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RESEARCH INTERESTS

General: combinatorics (AMS 05), probability (AMS 60), complexity theory (AMS 68),
bioinformatics (AMS 92D).
Specific: Finite Markov chains. Graph theory. Probabilistic methods in combinatorics.
Discrete dynamics of genetic sequences.

EDUCATION

Department of Mathematics, Harvard University.

Ph.D. received June 1999.

Advisor: Persi Diaconis.

Thesis: *Exact Rates of Convergence for Some Simple Non-Reversible Markov Chains.*

A.M. received 1996.

Department of Mathematics, University of Chicago. 1991-1992.

Harvard and Radcliffe Colleges.

A.B. magna cum laude in Mathematics received 1991.

Budapest Semesters in Mathematics. Fall 1989.

EMPLOYMENT

Department of Mathematics, Oberlin College.

Associate Professor, July 2004-present.

Assistant Professor, July 1999-June 2004.

Instructor, July 1998-June 1999.

Have taught courses at all levels of the undergraduate curriculum, including calculus, discrete mathematics, probability, and abstract algebra. Developed upper-level courses in combinatorics and mathematical logic and a non-majors course (*Dots, Lines, and Coin Flips*) on applications of graph theory and probability. Have supervised senior honors projects on combinatorics, representation theory, algebra, and mathematical logic.

Department of Mathematics, Harvard University.

Teaching Fellow, 1997. Led section of linear algebra with differential equations.

Teaching Fellow, 1996. Developed undergraduate seminar course in probabilistic combinatorics.

Graduate Course Assistant, 1992-1995.

Undergraduate Course Assistant, 1988-1991.

Summer Program for Women in Mathematics, George Washington University.

Graduate Assistant, 1996. Worked with courses in algebraic combinatorics and topology.

Information Sciences, AT&T Bell Laboratories.

Member of the Technical Staff-III, summer 1994.

Summer Technical Associate, summer 1991.

Center For Communications Research, Institute for Defense Analyses.

SCAMP Research Staff Member, summer 1992, 1993.

Mathematical Olympiad Training Program, United States Military Academy.

Lecturer, June 1993.

PUBLICATIONS

Reversals and transpositions over finite alphabets.

Joint with A.D. Scott and A.J. Radcliffe. To appear, *SIAM Journal on Discrete Mathematics*.

A local limit theorem for a family of non-reversible Markov chains.

Journal of Theoretical Probability **16** (2003), pp. 751–770.

A note on completely disconnecting trees.

Congressus Numerantium **159** (2002), pp. 143-149.

Graphs induced by Gray codes.

Joint with Michael D. Ernst. *Discrete Mathematics* **257** (2002), pp. 585-598.

Comparing eigenvalue bounds for Markov chains: when does Poincaré beat Cheeger?

Joint with Jason Fulman. *The Annals of Applied Probability* **9** (1999), pp. 1-13.

IN PREPARATION

Local limit theorems for sparse and multiscale random walks on graphs.

Asymptotic spectra of daisy chains.

Sharp results on shuffling genomes.

Joint with A.D. Scott.

Transposition sorting of ternary strings.

PRESENTATIONS

Finding your Niche.

Panel member, Women in Mathematics lunch. University of Akron, November, 2003.

Extreme Hypergraphs.

Invited talk. Kenyon College (Ohio Speakers Circuit), March, 2003.

A local limit theorem for a family of non-reversible Markov chains.

Contributed talk. Joint Mathematics Meetings, Baltimore. January, 2003.

Graphs Induced by Gray Codes.

Invited talk. SIAM Workshop on Algorithms for Listing, Counting, and Enumeration, Baltimore. January 2003.

- Completely disconnecting trees.*
Contributed paper, 33rd Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Florida Atlantic University. March 2002.
- Local Limit Theorems for Some Simple Non-Reversible Markov Chains.*
Combinatorics seminar, Massachusetts Institute of Technology. May 2000.
- Graphs Induced by Gray Codes.*
Invited talk. Combinatorialists of New England meeting, Smith College. April 2000.
- Gray Codes and Graphs.*
Oberlin College. November 1999.
- An Introduction to Hyperbolic Ramsey Theory.*
University of Minnesota, Duluth. August 1999.
- Exact Rates of Convergence for Random Walks on Some Simple Digraphs.*
Indiana-Purdue University Fort Wayne. April 1999.
- A Small Unsolved Problem and How It Grew.*
University of Akron. February 1999.
- Random Walks and Electrical Networks.*
Oberlin College. December 1998.
- Convergence to Stationarity for Non-Reversible Markov Chains.*
Smith College, March 1998. Also at Hofstra University, March 1998.
- Introduction to Probabilistic Combinatorics.*
Gustavus Adolphus College, February 1998. Also at Oberlin College, February 1998.
- Local Limit Theorems for Simple Non-Reversible Markov Chains.*
Seminar, Johns Hopkins University. January 1998.
- Exact Rates of Convergence for Some Simple Non-Reversible Markov Chains.*
AWM Workshop poster presentation, Joint Mathematics Meetings. Baltimore, January 1998.
- Random Walks on Some Simple Digraphs.*
Contributed paper, 28th Southeastern International Conference on Combinatorics, Graph Theory, and Computing. Florida Atlantic University, 1997.
- Graph Eigenvalues and Random Walks.*
Seminar, George Washington University. 1996.

RESEARCH SUPPORT

- Member, Mathematical Sciences Research Institute, Berkeley, CA. January-May 2005.
- Invited participant, American Institute of Mathematics Research Conference Center Workshop on Sharp Thresholds for Mixing Times. December 2004.
- Association for Women in Mathematics Mentorship Travel Grant. August 2002 and June 2003.

Microsoft Research Theory Group consultant, with visits in January 2001, November 2001 and July 2003.

Invited participant, Network Dynamics Workshop, Santa Fe Institute. August 2000.

Invited participant, Workshop in Combinatorial Methods for Statistical Physics Models, Georgia Institute of Technology. April 1999.

HONORS

Project NExT (New Experiences in Teaching) Fellow, 1998-1999.

AT&T Laboratories Fellowship Program, 1996-1998.

AT&T Bell Laboratories Graduate Research Program for Women Fellowship, 1991-1996.
(Also offered graduate fellowships by National Science Foundation, Office of Naval Research, US Air Force Laboratories, and National Physical Science Consortium, 1991.)

University of Chicago Robert R. McCormick Fellow, 1991-1992.

Phi Beta Kappa, Radcliffe chapter, 1991.

Achievement Rewards for College Scientists Foundation Boston Chapter Scholarship, 1990.

Association for Women in Mathematics Alice T. Schafer Mathematics Prize, 1990.

Mathematical Contest in Modeling, member, first place team, 1988.

Westinghouse Science Talent Search, second place, 1987.

USA Mathematical Olympiad, seventh place, 1987.

PROFESSIONAL SERVICE

Referee for *Random Structures and Algorithms* and *The College Mathematics Journal*.

Five College Mathematics Contest.

Author and Grader. Wrote and graded the 2003 competition, which is taken by teams from Antioch, Denison, Kenyon, Ohio Wesleyan, and Wittenburg.

American Regions Mathematics League

Author and Grader. Wrote Power Question (15 students write proofs for an hour) and solutions for national high school team competition, 1997. Graded, 1996 and 1997.

PROFESSIONAL SOCIETIES

American Mathematical Society
Society for Industrial and Applied Mathematics
Mathematical Association of America
Association for Women in Mathematics