

## EMILY B. DRYDEN

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### EDUCATION

DARTMOUTH COLLEGE, HANOVER, NEW HAMPSHIRE, 1999-2004  
Ph.D. in Mathematics, June 2004  
Advisor: Carolyn S. Gordon  
A.M. in Mathematics, June 2001  
BOWDOIN COLLEGE, BRUNSWICK, MAINE, 1995-1999  
A.B. in Mathematics (with Honors) and French, *summa cum laude*

### ACADEMIC POSITIONS

BUCKNELL UNIVERSITY, LEWISBURG, PENNSYLVANIA, August 2006-present  
Assistant Professor, Department of Mathematics  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS, January 2009-August 2009  
Visiting Scholar in Pure Mathematics  
MATHEMATICAL SCIENCES RESEARCH INSTITUTE, BERKELEY, CALIFORNIA, August 2008-December 2008  
Postdoctoral Fellow, Analysis of Singular Spaces program  
INSTITUTO SUPERIOR TÉCNICO, LISBON, PORTUGAL, October 2005-July 2006  
Postdoctoral Fellow, Centro de Análise Matemática, Geometria e Sistemas Dinâmicos  
CENTRE INTERFACULTAIRE BERNOULLI, EPFL, LAUSANNE, SWITZERLAND, August-September 2005  
Visiting Professor, program in *Spaces of Negative Curvature*  
MCGILL UNIVERSITY, MONTREAL, CANADA, August 2004-July 2005  
Postdoctoral Fellow, Department of Mathematics and Statistics  
COLLEGE OF WILLIAM AND MARY, WILLIAMSBURG, VIRGINIA, June-July 2004  
Mentor, Research Experience for Undergraduates (REU) in Matrix Analysis  
EPFL, LAUSANNE, SWITZERLAND, January 2004  
Invited Academic Visitor, Département de Mathématiques

### RESEARCH INTERESTS

Geometry, with connections to analysis and number theory. Recent work involves inverse spectral problems, asymptotics of the heat trace on orbifolds, and upper bounds on eigenvalues.

### PUBLICATIONS

Huber's Theorem for Hyperbolic Orbisurfaces, with Alexander Strohmaier, *Canadian Mathematical Bulletin*, **52** (2009), 66-71.  
Asymptotic expansion of the heat kernel for orbifolds, with Carolyn S. Gordon, Sarah J. Greenwald and David L. Webb, *Michigan Mathematical Journal*, **56** (2008), 205-238.  
Hearing the weights of weighted projective planes, with Miguel Abreu, Pedro Freitas and Leonor Godinho, *Annals of Global Analysis and Geometry*, **33** (2008), 373-395.  
Extremal  $G$ -invariant eigenvalues of the Laplacian of  $G$ -invariant metrics, with Bruno Colbois and Ahmad El Soufi, *Mathematische Zeitschrift*, **258** (2008), 29-41.  
Adjacent Edge Conditions for the Totally Nonnegative Completion Problem, with Charles R. Johnson and Brenda K. Kroschel, *Linear and Multilinear Algebra*, **56** (2008), 261-277.  
Collars and partitions of hyperbolic cone-surfaces, with Hugo Parlier, *Geometriae Dedicata*, **127** (2007), 139-149.  
*Geometric and Spectral Properties of Compact Riemann Orbisurfaces*, Ph.D. thesis, 2004.

## ARTICLES UNDER REVIEW

*In search of a round football*, with Elizabeth Stanhope.

*Bounding the eigenvalues of the Laplace-Beltrami operator on compact submanifolds*, with Bruno Colbois and Ahmad El Soufi.

*Hearing Delzant polytopes from the equivariant spectrum*, with Victor Guillemin and Rosa Sena-Dias.

## HONORS AND AWARDS

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

Selected Presenter, AWM Workshop, January 2004 (declined due to conflict with invitation to EPFL)

Graduate Fellowship, Dartmouth College, 1999-2004

Hammond Mathematics Prize, Bowdoin College, 1999

Phi Beta Kappa, 1999

Smyth Mathematics Prize, Bowdoin College, 1997

Barry M. Goldwater Scholarship, 1997-1999

## SELECTED PRESENTATIONS

*The equivariant heat trace and isospectrality*

Spring Meeting of the Swiss Mathematical Society 2009: Geometric Spectral Theory, Neuchâtel, 10 June 2009

*Eigenvalue (mis)behavior on manifolds*

Mathematics Department Colloquium, Dartmouth College, 7 May 2009

*Hearing Delzant polygons*

Spectral Geometry Seminar, Dartmouth College, 7 May 2009

*The asymptotic expansion of the heat kernel for orbifolds*

MSRI Joint Postdoctoral Seminar, 24 October 2008

*Hearing the geometry of orbifolds*

San Francisco State University Mathematics Department Colloquium, 5 November 2008

UC Santa Cruz Mathematics Department Colloquium, 7 October 2008

*Listening to orbifolds: What does the Laplace spectrum tell us?*

Interdisciplinary Seminar on PDEs and their Applications, Penn State Altoona, 9 May 2008

*Extremal invariant eigenvalues of the Laplacian of invariant metrics*

AMS Special Session on Inverse Problems in Geometry, San Diego, 8 January 2008

*Bagels, beach balls, and the Poincaré Conjecture*

Mathematics Department Colloquium, Susquehanna University, 18 October 2007

*Hearing the weights of weighted projective planes*

AMS Special Session on Spectral Theory, Orbifolds, Symplectic Reduction and Quantization, Oxford, Ohio, 17 March 2007

*Using heat invariants to hear the geometry of orbifolds*

Geometria em Lisboa, Instituto Superior Técnico, Portugal, 7 March 2006

*Upper bounds for invariant eigenvalues of the Laplacian*

Seminário de Física-Matemática, Universidade de Lisboa, Portugal, 10 February 2006

*The Laplace spectrum reveals (some of) its secrets*

Research Seminar, Centre Interfacultaire Bernoulli, Lausanne, Switzerland, 31 August 2005

*Can one hear the shape of a...?*

Mathematics Department Colloquium, Scripps College, 16 February 2005

*Triangles, Tilings, and Tori*

Mathematics Department Colloquium, Middlebury College, 8 February 2005

*Listening to Orbifolds: What does the Laplace spectrum tell us?*

Mathematics Department Colloquium, Bucknell University, 1 February 2005

*Inverse Spectral Problems on Hyperbolic Orbisurfaces*

Analysis Seminar, McGill University, 28 January 2005

*Collars and Partitions of Hyperbolic Cone-Surfaces*

AMS Special Session on Inverse Spectral Geometry, Atlanta, 8 January 2005

*Isospectrality of Compact Riemann Orbisurfaces*

Recent developments in spectral geometry, Blossin, Germany, 2 November 2004

*Geodesic Behavior on Hyperbolic Cone-Surfaces*

Séminaire CIRGET, Université du Québec à Montréal, 10 September 2004

*Geometric and Spectral Properties of Compact Riemann Orbisurfaces*

Thesis Defense, Dartmouth College, 13 May 2004

*Bounding the Size of Isospectral Sets of Orbifolds*

Analysis Seminar, McGill University, 27 February 2004

*Isospectrality of Two-Dimensional Riemannian Orbifolds*

Workshop on Inverse Spectral Problems, Dartmouth College, 21 November 2003

*Inverse Spectral Problems on Riemannian Orbifolds*

Differential Geometry Session, Union College Mathematics Conference, 8 November 2003

*Isospectrality of Orbifolds*

Geometry Seminar, EPFL, Switzerland, 25 June 2003

## TEACHING AND MENTORING EXPERIENCE

BUCKNELL UNIVERSITY, Fall 2006-present

*Assistant Professor*

Fall 2009: Math 211 (Calculus III), Math 280 (Logic, Sets, and Proofs)

Spring 2008: Math 202 (Calculus II), Math 345 (Linear Algebra)

Fall 2007: Math 211 (Calculus III)

Spring 2007: Math 213 (Elementary Linear Algebra)

Fall 2006: Math 202 (Calculus II), Math 335 (Geometry)

*Mentor for Honors Thesis*, Fall 2009-Spring 2010

*Mentor for Presidential Fellow*, Fall 2007: assisted in supervising a “Mathematics WeBWorK Intern”

McGILL UNIVERSITY, Summer 2005

*Mentor*: supervised undergraduate research project in Riemannian “football” orbifolds

COLLEGE OF WILLIAM AND MARY, REU in Matrix Analysis, Summer 2004

*Mentor*: supervised undergraduate research project in completion problems for partial matrices

DARTMOUTH COLLEGE, Winter 2002, Spring 2003, Fall 2003

*Lecturer*: Calculus with Algebra and Trigonometry, Linear Algebra with Applications, Discrete Probability

## SERVICE TO BUCKNELL UNIVERSITY

SECRETARY, Phi Beta Kappa, May 2009-present

MEMBER, Composition Council, August 2008-July 2011 (on leave August 2008-July 2009)

MATHEMATICS DEPARTMENT COMMITTEES

Talks Committee, Chair: June 2009-May 2010, Member: August 2006-May 2008

External Review Committee, Member: June 2009-May 2010

Student Liaisons and Resources Committee, Member: August 2006-May 2008, June 2009-May 2010

Hiring Committee, Member: June 2007-May 2008

Curriculum Committee, Member: August 2006-May 2007

MEMBER, Phi Beta Kappa Awards Committee, April 2008

ORGANIZER, student trip to Conference on Undergraduate Research in Mathematics, Penn State University, November 2007

PRESENTER, “Bagels, beach balls, and the Poincaré Conjecture,” Mathematics Department Student Colloquium Series, 6 September 2007

PRESENTER, “The Poincaré Conjecture: the people, the intrigue, the money and the math,” Bucknell Open House for Admitted Students, 14 April 2007

ADVISOR, Bucknell Chapter of Pi Mu Epsilon, August 2006-July 2008

MATHEMATICS DEPARTMENT REPRESENTATIVE, Admissions Open House, September 2006

#### **OTHER PROFESSIONAL ACTIVITIES**

AUTHOR, Teaching Time Savers: The Microphone is Mightier than the Pen, *MAA Focus*, November 2008

MEMBER, National Science Foundation Grant Proposal Review Panel, September 2008

SESSION CHAIR, Conference on Undergraduate Research in Mathematics, Penn State University, November 2007

ORGANIZER, Project NExT Panel on Assessment, Joint Mathematics Meetings, New Orleans, January 2007

JUDGE, Undergraduate Poster Session, Joint Mathematics Meetings, New Orleans, January 2007

ORGANIZER, Geometry Fair for area middle school students, November 2006

PARTICIPANT, American Mathematical Society Committee on Meetings and Conferences focus group, Atlanta, January 2005

REFEREE: *New York Journal of Mathematics*, National Science Foundation

REVIEWER, *Mathematical Reviews*

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