James Stuart Tanton

5033 E Turquoise Ave, Paradise Valley, AZ 85253
(617) 331 4558

tanton.math@gmail.com
www.gdaymath.com
www.jamestanton.com

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

Current Position:

Education Consultant 2012 - Present
Workshops, Professional Development, Curriculum Writing, Invited Lectures.
National and Overseas.

Mathematical Association of America 2014 – Present
Mathematician-at-Large
Ambassadorial work, outreach.
Founded the *Curriculum Inspirations Project*

Arizona State University 2014 – Present
Adjunct Professor

Current Service:

Chair Advisory Council
National Museum of Mathematics 2017-present

Global Math Project 2015 -present
Founder
Uplifting mathematics for the world.

Recent Awards:

Joint Policy Board of Mathematics Communication Award 2020

Recent Books:

How Round is a Cube? And Other Mathematical Ponderings.
American Mathematical Society 2019

Functions and their Graphs: A Clever Study Guide.
Mathematical Association of America 2018

Select Recent Keynotes:

AMATYC National Meeting Nov 2019
"A Dozen Proofs that 1 = 2: A misguided review of mathematics"

Alberta Teachers' Association Province Meeting Oct 2019
"Making Curriculum Mathematics a Mathematics High"

Australian Association of Mathematics Teachers National Meeting July 2019
"How to Think Brilliantly and Creatively in Mathematics:
A Few Modest Thoughts."

Past Experience:

Mathematical Association of America:
Mathematician in Residence 2012-2014

Common Core Inc./Great Minds 2013 – Present
Advisor and Consultant
K-12 mathematics curriculum for NY State. Advisor and consultant for grades 8-12. Consultant on extension to a national program.
Revised editions

Math for America (DC)
Teacher professional development 2012-2014

St. Mark's School 2004 – 2012
Full-time high school teacher

Founding Director St. Mark's Institute of Mathematics 2004 – 2012
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 each year the five 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 2003 – 2004
Fulltime high school teacher

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

Merrimack College
Associate Professor 1999 – 2000

St. Mary's College of Maryland
Assistant Professor 1995 –1999

New College of U.S.F.
Visiting Assistant Professor 1994 – 1995

Harvard Extension School 2002 – 2003
Graduate courses / professional development courses.

Boston Public Schools 2002
Teacher Professional Development courses

Other Service:

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

Editorial Boards
AMS Math Circles Library
Journal of Math Circles

Ad hoc review, editorial, and consulting services

Past Services
Board of Trustees: St. Mark's School
Anneli Lax New Mathematical Library (MAA): Editorial Board
SIGMAA MCST: Cofounder, Chair, Executive Officer

Other Awards:

MathMovesU Math Hero Award sponsored by Raytheon Company 2010
For Mathematics middle and high school teaching

The Kidder Faculty Prize 2006
St. Mark's School: High school teaching award

Beckenback Book Prize: The Mathematical Association of America 2004
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).

Other Books:

The Power of Mathematical Visualization:
DVD course and textbook. The Teaching Company, 2016.

The Zen Master's Collection: Relations and Equations. Edfinity. 2016

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.

The Zen Master's Collection: Logical Reasoning. Edfinity. 2016.

Avoid Hard Work: And other encouraging mathematical problem-solving tips for the young, the very young, and the young at heart. Co-authored with Maria Droujkova, Yelena McManaman, Natural Math, 2015.

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

Self-published Online Courses (www.gdaymath.com)
Exploding Dots
Quadratics
Permutations and Combinations
The Astounding Power of Area
Fractions are Hard!

Sample International Workshops and Invited Talks:

"How to Fold Things into Thirds"
Mumbai, 2020.

"The Fabric of Math": Co-presented with Jennifer Wathal, Karim Letwinsky
Hong Kong, 2019

"Exploding Dots"
Tanzania, Serbia, Malaysia, India, Canada, Australia, Panama, Hong Kong, Vietnam, Thailand, Philippines : 2016, 2017, 2018, 2019 , 2020

"How Many Degrees are in a Martian Circle? And other human – and non-human – questions one should ask."
India, Serbia, Panama, Australia: 2016, 2017, 2018, 2019

"The Area Model," "Mathematical Visualization"
UAE, Philippines, Australia, India: 2017, 2018, 2019

"Dyadic Fractions, Folding, and Dragons" (and a suite of 11 additional lectures)
CPN, Belgrade, Serbia, 2016

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

American School in Dubai
Various Workshops
February, 2015

MATRIX workshop
"The Global Math Project"
Leeds, UK, September 2016

"A Dozen Proofs that 1 = 2: A misguided review of all of mathematics"
U.S., Germany, 2014, 2015, 2016, 2017, 2020.

EARCOS 2017
Curriculum-focused workshops for South East Asian International School educators.
Kota Kinabalu, Borneo, April 2017.

EARCOS 2014
Curriculum-focused workshops for South East Asian International School educators.
Bangkok, Thailand, March 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 U.S. Presentations:

Numerous presentations and workshops at Math Circle groups, school events, colleges, and incidental conference and special events across the U.S. (Typically two or three per month.)

"Exploding Dots," "The Power of Mathematical Visualization," "How Many Degrees are in a Martian Circle?" as above throughout North America. 2012,2017,2018, 2019, 2020

"Quadratics: How to teach the problem-solving mindset while teaching"
Tuscon, 2020 (and elsewhere).

"A Dozen Proofs that 1 equals 2"
Joint Mathematics Meetings, 2020

"Seriously … Why is Negative Times Negative Positive?"
Joint Mathematics Meetings, 2020.

"Fractions are Hard!"
Phoenix, 2019.

"Impossible Tangles"
National Museum of Mathematics, 2018

"Freaky Fixed Points"
MAA MathFest, 2018

"Jazz and Math" Quadrivium series with Marcus Miller and Mark Gross
National Museum of Mathematics, 2018

"Exploding Dots," "The Power of Mathematical Visualization," "How Many Degrees are in a Martian Circle?" as above throughout North America. 2012,2017,2018, 2019, 2020

"The Global Math Project: Exploding Dots"
Global Math Project Symposium, October 2017
New York University

"The Power of Visualization in Mathematics"
Texas Graduate Center, November 2017
New York University- Abu Dhabi, New York Campus, October 2017

"Course Correction: Is high school mathematics serving society?
Can it? Does it? Should it?"
Public debate with Andrew Hacker, *The Math Myth.*
The National Museum of Mathematics, May 2016

"How to Think Brilliantly and Creatively in Mathematics: A guide for faculty."
Phoenix area Community Colleges, 2016

"The Astounding Mathematics of Bicycle Tracks"
NCTM, San Francisco, 2016

"Fibonacci Surprises"
University of Oklahoma, 2016
University of San Francisco, 2015

"Weird Ways to Multiply"
JMM: Council of Outreach presentation, 2016

"A Little Thought about Dots and Dashes"
MOVES conference, 2015

"Freaky Fixed Points"
MoMath, 2015

"What made me a Mathematician"
US Science and Engineering "Nifty Fifty" presentation, 2013

"Laundry Math"
Math Encounters lecture, MoMath NY, 2013

"Weird Ways to Work with Pi"
MoMath, 2015
JMM Public Outreach, 2014
Gathering of the Minds in celebration of Martin Gardner, 2013
MAA Carriage House lecture, 2012
Various school presentations

"A Sampler of Successful Math Circle Topics"
Joint Mathematics Meetings, New Orleans, 2011

"Research Mathematics from the Perspective of a Third-Grader"
Brigham-Young University, October 2008

"Three Calculus Questions that do not require Calculus"
Association of Advanced Placement Mathematics Teachers, 2007

"Sums of Powers: A Historical Overview"
Indian Institute of Technology, Chennai, India, 2007

"Seeking Points of Intersection: High-School Curricula vs. Math Circle Goals"
Joint Mathematical Meetings, New Orleans, 2007

"Accessible, but surprisingly sophisticated, research projects,"
MAA sectional meeting, Charlottesville, VA. 2005

MSRI Conference on Math Circle and Olympiads. Panel discussions. 2004.

Johns Hopkins CTY Career Symposium: Panel discussion.
Boston University, Boston, 2003

"New Undergraduate Research Projects"
Brigham Young University, 2002

"The Math Circle"
Brigham Young University, 2002

"Problem Solving techniques, with emphasis on open-response MCAS questions."
BPS Wilson Workshop, 2001

"Creating Excitement in the Classroom and out through Problem Solving"
BPS Summer Institute: Northeastern University, MA August 2001.

"Layered tilings"
MAA sectional meeting, Haverill MA, 1999

"The Banach-Tarski paradox"
St. Mary's College of Maryland, 1998.

Articles:

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. **111**, no. 7 (2004), 599 – 603.

Pedagogical

"How to Think Brilliantly and Creatively in Mathematics: A Few Modest Thoughts.
Australian Mathematics Education Journal, Vo1, Issue 3 (2019).

"The Global Math Project: Uplifting Mathematics for All"
Book chapter in *MATHEMATICAL OUTREACH: Explorations in Social Justice Around the Globe.* (Ed: Hector Rosario) World Scientific Publishing, 2019.

"Hello! My name is …" *Oncore AATM Journal*, Fall 2017, 50-60.

"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:

"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