

# Andrew M. Baxter

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## Education

Ph.D. Mathematics. Rutgers, The State University of New Jersey. 2011.

*Thesis:* Algorithms for Permutation Statistics

*Advisor:* Doron Zeilberger

B.A. Mathematics. Millersville University, 2005.

*Minor:* Geography.

*Honors:* Magna Cum Laude, Departmental Honors (Mathematics)

## Teaching and Research Fields

Discrete Mathematics, Enumerative Combinatorics, Permutation Patterns, Experimental Mathematics.

## Academic Employment

*Pennsylvania State University*

Instructor, Fall 2011 – Present.

*Rutgers, The State University of New Jersey*

Graduate Assistant, Spring 2011.

Teaching Assistant, *Various Courses*. See “Teaching” below, Fall 2006 – Fall 2010.

Grader, *Math 300: Introduction to Proof*, Fall 2005 – Spring 2006.

*Millersville University, Department of Mathematics*

Mathematics Tutor, Math Assistance Center. Spring 2002 – Spring 2005.

Math Assistance Center Assistant-Coordinator. Spring 2002 – Spring 2005.

Teaching Assistant, Mathematics for Non-Science Majors. Spring 2002 – Spring 2005.

*Millersville University, Department of Earth Sciences*

Research Assistant, Jason Price, Summer 2004.

## Honors & Awards

*Fellowships*

Rutgers Academy for the Scholarship of Teaching and Learning. Fall 2010 — Spring 2011.

Carnegie Academy for the Scholarship of Teaching and Learning. Fall 2008 – Spring 2010.

*Awards*

School of Arts Sciences Award for Distinguished Contributions to Undergraduate Education (Click here for link.) 2009.

TA Excellence Award (Rutgers Math Department). Fall 2007.

EPADEL Prize: Best Undergraduate Paper. “Combinatorial properties of billiards on an equilateral triangle.” 2005.

MathFest Outstanding Undergraduate Presentation (joint with Stephen Weaver). “Periodic Orbits in Triangular Air Hockey.” 2003.

## Publications

*Papers*

Baxter, Andrew and Ron Umble. “Periodic orbits of billiards on an equilateral triangle.” *American Math Monthly*. Vol. 115, no. 6 2008. 479–491.

Baxter, Andrew. “Applying the cluster method to count occurrences of generalized permutation patterns.” *Journal of Difference Equations and Applications*. Volume 17, Issue 05, 2011. 709–720.

Baxter, Andrew. “Refining enumeration schemes to count according to inversion number.” *Pure Mathematics and Applications* (Special issue for the proceedings of Permutation Patterns 2009). Volume 21. Issue No. 2. (2010). 137–160.

Baxter, Andrew and Doron Zeilberger. “The number of inversions and the major index of permutations are asymptotically joint-independently normal.” *Personal Journal of Shalosh B. Ekhad and Doron Zeilberger*. October 2010.

Baxter, Andrew and Brian Nakamura and Doron Zeilberger. “Automatic generation of theorems and proofs on enumerating consecutive-Wilf classes.” *To appear in the Proceedings of the W80 Conference*.

Baxter, Andrew and Aaron Jaggard. “Some general results for even-Wilf-equivalence.” *Electronic Journal of Combinatorics*. Volume 18 (2), 2011.

Baxter, Andrew and Lara Pudwell. “Enumeration schemes for vincular patterns.” *To appear in Discrete Mathematics*.

Baxter, Andrew. “Shape-Wilf-equivalence for vincular patterns.” *Available on ArXiv*.

Baxter, Andrew. “Translating enumeration schemes into functional equations.” *In Preparation*.

Baxter, Andrew and Jonathan Eskreis-Winkler and Ethan McCarthy. “Enumerating periodic billiards in certain polygons.” *In Preparation*.

### *Instructional Websites*

Background Information Pages for Maple Assignments in Math 251. Revised and partially re-wrote the original versions by Stephen Greenfield.  
<http://www.math.rutgers.edu/courses/251/>

Information for Instructors for Maple Assignments in Math 251. Revised and streamlined process originally developed and documented by Stephen Greenfield.  
[http://www.math.rutgers.edu/courses/251/251\\_for\\_instructors/maple\\_start.html](http://www.math.rutgers.edu/courses/251/251_for_instructors/maple_start.html)

### *Books*

Baxter, Andrew, Amanda Mills, and Hisa Tsutsui. “Mathematical Ideas for Non-Science Majors.” Pearson Books. January 2005.

## Talks

### *Invited Talks*

“Enumerating periodic billiards on certain polygons.” Millersville University/Franklin & Marshall Joint Colloquium. October 2011.

“Enumeration schemes and their extensions and refinements.” Penn State Combinatorics/Partitions Seminar. April 2010.

“An invitation to permutation patterns.” Embry-Riddle Mathematics Faculty Colloquium. October 2009.

### *Conference Presentations*

“From enumeration schemes to functional equations.” Permutation Patterns 2011. June 2011.

“Some general results for even-Wilf-equivalence.” Permutation Patterns 2010. August 2010.

“Using enumeration schemes to  $q$ -enumerate avoidance sets.” Permutation Patterns 2009. July 2010.

“Generalized permutation patterns over words.” Graduate Student Combinatorics Conference. March 2009.

“A translation method for finding combinatorial bijections.” Graduate Student Combinatorics Conference. April 2008.

“Partitioning an integer into  $k$  parts congruent modulo  $m$ .” Graduate Student Combinatorics Conference. April 2007.

“Periodic orbits in triangular air hockey.” MathFest. August 2003.

### *Rutgers University Seminars*

“Dealing with different levels of academic preparation.” Teaching Seminar (Mathematics Department). October 2010.

“Pattern avoidance by even permutations.” Rutgers Graduate Combinatorics Seminar. September 2010.

“Dealing with different levels of academic preparation.” Teaching Assistant Project Workshop. September 2010, February 2011.

- “Active learning.” Guest lecture in Introduction to College Teaching I. March 2010.
- “Motivating students.” Teaching Assistant Project Workshop. February 2010.
- “Using the cluster method to enumerate generalized permutation patterns.” Rutgers Graduate Combinatorics Seminar. October 2009.
- “An invitation to permutation patterns.” Rutgers Graduate Pizza Seminar. October 2009.
- “Strategies for dealing with difficult students.” Teaching Assistant Project Workshop. September 2009.
- “Overcoming teaching anxiety.” Session during Rutgers Teaching Assistant Orientation. August 2009, August 2010.
- “An introduction to generating functions, part 2.” Rutgers Graduate Combinatorics Seminar. February 2009.
- “Active learning in large classes.” TA Project Workshop. Rutgers Teaching Assistant Project Workshop. February 2009.
- “Teaching a class for the first time.” Rutgers Teaching Assistant Project Workshop. November 2008.
- “Active learning / group work / problem solving.” Guest lecture in Introduction to College Teaching II. October 2008, September 2009.
- “Generalized permutation patterns and Mahonian statistics.” Rutgers Graduate Combinatorics Seminar. September 2008.
- “Sperner’s lemma and fair division.” Rutgers Graduate Pizza Seminar. September 2008.
- “Modular diagrams in partition theory.” Rutgers Graduate Combinatorics Seminar. March 2008.
- “What I learned in Math 103.” Rutgers Graduate Pizza Seminar. September 2007.
- “Periodic billiards on an equilateral triangle.” Rutgers Experimental Math Seminar. February 2007.
- “Partition bijections.” Rutgers Graduate Pizza Seminar. April 2007.
- “Euler, the master of us all.” Rutgers Graduate Pizza Seminar. September 2006.
- “Triangular billiards.” Rutgers Graduate Pizza Seminar. November 2005.

“Periodic orbits in triangular air hockey.” Millersville University Math Awareness Month Talk. April 2005.

“Periodic orbits in triangular air hockey.” Millersville University Undergraduate Research Conference. April 2005.

## Teaching

### *Penn State University*

Math 035: General View of Mathematics. Instructor. Spring 2012.

Math 471: Geometry for Teachers. Instructor. Spring 2012.

Math 140: Calculus with Analytic Geometry I. Instructor. Fall 2011.

### *Rutgers University*

Math 454: Combinatorial Theory. Lecturer. Summer 2010.

Math 151: Calculus I for Mathematical and Physical Sciences. Lecturer and Recitation Instructor. Fall 2009, Spring 2010.

Math 152: Calculus II for Mathematical and Physical Sciences. Recitation Instructor. Spring 2009.

Math 151: Calculus I for Mathematical and Physical Sciences. Recitation Instructor. Fall 2008.

Math 251: Multivariable Calculus. Recitation Instructor. Spring 2007, Fall 2007, Spring 2008, Fall 2010.

Math 112: Precalculus II. Recitation Instructor. Fall 2007.

Math 103: Topics in Mathematics for Liberal Arts Majors. Lecturer. Summer 2007, Summer 2008.

### *Instructional Support*

Head Teaching Assistant for Maple Instruction in Math 251/244, Fall 2007, Spring 2008, Fall 2010.

Mentor for Summer Instructors. Summers 2008 – 2011.

Duties: Performed classroom observations and discussed them with the instructor, previewed exams, and aided in Maple instruction.

Head Teaching Assistant for Calculus Workshops in Math 151/152. Fall 2008 and Spring 2009.

## Professional Activities

### *Service*

Referee for American Mathematical Monthly (2011) and Mathematics Magazine (2011).

Mentor for DIMACS-Rutgers REU. Advised two students (Jonathan Eskreis-Winkler and Ethan McCarthy) for an eight-week span on an original research project. Summer 2011.

Instructional Assistant for the Summer Institute of the NJ Partnership for Excellence in Middle School Mathematics. Summer 2011.

Duties: Overseeing workshop sessions in a course on Data and Probability. The program is designed for mid-career middle school math teachers preparing to become math coaches and facilitating professional learning communities.

Associate Editor for the Online Encyclopedia of Integer Sequences.

Co-founder and co-organizer for the Math Department's Teaching Seminar. Fall 2009, Fall 2010.

Co-organizer for DIMACS and Rutgers Experimental Math Seminar. Fall 2007 – Present.

Co-organizer for Rutgers Graduate Pizza Seminar. Fall 2006 – Spring 2007.

Assistant Coordinator for Math Assistance Center (Millersville University). Spring 2002 – Spring 2005.

### *Professional Memberships*

Mathematics Association of America, 2008 – Present.

American Mathematical Society, 2006 – 2008. Fall 2010 – Present.

### *Conferences Attended*

An asterisk indicates I presented a talk at the conference.

Permutation Patterns 2011\*, California Polytechnic State University (CalPoly), June 20–24, 2011.

Joint Mathematics Meetings, New Orleans, LA, January 6–9, 2011.

Permutation Patterns 2010\*, Dartmouth College, August 9–13, 2010.

Permutation Patterns 2009\*, University of Florence, Italy, July 13–17, 2009.

Graduate Student Combinatorics Conference\*, University of Kentucky, March 28–29, 2009.

Joint Mathematics Meetings, Washington, DC, January 5–8, 2009.

Graduate Student Combinatorics Conference\*, University of California, Davis, April 12–13, 2008.

Graduate Student Combinatorics Conference\*, University of Washington, April 21–22, 2007.

MathFest 2003\*, University of Colorado at Boulder, July 31 – August 2, 2003.

### *Service-related Coursework*

Leadership Issues in Higher Education. Fall 2010. This course, the first of its kind, is designed to “enhance graduate students’ leadership knowledge and competencies, and [to] broaden their understanding of the contemporary challenges facing U.S. colleges and universities.”

Educating about the State of the Planet and Sustainability while Enhancing Calculus. Minicourse at the Joint Mathematics Meetings, Washington D.C., January 5–8, 2009.

## Miscellaneous

### *Computer Skills*

Maple, Mathematica, HTML,  $\LaTeX$ .

## References

Doron Zeilberger  
Professor of Mathematics  
Rutgers University  
zeilberg@math.rutgers.edu

Michael Weingart  
Instructor of Mathematics  
Rutgers University  
`weingart@math.rutgers.edu`

Barbara Bender  
Associate Dean for Academic Support and Graduate Student Services  
Rutgers University  
`bbender@rci.rutgers.edu`

Sergi Elizalde  
Assistant Professor  
Dartmouth College  
`sergi.elizalde@dartmouth.edu`

Aaron Jaggard  
Visiting Assistant Professor of Computer Science  
Colgate University  
`adj@dimacs.rutgers.edu`

Stephen Greenfield  
Professor of Mathematics, Emeritus  
Rutgers University  
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