James Stuart Tanton

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Education:

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

Awards:

MathMovesU Math Hero Award sponsored by Raytheon Company 2010
For Mathematics middle-highschool teaching

The Kidder Faculty Prize 2006
St. Mark's School

Beckenback Book Prize: The Mathematical Association of America 2005
For "Solve This: Mathematical Activities for Students and Clubs"

Trevor Evans Award: The Mathematical Association of America 2002

Trevor Evans Award: The Mathematical Association of America 2001
Distinguished writing award.

Homer L. Dodge Award 1999
For college teaching excellence, St. Mary's College of Maryland.

Princeton University Engineering Council Teaching Award 1994
Teaching excellence.

George Murray Scholar 1988 – 1991
Australian award for academic achievement and progress.

Undergraduate Prizes: Pure Mathematics.
Amir Hasan Abdi Prize (1987); J. R. Wilton Prize (1986);
E. S. Barnes Prize (1986); J. H. Michael Prize (1985).

Experience:

St. Mark's School:
Founding Director **St. Mark's Institute of Mathematics** 2004 - present

Northeastern University School of Education: Adjunct Professor 2004-Present
Created and run the five yearly graduate/teacher professional development core courses for Masters of Education, Mathematics. Algebra, Numbers and Geometry; Geometry; Functions and Trigonometry; Calculus; Probability and Statistics

Milton Academy 2003 - 2004

The Math Circle: Co-director 2000 – 2003
Innovative Mathematics K-12

Merrimack College: Associate Professor 1999 – 2000
Courses taught: Finite mathematics (for non-majors); Readings in Mathematics (for teacher certification); 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.

Other Experience:

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

Books:

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

The Encyclopedia of Mathematics
Facts on File. June 2005.

Encyclopedia of Science and Mathematics
Facts on File: Mathematics Component. Final Production Stage

Mathematics Galore: The First Five Years of the St. Mark's Institute of Mathematics
Under Review: The Mathematical Association of America

Self Published Texts and Curricular Material
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: The Calculus of Infinite Sums (In preparation)
- Volume 8: Probability and Statistics
- Volume 9: What is wrong with Calculus and How to Fix It (In preparation)
- Volume 10: All Solutions (In preparation)

GEOMETRY: Volume 1 and Volume 2
MATH WITHOUT WORDS
STATE LICENSURE PREPARATION GUIDE
MATHEMATICAL THINKING: Numbers and their Algebra
(An advanced course for middle-school students and their teachers.)

Consulting:

Oregon Public Broadcasting
Mathematics advisor for two episodes of "MATHEMATICS ILLUMINATED," a 13-part series on mathematics. September 2006 – May 2008.

MSRI: "Puzzles on Wheels"
Pilot program to introduce mathematics on public transport advertising placards.

External Review Team member to assess the mathematics and computer science program at St. Mary's College of Maryland, February 2004.

Charlesbridge Publishing: Editor elementary and middle mathematical texts.

McGraw-Hill: Algebra video series talent, Textbook editor.
McGraw-Hill: Calculus supplemental video material: co-author

Brown University: "Mesolore." Cultural diversity consultant: $9^{th}/10^{th}$ grade algebra.

Pedagogy Workshops:

Korean International School, 9-12 mathematics, Seoul. December 2010
Newton Schools, 6-12 mathematics; Newtonville, MA; February 2010
The Common School, K-6 mathematics; Amherst, MA; February 2009
Scituate Public Schools, K-12 mathematics; Scituate,. MA; Oct, Nov 2009
Velammal School Workshops; Eleven eight-hour workshops for educators covering the entire K-12 mathematics curriculum. Chennai, India. June 2007

Pedagogical Presentations:

"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: *Circle on the Road* Program**,** Tempe, AZ — March 2010
The Math Teachers' Circle Workshop, Washington D.C. — July 2010
Special Demonstration Session, JMM, New Orleans — 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. — March 2009
San Jose State University Mathematics Circle — March 2009
Pi Mu Epsilon Induction Ceremony: Bridgewater State College — April 2007
MAA Undergraduate Student Activities Session; MathFest Knoxville, TN. — August 2006
ATMIM Winter Conference — January 2006
MAA sectional meeting. Undergraduate Conference. Charlottesville, VA.. — 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 — April 2008
Workshop for promotion of *MATHEMATICS ILLUMINATED*,
13-part DVD series supported by the Annenberg Foundation.

"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" January 2003
Professional development morning workshop for Boston Public High School teachers.

"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 August 2000
St. Mary's College of Maryland, 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.

"π 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. September 2004.

Pedagogical: "Teaching Tip: An Introduction to e^ix 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:

"Pick's Theorem – and Beyond!" co-authored with St. Mark's Institute of Mathematics students, *FOCUS*, **30**, no. 1 (Feb/March 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" To appear.

"A dozen proofs that 0 = 1". Submitted.

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:

"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.

Current Service: Founding member, 2009 chair and 2011 chair of SIGMAA on math circles for students and teachers.

Steering Committee: The National Association of Math Circles (MSRI)

Steering Committee Member: The Math Teachers Network

Math Horizons editorial board: MAA.

Anneli Lax New Mathematical Library editorial board: MAA.

Institutional Service: MAA: Referee work.

St. Mark's School: 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 Math. search committees; Numerous ad hoc committees; Mathematics club.