

PETER MCNAMARA

Department of Mathematics
Bucknell University
Lewisburg, PA 17837
USA

Office Phone: (570) 577-1901
Fax: (570) 577-3264
peter.mcnamara@bucknell.edu
<http://www.facstaff.bucknell.edu/pm040>

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS,
1999-2003

Ph.D. in Pure Mathematics, June 2003

Thesis: *Edge labellings of partially ordered sets*

Advisor: Richard P. Stanley

TRINITY COLLEGE, DUBLIN, IRELAND, 1995-1999

B.A. in Mathematics

ACADEMIC POSITIONS

BUCKNELL UNIVERSITY, LEWISBURG, PENNSYLVANIA, August 2006 - present

Assistant Professor

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS,

January 2009 - August 2009

Visiting Scholar

UNIVERSITY OF CALIFORNIA, BERKELEY, August 2008 - December 2008

Visiting Scholar

INSTITUTO SUPERIOR TÉCNICO, LISBON, PORTUGAL, August 2005 - July 2006

Postdoctoral Fellow

Mentor: Raul Cordovil

LABORATOIRE DE COMBINATOIRE ET D'INFORMATIQUE MATHÉMATIQUE,

UNIVERSITÉ DU QUÉBEC À MONTRÉAL, CANADA, July 2003 - July 2005

Postdoctoral Fellow

Mentors: François Bergeron and Christophe Reutenauer

HONORS AND AWARDS

Project NExT (New Experiences in Teaching) Fellow, 2006-2007

Charles W. and Jennifer C. Johnson Prize, 2003

Awarded by the MIT Department of Mathematics to a graduate student for an outstanding research paper accepted for publication in a major journal.

Charles and Holly Housman Award for Excellence in Teaching, 2003

Awarded by the MIT Department of Mathematics to a graduate student on the basis of student and staff evaluations.

MIT Presidential Fellowship, 1999-2000

Gold Medal for academic excellence upon graduation, Trinity College, 1999

Lloyd, Minchin and Roberts Prizes and Foundation Scholarship, Trinity College, 1996-1998

Individual winner, Irish Intervarsity Mathematics Competition, 1998

Honorable Mention, International Mathematics Olympiad, Toronto, 1995

RESEARCH INTERESTS

Combinatorics, often of an algebraic or order-theoretic nature. Specific topics include:

- Questions of Schur-positivity
- Relations among skew Schur functions
- Edge labellings of partially ordered sets
- P -partitions
- Matrix theory

PUBLICATIONS

Infinite log-concavity: developments and conjectures, with Bruce E. Sagan, *Advances in Applied Mathematics*, 44 (1) (2010), 1-15.

Positivity results on ribbon Schur function differences, with Stephanie van Willigenburg, *European Journal of Combinatorics*, 30 (5) (2009), 1352-1369.

Towards a combinatorial classification of skew Schur functions, with Stephanie van Willigenburg, *Transactions of the American Mathematical Society*, 361 (8) (2009), 4437-4470.

Necessary conditions for Schur-positivity, *Journal of Algebraic Combinatorics*, 28 (4) (2008), 495-507.

Cylindric skew Schur functions, *Advances in Mathematics*, 205 (1) (2006), 275-312.

Poset edge-labellings and left modularity, with Hugh Thomas, *European Journal of Combinatorics*, 27 (1) (2006), 101-113.

P -partitions and a multi-parameter Klyachko idempotent, with Christophe Reutenauer, *Electronic Journal of Combinatorics*, 11 (2) (2005), #R21, 18pp. Special volume in honor of Richard Stanley on the occasion of his 60th birthday.

Principal minor sums of $(A + tB)^m$, with Charles R. Johnson, Stefan Leichenauer and Roberto Costas, *Linear Algebra and its Applications*, 411 (2005), 386-389. Special issue on determinants and the legacy of Sir Thomas Muir.

Edge labellings of partially ordered sets, Ph.D. thesis, 2003.

EL-labelings, supersolvability and 0-Hecke algebra actions on posets, *Journal of Combinatorial Theory (Series A)*, 101 (1) (2003), 69-89.

PAPERS UNDER REVIEW

A Pieri rule for skew shapes, with Sami Assaf and an appendix by Thomas Lam, submitted, 16 pp.

PAPERS APPEARING IN PROCEEDINGS OF REFEREED CONFERENCES

Infinite log-concavity: developments and conjectures, with Bruce E. Sagan,
Formal Power Series and Algebraic Combinatorics, Hagenberg, Austria, July 2009.

A combinatorial classification of skew Schur functions, with Stephanie van Willigenburg,
Formal Power Series and Algebraic Combinatorics, Tianjin, China, July 2007.

Positivity questions for cylindric skew Schur functions,
Formal Power Series and Algebraic Combinatorics, Taormina, Italy, June 2005.

Poset edge-labellings and left modularity, with Hugh Thomas,
Formal Power Series and Algebraic Combinatorics, Vadstena, Sweden, June 2003.

PAPERS NOT INTENDED FOR PUBLICATION

Some positive differences of products of Schur functions, with François Bergeron, 2004, 24 pp.

PRESENTATIONS

Formal Power Series and Algebraic Combinatorics, Hagenberg, Austria, July 2009
Infinite log-concavity: developments and conjectures (poster)

Combinatorics Seminar, Dartmouth College, May 2009
The Schur-Positivity Poset

Combinatorics Seminar, University of Minnesota, April 2009
Infinite Log-Concavity

Combinatorics Seminar, MIT, February 2009
The Schur-Positivity Poset

Discrete Maths Seminar, University of British Columbia, November 2008
Infinite Log-Concavity

Mathematics Colloquium, San Francisco State University, October 2008
Infinite Log-Concavity

AMS Special Session on Combinatorics of Partially Ordered Sets, Claremont, California, May 2008
The Schur-Positivity Poset

Algebra Seminar, Bucknell University, September 2007
Two talks: *An Introduction to Symmetric Functions* and *The Schur-Positivity Poset*

Formal Power Series and Algebraic Combinatorics, Tianjin, China, July 2007
A Combinatorial Classification of Skew Schur Functions

- Workshop on Combinatorial Hopf Algebras and Macdonald Polynomials, Centre de Recherches Mathématiques, Montreal, May 2007
A Combinatorial Classification of Skew Schur Functions
- AMS Special Session on Algebraic Combinatorics, Fayetteville, Arkansas, November 2006
A Combinatorial Classification of Skew Schur Functions
- Combinatorics Seminar, University of Michigan, September 2006
When Are Two Skew Schur Functions Equal?
- Algebra Seminar, Universidade de Coimbra, Portugal, November 2005
A Combinatorial Lie Element for the Symmetric Group Algebra
- Seminário do CAMGSD, Instituto Superior Técnico, Portugal, October 2005
Symmetric Functions and Cylindric Schur Functions
- Formal Power Series and Algebraic Combinatorics, Taormina, Italy, June 2005
Positivity Questions for Cylindric Skew Schur Functions
- Mathematics Seminar, Pomona College, February 2005
An Introduction to the Combinatorics of Symmetric Functions
- Mathematics Department Colloquium, Bucknell University, January 2005
Symmetric Functions and Cylindric Schur Functions
- Combinatorics Seminar, University of Minnesota, November 2004
Cylindric Skew Schur Functions
- Le Séminaire du LaCIM, Université du Québec à Montréal, October 2004
Positivity Questions for Generalised Schur Functions
- Retrospective in Combinatorics: Honoring Stanley's 60th Birthday, MIT, June 2004
Cylindric Schur Functions
- Applied Algebra Seminar, York University, February 2004
P-partitions and Quasi-Symmetric Functions
- Discrete Mathematics and Optimization Seminar, McGill University, November 2003
Questions of Schur-Positivity
- Le Séminaire du LaCIM, Université du Québec à Montréal, September 2003
Edge Labellings of Partially Ordered Sets and Their Implications
- Formal Power Series and Algebraic Combinatorics, Vadstena, Sweden, June 2003
Poset Edge-Labellings and Left Modularity
- Ph.D. Thesis Defense, MIT, April 2003
Edge Labellings of Partially Ordered Sets
- AMS Special Session on Lattice Theory, Joint Mathematics Meetings, Baltimore, January 2003
Equivalent Characterizations of Lattice Supersolvability and Their Extensions
- Canadian Mathematical Society Summer Meeting, Québec City, June 2002
Permutation Edge-Labellings of Partially Ordered Sets

Combinatorics Seminar, MIT, December 2001

Two New Characterizations of Lattice Supersolvability

TEACHING AT BUCKNELL

Math 202 (Calculus II), Fall 2009

Math 320 (Introduction to Algebra), Fall 2009

Math 211 (Calculus III), Spring 2008

Math 320 (Introduction to Algebra), Spring 2008

Math 291 (Mathematical Problem Solving), Fall 2007

This new seminar course, which I proposed and designed, emphasized problems that appear in contests such as the Putnam Competition.

Math 343 (Numerical Analysis), Fall 2007

Math 240 (Combinatorics and Graph Theory for Secondary Mathematics), Spring 2007

Math 241 (Discrete Structures), Spring 2007

Math 202 (Calculus II), Fall 2006

Math 320 (Introduction to Algebra), Fall 2006

PREVIOUS TEACHING AND MENTORING EXPERIENCE

Mentor, Research Experiences for Undergraduates Program, College of William and Mary, Williamsburg, Virginia, Summer 2004

As part of NSF-funded program, guided two undergraduate research projects in Matrix Analysis. Worked with students to improve the mathematical exposition in their writing and presentations.

Instructor, Calculus, MIT, Summers 2001 and 2002

Full responsibility for course. This was a component of Project Interphase, an intensive program for entering first-years from minority backgrounds.

Recitation Instructor, MIT, 2000-2003

Taught for courses in Calculus, Linear Algebra, Differential Equations, Multivariable Calculus and Complex Analysis. Responsibilities included leading recitations, holding office hours, grading exams and homework, and assigning final grades.

Mentor, Summer Program for Undergraduate Research, MIT, 2001

Compiled a short list of appropriate open problems and presented them to an undergraduate student. Through daily meetings, guided him on his chosen research project regarding the combinatorics of hyperplane arrangements.

SERVICE TO BUCKNELL UNIVERSITY

Member of committee at the university level:

Committee on Staff Planning, August 2009 - present

Chair of departmental committee:

Competitions, August 2009 - present

Member of departmental committees:

Scholarships, August 2009 - present

Competitions, August 2006 - July 2008, August 2009 - present

Webmaster, August 2006 - July 2007, August 2009 - present

Mathematics Scholarships Selection Committee, February 2008 - April 2008

Student Liaisons and Resources, August 2007 - July 2008

Student Recruitment and Propaganda, August 2007 - July 2008

Ad Hoc Committee on Statistics, April 2007

Computer and Library Committee, August 2006 - July 2007

Presenter of talks entitled “A Life and Death Application of Mathematics,” September 2009, and “Tilings from the Floor Up,” October 2007, both in the Mathematics Department’s Student Colloquium Series.

Organizer of student trip to the Conference on Undergraduate Research in Mathematics, Penn State University, November 2007

Presenter of a talk entitled “Tangrams, Chessboards and Dominoes: Exploring Tilings,” Spring Open House, April 2007

Representative for Mathematics Department at the Fall University Fair, September 2006, and at the University Welcome Reception, August 2007

OTHER PROFESSIONAL ACTIVITIES

Member of the organizing committee for the 22nd International Conference on Formal Power Series and Algebraic Combinatorics, San Francisco, August 2010

Organizer of Special Session on Algebraic Combinatorics at the Fall Eastern Section Meeting of the American Mathematical Society, Pennsylvania State University, October 2009

Session Chair at the Conference on Undergraduate Research in Mathematics, Pennsylvania State University, November 2007

Organizer of Project NExT Session on “How to Increase the Number of Majors,” San Jose, August 2007

Judge for the Mathematical Association of America Undergraduate Poster Session, Joint Mathematics Meetings, New Orleans, January 2007

Organizer of Special Session on Algebraic Combinatorics at the Winter Meeting of the Canadian Mathematical Society, Montreal, December 2004

Research Assistant, MIT and Whitehead Institute, Summer 2000

Member of the development team of a gene-finding program as part of the MIT and Whitehead Institute’s contribution to the Human Genome Project

Referee for *Journal of Combinatorial Theory (Series A)*, *Electronic Journal of Combinatorics*, *Order*, *Central European Journal of Mathematics*, *Information Sciences*, *European Journal of Combinatorics*, *Annals of Combinatorics*, *Journal of Algebraic Combinatorics*

Reviewer for *Mathematical Reviews*; ten reviews completed

Member of the American Mathematical Society, the Mathematical Association of America, and the Association for Women in Mathematics