

ELIZABETH J DENNE

CURRICULUM VITAE 2011-12

CURRENT ADDRESS

Smith College
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CITIZENSHIP Australian, US green-card holder.

POSITIONS HELD

Assistant Professor July 2007 – present.
Smith College, Department of Mathematics & Statistics.

Benjamin Peirce Assistant Professor July 2004 – June 2007.
Harvard University, Department of Mathematics.

ACADEMIC DEGREES

Ph.D. Mathematics University of Illinois, Urbana-Champaign. Aug. 1998 – May 2004.
Thesis Advisor: Professor John M. Sullivan.
Thesis Title: *Alternating Quadrisecants of Knots*.

B.Sc. (Hons) University of Sydney, Australia. First class Honours. Feb. 1993 – Dec. 1997.
Thesis Advisor: Dr Donald Cartwright.
Honours Thesis: *The Uniformization Theorem for Riemann Surfaces*.

RESEARCH

Published

- (1) *Quadrisecants give new bounds for Ropelength*, with Y. Diao, J.M. Sullivan.
Geometry and Topology **10** (2006), 1–26
- (2) *Convergence and Isotopy for Graphs of Finite Total Curvature*, with J.M. Sullivan.
In *Discrete Differential Geometry*, Birkhäuser, (2008). 163–174
- (3) *The distortion of a knotted curve*, with J.M. Sullivan.
Proc. Amer. Math. Soc. **137** (2009) no. 3, 1139–1148

Submitted

- (1) *Alternating Quadrisecants of Knots*.
Submitted. arXiv:math.GT/0510561.

In Preparation — results summarized at www.math.smith.edu/~edenne/research.php.

- (1) *Transversality theorems for configuration spaces and applications to the “square peg” problem*, with J. Cantarella and J. McCleary. In preparation.
- (2) *Ribbonlength for knot diagrams*, with J.M. Sullivan and N. Wrinkle.
In preparation.

(3) *Quadriseccants and unknotting number of knots.*

In preparation.

(4) *From Molecules to the Universe: an Introduction to Topology*, with Erica Flapan & 17 other members of the Undergraduate Faculty Program at PCMI (July 2011). This is an introductory undergraduate textbook on topology.

INVITED TALKS — conferences (2006-2011)

Sept. 2011 **AMS Sectional Meeting** Wake Forest University, Winston-Salem, NC.

Geometric Knot Theory Special Session — *Square pegs and Inscribed Polygons.*

March 2011 **Topological Problems in Molecular Biology Conference** Iowa City, IA.

Flat Ribbon Links in \mathbb{R}^2 and the medial axis.

Jan. 2011 **Joint Math Meetings** New Orleans, LA.

AMS Special Session on Measures of Entanglement — *Flat Ribbon Links in \mathbb{R}^2 , an update.*

April 2010 **AMS Sectional Meeting** Macalester College, St Paul, MN.

Physical Knotting and Linking Special Session — *Flat Ribbon Links in \mathbb{R}^2 .*

July 2009 **Unknot Conference** Denison University, Granville, OH.

How much string do you need to tie your shoelaces?

Sept. 2008 **AMS Sectional Meeting** Wesleyan University, Middletown CT.

Low dimensional topology Special Session — *Further results on the “square peg” problem.*

Nov. 2007 **AMS Sectional Meeting** Murfreesboro, Tennessee.

Physical Knots and Links Special Session — *Further results on the “square peg” problem.*

May 2007 **Southeast Geometry Seminar** Georgia Institute of Technology, Atlanta GA.

The distortion of a knotted curve.

Oct. 2006 **AMS Sectional Meeting** Cincinnati, OH.

Knot Theory Special Session — *Convergence and isotopy type of knotted graphs.*

RESEARCH PROGRAMS & WORKSHOPS (2006-2011)

July 2011 **Participant:** *Park City Mathematics Institute* Undergraduate Faculty Program, UT.

Spring 2010 **Participant:** *Homology Theories of Knots and Links program* MSRI, Berkeley, CA.

Visited program regularly, and attended the three conferences: Connections for Women, Introductory Workshop, and Research Workshop.

May 2007 **Invited participant:** *The Mathematics of Knotting and Linking in Polymer Physics and Molecular Biology* workshop at Banff International Research Station, Banff Canada.

Jan. 2006 **Invited participant:** *Moduli spaces of knots* ARCC workshop

American Institute of Mathematics, Palo Alto, CA.

INVITED TALKS — colloquia and seminars (2006-2011)

Oct. 2009 **Mathematics Colloquium** Central Connecticut State University, Hartford CT.

July 2009 **Prime Time Talk** Hampshire College Summer Studies in Mathematics, Hampshire College, MA.

Apr. 2009 **Topology et al. seminar** Wesleyan University, Middletown CT.

Dec. 2008 **Geometry Seminar** University of Massachusetts, Amherst MA.

Dec. 2007 **Geometry and Topology seminar** Dartmouth College, Hanover NH.

Apr. 2007 **Geometry and Topology seminar** Toronto University, Toronto Canada.

Dec. 2006 **Gauge Theory and Topology seminar** Harvard University, Cambridge MA.

- Nov. 2006 **Geometry Seminar** University of Georgia, Athens, GA.
 Oct. 2006 **Geometry Seminar** University of Connecticut, Storrs, CT.
 Oct. 2006 **Valley Geometry Seminar** University of Massachusetts, Amherst, MA.
 Mar. 2006 **Topology Seminar** Brown University, Providence, RI.

GRANTS and AWARDS

- Spring 2010 **Picker Fellowship** for faculty research, Smith College.
- Summer 2008 **AWM Mentoring Fellowship**. Association for Women in Mathematics.
- Spring 2004 **Bourgin Fellowship**. Math Department, University of Illinois, Urbana-Champaign. Awarded to top student in topology or geometry.
- April 2002 **Liberal Arts and Sciences Award for Excellence in Undergraduate Teaching**. University of Illinois, Urbana-Champaign. (Awarded to 6 out of 1000 LAS College TAs.)
- May 2000 **Mathematics Instructional Award** for excellence in teaching, UIUC.

THESES and RESEARCH EXPERIENCES for UNDERGRADUATES

- **Research Experiences**
 - F 2011 Advisor to Eleanor Conley, Emily Meehan, Rebecca Terry on *Folded ribbon knots in the plane*. Students will present their results at Jan 2012 Joint Math Meetings, Boston, MA.
 - Summer 2009 SURF advisor to Shivani Aryal, Shorena Kalandarishvili, Sarah Meyer on *Knots and flat-ribbons*. Research presented at the *Unknot Conference*, Denison OH.
 - Summer 2005 & 2006 advised Gerardo con Diaz, a Mellon Mays Undergraduate Fellow in knot theory research. Mathematics Department, Harvard University.
 - Summer 2001 & 2002 mentor at Illimath 2001 & 2002, Mathematics Department, University of Illinois, Urbana-Champaign. Research presented at MAA MathFest '01, '02.
- **Honors Thesis advisor**
 - Emma Schlatter. *Knot theory and classifying 3-manifolds*.
 - Regin McNeill. *Knots and the Alexander Polynomial*.
- **Special Studies advisor** — includes both reading courses and research experiences.
 - S 2011 Viktoria Pardey. *Advanced Algebraic Topology*.
 - F 2009 Emma Schlatter, Nicole Vitale. *Introduction to Algebraic Topology*.
 - S 2008 Rosanna Speller. *The Minimum Distance Energy of Knots*.

TEACHING

Smith College. July 2007 – present.

- Math 114 Calculus II (F 2007, 2008; S 2008, 2012)
- Math 211 Introduction to Linear Algebra (F 2009; S 2008, 2009, 2011)
- Math 212 Multivariable Calculus (F 2008)
- Math 225 Advanced Calculus (S 2009, 2011, 2012)
- Math 342 Introduction to Topology (F 2007, 2009)
- Math 342 Introduction to Differential Geometry (F 2011)
- Math 343 Differential Topology (S 2010)

Harvard University. July 2004 – June 2007.

- Introduction to Knot Theory (S 2007)
- Calculus on Manifolds (advanced calculus/differential geometry) (F 2004, 2006)

- Math 25: Honors Multivariable Calc, Analysis & Linear Algebra (F 2005, S 2006)
- Introduction to Linear Algebra (S 2005, F 2006)
- Multivariable Calculus (F 2004)

University of Illinois, Urbana-Champaign. Aug. 1998 – May 2004.

- Instructor with full responsibility for classes: Calculus I (one semester), Calculus II (three semesters), Multivariable Calculus (four semesters).

SERVICE

- **Smith College** Department of Mathematics & Statistics.
 - July 2007 – present **Advising** (8 premajor, 7 major, 5 postbac, and 4 minor advisees.)
 - July 2007 – present **Career and graduate school advising**
 - May 2011 – present **Calculus Placement Tool:** responsibility for editing & maintaining the tool, education in its use, and studies on effectiveness of tool.
 - F 2011 **Chair** committee on text and curriculum for Calculus I.
 - S 2011, F 2011 **Coordinator** of interdepartmental discussions on the curriculum: including updates on course changes, and coordinating course offerings.
 - F 2011, S 2012 **Organizer** invited lectures for faculty.
 - S 2011, F 2011 **Coordinator** refurbishing the math forum and classrooms.
 - S 2010 **Calculus subcommittee** on Calculus II students, curriculum and text.
 - F 2009, 2011, S 2010, 2011 **Minute Taker** Departmental meetings.
 - July 2007 – June 2011 **Course Assignment Committee.**
 - F 2009, S 2010 **Steering Committee on the Curriculum** included: department-wide survey on teaching & curriculum, and long term planning.
 - S 2008 – S 2010 **Departmental representative** consulting with architects on remodeling Sabin-Reed/Burton Hall. Department of Mathematics & Statistics.
 - F 2008, 2009 **Organizer** *Life as a graduate student* session for the Women in Math in New England conferences, Smith College, MA.
 - F 2008 **Committee on refurbishing** the math forum.
- **Harvard** Mathematics Department.
 - June 2005 – June 2007 **Assistant** to the Director of Graduate Studies.
 - August 2005 and 2006 **Coordinator** Graduate student orientation session.
 - S 2005, 2006, 2007 **Member** Graduate Admissions Committee.
- **University of Illinois, Urbana-Champaign** Mathematics Department.
 - S 2002 **Organizer** Graduate Student Research Seminar.
 - S 2001, 2002 **Member** then **Chair** Teaching Assistant Teaching Awards Committee.
 - F 2000, S 2001 **Student Representative** Graduate Affairs Committee.

PROFESSIONAL ACTIVITIES and SERVICE

F 2009 **Co-organizer** Geometry and Topology seminar UMass, Amherst.

F 2008 **Reviewer** for undergraduate topology text (editor Bob Stern) for CRC press.

July 2007 – present **Referee** for articles for mathematics journals (Geometry and Topology, Kobe Journal of Mathematics, Involve - a Journal of Mathematics).

PROFESSIONAL SOCIETIES

Aug. 1998 – present **American Mathematical Society**

Aug. 2001 – present **Association for Women in Mathematics**

Aug. 2004 – present **Mathematical Association of America**

LETTERS OF REFERENCE

Professor Cliff Taubes: Harvard University `chtaubes@math.harvard.edu`

Professor John M. Sullivan: Technische Universität, Berlin `Sullivan@Math.TU-Berlin.DE`

Professor Erica Flapan: Pomona College `eflapan@pomona.edu`

(Teaching) Professor Chris Gole: Smith College `cgole@smith.edu`

(Teaching) Professor Nick Horton: Smith College `nhorton@smith.edu`