scheme, and a characterization of its parameters. Equivalent conditions to those of Godsil and Martin are determined.

15. (1993). Regular weights on strongly regular graphs. Jerusalem Combinatorics '93, Jerusalem, Israel
    Main Audience: Researcher
    Description / Contribution Value: Regular weights on coherent configurations are a natural extension of regular 2-graphs that were developed and parametrized by D.G. Higman. In this talk we investigate existence and non-existence of regular weights of full rank on strongly regular graphs.

Publications

Journal Articles

1. Sankey A. (2021). On strongly regular designs admitting fusion to strongly regular decomposition. Journal of Combinatorial Designs.
   Submitted,
   Refereed?: Yes
   Description / Contribution Value: A strongly regular decomposition of a strongly regular graph is a partition of the vertex set into two parts on which the induced subgraphs are strongly regular, or cliques or cocliques. Strongly regular designs as defined by D.G. Higman are coherent configurations of rank 10 with two fibres in which the homogeneous configuration on each fibre is a strongly regular graph. Haemers and Higman proved the equivalence between strongly regular decompositions, excluding special cases, and strongly regular designs with certain parameter conditions. Here we obtain this result by examining the strongly regular designs that admit a fusion to a strongly regular graph on the full vertex set. We derive equivalent conditions by elementary methods. Incorporating recent work of Hanaki and Kin and Reichard, a table of feasible parameter sets for this class of strongly regular designs is presented along with a discussion of known constructions.

2. Sankey A. (2018). On t-fold covers of coherent configurations. Ars Mathematica Contemporanea. 14: 397-413.
   Published,
   Refereed?: Yes

3.   Sankey A. (2015). Weighted association schemes, fusions, and minimal coherent closures. Journal of Algebraic Combinatorics. 41: 785-815.
     Published,
     Refereed?: Yes

4.   Sankey A. (2010). Type-II matrices in weighted Bose-Mesner algebras of ranks 2 and 3. Journal of Algebraic Combinatorics. 32: 133-153.
     Published,
     Refereed?: Yes

5.   Sankey A. (1997). Regular weights and the Johnson scheme. Israel Journal of Mathematics. 97: 11-28.
     Published, Israel
     Refereed?: Yes

6.   Sankey A. (1996). Regular weights of full rank on strongly regular graphs. Israel Journal of Mathematics. 95: 1-23.
     Published, Israel
     Refereed?: Yes

7.   Sankey A. (1994). Strongly regular fusions of tensor products of strongly regular graphs. Rocky Mountain Journal of Mathematics. 24: 709-718.
     Published, United States
     Refereed?: Yes

Thesis/Dissertation

1.   Regular weights on strongly regular graphs. (1992). University of Michigan. Doctorate. Supervisor: Donald G. Higman

Online Resources

1.   Sankey A. Repository of python code for use with strongly regular designs. (2021).
     Description / Contribution Value: This is a repository open to the public with Python code for: (i) producing tables of feasible parameters for strongly regular designs arising from strongly regular decompositions; (ii) testing feasible parameter sets using the krein condition; (iii) producing feasible parameter sets for two infinite families of strongly regular decompositions.

Tests

1.   Co-Author. Co-authored the exam from June 2007 through June 2018, with colleague at UNB-Saint John. This was Merzik Kamel, and later Rebecca McKay.Calculus Challenge Exam. (2007).
     Number of Contributors: 2
     Contribution Percentage: 51-60
     Description of Contribution Role: Oversaw creation, distribution, invigilation of the exam. With administrative assistance, maintained the website with topics list and past exams.
     Description / Contribution Value: Exam for students in high school (grade 12) calculus courses who are entering the University of New Brunswick and wish to receive credit and a grade for Math 1003 (Introduction to Calculus I) in lieu of taking the course at UNB.

Conference Publications

1.   (2005). Ethical behaviour and the cost of capital. Southern Management Association, 35th Annual Meeting, Charleston, SC, United States,
     Paper
     Published

2.   (2005). Four measures of firm risk and social performance. Southern Management Association, 35th
      Annual Meeting, Charleston, SC, United States,
      Paper
      Published