

## James Stuart Tanton

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[www.jamestanton.com](http://www.jamestanton.com)  
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<b>Education:</b>	Ph. D.	Mathematics	Princeton	1994
	M.A.	Mathematics	Princeton	1990
	B. Sc (Hons.)	Mathematics	University of Adelaide	1988
	B. Sc.	Mathematical Physics	University of Adelaide	1987
<b>Current Position:</b>	<b>Mathematical Association of America</b>			2014 – Present
	Mathematician-at-Large			
	<b>Education Consultant</b>			2012 - Present
	Workshops, Professional Development, Curriculum Writing, Invited Lectures. National and Overseas.			
<b>Awards:</b>	MathMovesU Math Hero Award sponsored by Raytheon Company			2010
	<i>For Mathematics middle and high school teaching</i>			
	The Kidder Faculty Prize			2006
	<i>St. Mark's School: High school teaching award</i>			
	Beckenback Book Prize: The Mathematical Association of America			2004
	<i>For "Solve This: Mathematical Activities for Students and Clubs"</i>			
	Trevor Evans Award: The Mathematical Association of America			2002
	Trevor Evans Award: The Mathematical Association of America			2001
	<i>Distinguished writing award.</i>			
	Homer L. Dodge Award			1999
	<i>For college teaching excellence, St. Mary's College of Maryland.</i>			
	Princeton University Engineering Council Teaching Award			1994
	<i>Teaching excellence.</i>			
	George Murray Scholar			1988 – 1991
	<i>Australian award for academic achievement and progress.</i>			
	Undergraduate Prizes: Pure Mathematics.			
	Amir Hasan Abdi Prize (1987); J. R. Wilton Prize (1986);			
	E. S. Barnes Prize (1986); J. H. Michael Prize (1985).			
<b>Past Experience:</b>	<b>Mathematical Association of America:</b>			
	•	<b>Mathematician in Residence</b>		2012-2014
	<b>Common Core Inc.</b>			2013 – Present
	•	<b>Advisor and Consultant</b>	Rewriting K-12 mathematics curriculum for NY State. Advisor and consultant for grades 8-12. Consultant on extension to a national program.	
	<b>Math for America (DC)</b>			
	•	<b>Teacher professional development</b>		2012-2014
	<b>St. Mark's School</b>			2004 – 2012
	•	<b>Full-time high school teacher:</b>	Grades 9-12: Geometry, Algebra, AP Calculus, Advanced Topics.	
	•	<b>Founding Director St. Mark's Institute of Mathematics</b>		

Mathematics outreach: extracurricular middle-school and high-school student research classes; professional development and graduate courses for 7-12 mathematics teachers; public presentations, lectures and incidental workshops; mathematics publications and books; consulting.

**Northeastern University School of Education:**

- **Adjunct Professor** 2004 - 2012  
Created and ran the five yearly graduate/teacher professional development core courses for Masters of Education, Mathematics. (Offered in conjunction with the St. Mark's Institute of Mathematics.)

**American University:**

- **Adjunct Professor** Spring 2012  
Graduate Course for In-service Teachers

**Milton Academy**

- **Fulltime high school teacher** 2003 – 2004

**The Boston Math Circle:**

- **Co-director** 2000 – 2003  
Innovative Mathematics K-12

**Merrimack College:**

- **Associate Professor** 1999 – 2000  
*Courses taught:* Finite mathematics: Readings in Mathematics; Modeling and Simulation; Mathematics Club.

**St. Mary's College of Maryland:**

- **Assistant Professor** 1995 – 1999  
*Courses taught:* Calculus, Vector Calculus; Mathematical Modeling; Introduction to Advanced Mathematics; Abstract Algebra; Topology; Differential Geometry; Algebraic Topology; Classical Applied Mathematics; Mathematics Club.

**New College of U.S.F.:**

- **Visiting Assistant Professor** 1994 – 1995  
*Courses taught:* Calculus; Real Analysis.  
*Tutorials offered:* Differential Equations; Probability Theory; Pre-Calculus; Algebraic Topology; Putnam Mathematics Competition Preparation.

**Harvard Extension School**

- 2002 – 2003  
*Graduate courses / professional development courses.*  
Graph Theory: Investigating the Mathematical Process;  
Geometry: Theory and Practice

**Boston Public Schools**

- 2002  
*Teacher development courses:* Problem Solving; On Teaching Algebra

**Current Service:**

- SIGMAA MCST** 2008-present  
Cofounded Special Interest Group of the MAA on Math Circles for Students and Teachers. Service as an executive officer.

**Board of Trustees**

- St Mark's School 2012-present

**Advisory Boards:**

Illustrative Mathematics

The National Association of Math Circles  
 The Math Circle Teachers' Network (AIM)  
 The Proof School  
 Math Pickle  
 Math for Teaching Program, Harvard Extension School

**Editorial Boards:**

Anneli Lax New Mathematical Library (MAA)

**MAA:**

Ambassadorial work, referee work, Curriculum Inspirations project,  
 Council of Outreach

**Books:****In review:**

*The Power of Mathematical Visualization*: DVD course and textbook. The Teaching Company. In Production.

*Probability: A Clever Study Guide*. MAA. In Review

**In press:**

*The Zen Master's Collection: Relations and Equations*. Edfinity.

**Released:**

*The Zen Master's Collection: 8 Tips to Conquer Any Problem*. Edfinity. 2016.

*The Zen Master's Collection: Counting and Probability*. Edfinity. 2016.

*The Zen Master's Collection: Numbers and the Number System*. Edfinity. 2016.

*Without Words*: Tarquin. 2015.

*Without Words II*: Tarquin. 2015.

*Trigonometry: A Clever Study Guide*. MAA. 2015.

*Geometry: An Interactive Journey to Mastery*. DVD course and textbook. The Teaching Company. 2014.

*Mathematics Galore: The First Five Years of the St. Mark's Institute of Mathematics*  
 MAA, 2012

*The Encyclopedia of Mathematics*  
 Facts on File. 2005.

*Solve This: Mathematical Activities for Students and Clubs*.  
 MAA, 2001.

**Self-published:****THINKING MATHEMATICS!:**

Volume 1: Arithmetic = Gateway to All

Volume 2: Advanced Counting and Advanced Algebra Systems

Volume 3: Lines, Circles, Trigonometry and Conics

Volume 4: Functions and their Graphs

Volume 5: e, i, pi and all that!

Volume 6: Calculus

Volume 7: More Calculus

Volume 8: Probability and Statistics

*GEOMETRY*: Volume 1 and Volume 2

*MATHEMATICAL THINKING: Numbers and their Algebra*  
(An advanced course for middle-school students and their teachers.)

*Weird Ways to Work with Pi*

**Online Courses** ([www.gdaymath.com](http://www.gdaymath.com))

*Exploding Dots*

*Quadratics*

*Permutations and Combinations*

*The Astounding Power of Area*

*Fractions are Hard!*

**Other On-Line Projects:** MAA's CURRICULUM INSPIRATIONS project  
[www.maa.org/ci](http://www.maa.org/ci)

STATE-LICENSURE EXAM PREPARATION GUIDE:  
Brigham Young University, 2014.

**Long-term Consulting Projects:**

Common Core, Inc. 2013 - present  
Advising EngageNY.

Northern Alberta: Calgary, Edmonton, Red Deer, Grande Prairie. 2012 - present.  
Numerous workshops and discussion sessions on a variety of topics from the high school curriculum.

Oregon Public Broadcasting 2006 - 2008  
Mathematics advisor on two episodes of "MATHEMATICS ILLUMINATED," a PBS series.

**Sample International Pedagogy Workshops and Invited Talks:**

American School in Japan  
"The story of Area," "Exploding Dots"  
March, 2015

American School in Dubai  
Various Workshops  
February, 2015

MATRIX workshop  
"A Dozen Proofs that  $1 = 2$ : A misguided review of all of mathematics"  
MathFest 2015. Special Outreach Lecture  
Dresden, Germany. September 2014.

*EARCOS 2014*  
Series of three curriculum-focused workshops for South East Asian International School educators. Bangkok, Thailand, March 26-30, 2014

*K-12 Unsolved Problems: Workshop*  
Co-organizer with Gordon Hamilton. Banff, BIRS, November 16 and 17, 2013

SUM conference, K-12 mathematics, Two Workshops: Saskatchewan; May 2012

“A Transition to Change”  
CBM Workshop, London. November 2011

Korean International School, 9-12 mathematics, Seoul. December 2010

Velammal School Workshops; Eleven eight-hour workshops for educators covering the entire K-12 mathematics curriculum. Chennai, India. June 2007

**Sample Presentations:** Numerous presentations and workshops at Math Circle groups, school events, colleges, and incidental conference and special events across the U.S.

“The Astounding Mathematics of Bicycle Tracks” NCTM, San Francisco	April 2016
“Fibonacci Surprises” University of Oklahoma University of San Francisco	March 2016 December 2015
“A Little Thought about Dots and Dashes” MOVES conference	August 2015
“Freaky Fixed Points” MoMath	June 2015
“A Dozen Proofs that $1 = 2$ ” Washington and Lee University. Carol College	March 2014 2013
“What made me a Mathematician” US Science and Engineering “Nifty Fifty” presentation	October 2013
“Exploding Dots” Dordt College Carleton College Special presentation for K-12 educators MathFest, Hartford CT NCTM, Reston VA Hood College, St. Mary’s College of Maryland Math for America, New York Numerous school presentations	October 2015 May 2015 August 2013 June 2013 February 2013 November 2012
“Laundry Math” Math Encounters lecture, MoMath NY	April 2013
“Weird Ways to Work with Pi” MoMath JMM Public Outreach Gathering of the Minds in celebration of Martin Gardner. MAA Carriage House lecture Various school presentations	June 2015 January 2014 October 2013 December 2012
“Dyadic fractions, permutations and dragons.” MathFest	August 2012
Allegheny Mountain Section Meeting, MAA	

Invited Speaker “A Dozen Fibonacci Surprises”	April 2012
Student, Educator, Undergraduate Lectures and Workshops NCSU and NC Math Circle San Francisco Math Circle, San Francisco Teachers’ Circle	March 2012 April 2012
Demonstration Math Circle Classes: Joint Mathematical Meetings MathFest	January 2010, 2012 August 2011, 2012
“Fibonacci Surprises” MathFest	August 2011
“A Few of my Favourite Mathematical Things” Bay Area Mathematical Adventures series. San Jose, CA.	March 2011
“What made me a Mathematician: An Interactive Experience.” AIM Math Teachers’ Circle. Palo Alto, CA	March 2011
“A Sampler of Successful Math Circle Topics” Joint Mathematics Meetings, New Orleans	January 2011
“Exploding Dots: A Point of Intersection between the K-12 Curriculum and Math Circle on the Road” and “Intersection Math” MSRI: <i>Circle on the Road</i> Program, Tempe, AZ <i>The Math Teachers’ Circle Workshop</i> , Washington D.C. Special Demonstration Session, JMM, New Orleans	March 2010 July 2010 January 2011
“On selecting Math Circle topics.” Joint Mathematics Meetings, San Francisco	January 2010
“How to operate creatively and brilliantly in mathematics: A parent’s guide.” SPLASH, M.I.T.	November 2009
“Base One and a Half” MathFest, Special Demonstration class for SIGMAA MCST	August 2009
“Weird Multiplication and Weird Ways to Multiply” Brigham-Young University, Provo, UT. San Jose State University Mathematics Circle Pi Mu Epsilon Induction Ceremony: Bridgewater State College MAA Undergraduate Student Activities Session; MathFest Knoxville, TN. ATMIM Winter Conference MAA sectional meeting. Undergraduate Conference. Charlottesville, VA..	March 2009 March 2009 April 2007 August 2006 January 2006 April 2005
“Research Mathematics from the Perspective of a Third-Grader” Brigham-Young University, Provo, UT	October 2008
“About Multiplication” The Boston Math Circle	May 2008
“Playing with Math: Figurate numbers and the square root of two” NCTM Annual Conference, Salt Lake City Workshop for promotion of <i>MATHEMATICS ILLUMINATED</i> .	April 2008
“Three Calculus Questions that do not require Calculus” Association of Advanced Placement Mathematics Teachers	October 2007

“Sums of Powers: A Historical Overview” Indian Institute of Technology, Chennai, India.	June 2007
“Going Dotty” ATMIM: Keynote Address. Marlborough, MA,	April 2007
“More Than a Dozen Proofs that $1 = 2$ : A misguided review of all of mathematics” MAA Sectional Meeting: Keynote Address, Tallahassee, FL	February 2007
MAA sectional meeting, Charlottesville, VA	April 2005
The Association of Advances Placement Teachers of Mathematics, Boston	April 2004.
“Seeking Points of Intersection: High-School Curricula vs. Math Circle Goals” Joint Mathematical Meetings, New Orleans,	January 2007
Panel Discussion: Special Session on Math Circles Joint Mathematical Meetings, New Orleans	January 2007
Math Mingling: Math Club Panel Session MathFest: Knoxville TN	August 2006
“On Sums of Powers” Association of Advances Placement Teachers of Mathematics, Boston	October 2005
“Accessible, but surprisingly sophisticated, research projects,” MAA sectional meeting, Charlottesville, VA.	April 2005
MSRI Conference on Math Circle and Olympiads. Panel discussions.	December 2004.
Johns Hopkins CTY Career Symposium: Panel discussion. Boston University, Boston	March 2003
“Mathematics Pedagogy” <i>Professional development morning workshop for Boston Public High School teachers.</i>	January 2003
“New Undergraduate Research Projects” Brigham Young University	September 2002
“The Math Circle” Brigham Young University, Provo UT	September 2002
“Problem Solving techniques, with emphasis on open-response MCAS questions.” BPS Wilson Workshop.	November 2001
“Creating Excitement in the Classroom and out through Problem Solving” BPS Summer Institute: Northeastern University, MA	August 2001.
“Motivational Pedagogy” Brigham Young University, Provo UT St. Mary’s College of Maryland,	August 2000 January 1999.
“Layered tilings” MAA sectional meeting, Haverill MA	November 1999

- “The Banach-Tarski paradox”  
St. Mary’s College of Maryland April 1998.
- “Homology stability and algebraic K-theory.”  
University of South Australia January 1993

### Publications:

- Academic:**
- “On the homology of general linear groups over field extensions.”  
*Thesis, Princeton University* (1994).
- “A homological fibration for  $GL$ .”  
*Journal of Algebra*, **190** (1997), 540 – 555.
- “ $\pi$  is the minimum value of  $\pi$ .” Co-authored with C. Adler.  
*College Mathematics Journal*, **31** no. 2 (2000), 102 – 106.
- “Fibonacci numbers, generating sets and the hexagonal property.”  
*The Fibonacci Quarterly* **38** (2000), 299 – 309.
- “Introducing binary and ternary expansions via weighings.” *College Mathematics Journal*, **33** no. 4 (2002), 17 – 18.
- “Candy sharing.” Co-authored with G. Iba.  
*The American Mathematical MONTHLY*. **110**, no. 1 (2003), 25 – 35.
- “The Hairy Ball Theorem via Sperner’s Lemma.” Co-authored with Tyler Jarvis.  
*American Mathematical MONTHLY*. **111**, no. 7 (2004), 599 – 603.
- Pedagogical:**
- “Teaching Tip: An Introduction to  $e^x$  without series.” *College Mathematics Journal*, **39**, no. 1, (2008), 23.
- “Pit Your Wits Against Young Minds!” *Mathematical Intelligencer*, **29**, no. 3, (2007), 55-59.
- “Math Circles and Olympiads. MSRI asks: Is the US Coming of Age?”  
*NOTICES* **53** no. 2 (2006), 200-205.
- “Les Cercles de math et les Olympiades.” *Mathématique et Pédagogie* **159** (2006), 27-39.  
*Translated by Charlotte Bouckaert.*
- Proof Without Words
- “Proof without words” *College Mathematics Journal* **40** no. 2 (2009), 86.
- “Proof Without Words.” *College Mathematics Journal* **39** no. 2 (2008), 106.
- “Proof Without Words” Co-authored with participants of the Northeastern University Geometry course, *College Mathematics Journal* 2006.
- “Mathematics Without Words.” *College Mathematics Journal*. **34**, no. 1 (2003), 14.
- “Proof Without Words.” *Math Magazine* **74** no. 4 (2001), 313.

### Co-Authored with K-12 students:

- “Tilings, Order Partitions and Weird Languages” co-authored with St. Mark’s Institute of Mathematics students. *FOCUS*, **32**, no. 3 (2012), 16-17.
- “Pick’s Theorem – and Beyond!” co-authored with St. Mark’s Institute of Mathematics students, *FOCUS*, **30**, no. 1 (2010), 14-35.



“Young Students Explore Proofs Without Words,” co-authored with St. Mark’s Institute of Mathematics students, *FOCUS*, **29**, no. 5 (2009), 10-11.

“Lattice Polygons for Mathematicians and for Engineers.” *College Mathematics Journal*, **40**, no. 5, (2009), 336, 360,369, 375. (Part 1 co-authored with high-school student N. Roumas.)

“An Intuitive Approach to the Borsuk-Ulam Theorem,” co-authored with St. Mark’s Institute of Mathematics students, *FOCUS*, **28**, no. 8 (2008), 14-15.

“Young students approach integer triangles.” Co-authored with students of *The Math Circle*. *FOCUS*, **22**, no. 5 (2002), 4 – 6.

**Expository:** “An illuminating introduction to the Möbius function.” *FOCUS*, **27**, no. 3 (2007), 16-17.

#### MATH HORIZONS

“A dozen questions about a donut.” *Math Horizons*, November 1998, 26 – 31.

“A dozen reasons why  $1 = 2$ .” *Math Horizons*, February 1999, 21 – 25.

“A half-dozen activities to try with friends.” *Math Horizons*, September 1999, 26 – 31.

“A dozen questions about squares and cubes.” *Math Horizons*, February 2000, 26 – 31.

“A dozen areal maneuvers.” *Math Horizons*, September 2000, 26 – 30, 34.

Also appears in *The Edge of the Universe*, MAA, 2006.

“A dozen questions about the powers of 2.” *Math Horizons*, September 2001, 5 – 10.

Also appears in “Biscuits of Number Theory,” Benjamin, A. and Brown, E. editors.

“A dozen questions about a triangle.” *Math Horizons*. April 2002, 23 - 28.

Also appears in *The Edge of the Universe*, MAA, 2006.

“A dozen questions leading to the isoperimetric problem.” *Math Horizons*. February 2003, 23 - 26.

“A dozen thoughts about sums of powers.” *Math Horizons*. September 2003, 15 – 18.

“A dozen questions about pile splitting.” *Math Horizons*. September, 2004, 28-31.

“A dozen questions about the Fibonacci numbers.” *Math Horizons*. February 2005, 5-8.

Also appears in “Biscuits of Number Theory,” Benjamin, A. and Brown, E. editors.

“A dozen questions about the triangular numbers” *Math Horizons*. November 2005, 5-8.

“A dozen questions about a dozen” *Math Horizons*. *Math Horizons*. April 2007, 12-15.

“A dozen questions about Pascal’s Triangle.” *Math Horizons*. November, 2008, 5-7, 27-30.

“A dozen hat problems.” Co-authored with Ezra Brown. *Math Horizons*. April 2009, 22-25.

“A dozen harmonious problems” *Math Horizons*, April 2010, 25-30.

“A dozen elementary problems” *Math Horizons*, November 2011, 21-24.

“A dozen proofs that  $0 = 1$ ”. *Math Horizons*, February 2012, 12-16.

**Other:**

### Reviews

“Mathematical Puzzles: A Connoisseur’s Collection by Peter Winkler”  
*Read This! The MAA online book review column.* August 2004

“Crossing the River with Dogs: Problem Solving for College Students”  
*Read This! The MAA online book review column.* October 2004

Letter to the Editor, “Math Circles,” *NOTICES*. March 2009.

“The Great Math Wrangle and Other News of SIGMAA MCST,” co-authored the T. Shubin and S. Vandervelde. *FOCUS*, **30** No 1, (Feb/March 2010), 18

### **Media articles about my work:**

“Toilet Paper used to break paper-folding record at MIT,” boston.com, December 11, 2011. (And all follow-up attention.)

“Toiling with toilet paper in MIT’s infinite corridor,” boston.com, April 5, 2011.

“Teacher’s Accolades Adding Up,” The MetroWest Daily News, August 19, 2010

“The Ganz Measures up at St. Mark’s,” The Daily News, April 30, 2006.

“Teacher makes mathematics accessible,” Boston Globe, Education, April 24, 2005.

“Just a spoonful of sugar ...” Boston Globe, Learning Section. March 5, 2000.

“Happy Birthday, Tootsie.” Eagle Tribune, February 23, 2000.

“Mathematics graduate comes full circle The Adelaidean, September 2001.

### **Past Institutional Service:**

#### St. Mark’s School:

As a faculty member: Finance Committee; Buildings and Grounds committee; Assistant Head/Dean of Faculty search committee co-chair; various ad hoc committees; faculty club advisor.

Milton Academy: Culture and Diversity Committee; student mathematics journal advisor.

Merrimack College: Merit and compensation committee; Mathematics club.

St. Mary’s College of Maryland: Chair of Curriculum Committee; Institutional Review Board; MAA liaison; Presidential welcoming committee; Business, Physics, Computer Science and Mathematics search committees; Numerous ad hoc committees; Mathematics club.