

SANDY GANZELL

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CURRENT POSITION

Professor of Mathematics and Computer Science, St. Mary's College of Maryland St. Mary's City, MD

EDUCATION

Rice University Houston, TX

- Ph.D. in Mathematics, May 2000
- Dissertation: Complexity of Exotic \mathbb{R}^4 s
- Advisor: Richard Stong

Dartmouth College Hanover, NH

- A.B. in Mathematics with High Honors, June 1992
- Minor in Women's Studies

Stuyvesant High School, graduated 1988 New York, NY

EMPLOYMENT HISTORY

St. Mary's College of Maryland: Department of Mathematics and Computer Science St. Mary's City, MD

- Department Chair: 2011–2012, 2015–2017
- Professor: 2015–present
- Associate Professor: 2009–2015
- Assistant Professor: 2005–2009

University of The Gambia: Division of Arts and Sciences Brikama, The Gambia

- Visiting Professor: 2012–2013

Coherent Technical Services, Inc. (CTSi) Hollywood, MD

- Mathematics Consultant: 2011–2012
- Algorithmic Scale Modeling of Boeing 737 Aircraft

Pomona College: Department of Mathematics and Computer Science Claremont, CA

- Visiting Assistant Professor: 2001–2005

Rice University: Department of Mathematics Houston, TX

- Instructor and Visiting Scholar: 2000–2001

Rice University: Department of Psychology Houston, TX

- Postdoctoral Research Fellow: 2000–2001
- Development of sonification design theory

Rice University: Department of Mathematics Houston, TX

- Graduate Student: 1994–2000
- Teaching Assistantship: 1994–2000
- Graduate faculty liaison: 1998–2000

Aiki Budokai, School of Jujutsu, Houston, Texas Houston, TX

- Head Instructor: 1994–2001

Dartmouth College: Department of Mathematics Hanover, NH

- Teaching Assistant: 1993–1994

AWARDS

The Homer L. Dodge Award for Excellence in Teaching, 2023

- Awarded to one St. Mary's College faculty member every three years to recognize excellence in teaching.

Peer-Reviewed Articles and Book Chapters

- *Derivatives of Jones Polynomials Detect Delta Moves in Virtual Knots* (with Victoria Furlow* and Madison Robinson*). *Journal of Knot Theory and its Ramifications*. Vol. 31, No. 12, 2250082, 2022.
- *Virtual Knots and Mosaics*. Accessible Mathematics Research for the Beginning Student, Vol. 1. Springer series: Foundations for Undergraduate Research in Mathematics. Birkhäuser Cham, Springer Nature Switzerland AG 2022.
- *Reidemeister Moves in Gauss Diagrams* (with Ellen Lehet*, Cristina Lopez*, Gilbert Magallon*, and Alyson Thompson*). *Involve*, Vol. 14, No. 3, 431–438, 2021.
- *Virtual Mosaic Knot Theory* (with Allison Henrich). *Journal of Knot Theory and its Ramifications*, Vol. 29, No. 14, 2050091, 2020.
- *Restrictions on Homflypt and Kauffman Polynomials Arising from Local Moves* (with Mercedes Gonzalez*, Chloe' Marcum*, Nina Ryalls*, Mariel Santos*). *Journal of Knot Theory and its Ramifications*. Vol. 29, No. 6, 2050036, 2020.
- *Unoriented Links and the Jones Polynomial* (with Janet Huffman*, Leslie Mavrakis*, Kaitlin Tademy*, Griffin Walker*). *Involve*. Vol. 12, No. 8, 2019.
- *Divisibility Tests, Old and New*. *The College Mathematics Journal*, Vol. 48, Issue 1, 36–40, 2017.
- *The Forbidden Number of a Knot* (with Alissa Crans and Blake Mellor). *Kyungpook Mathematical Journal*, Vol. 55, No. 2, 485–506, 2015.
- *TWIST UNTANGLE and Related Knot Games* (with Alex Meadows and John Ross*). *Integers, Electronic Journal of Combinatorial Number Theory*. Vol. 14, 2014.
- *Local Moves and Restrictions on the Jones Polynomial*. *Journal of Knot Theory and its Ramifications*, Vol. 23, No. 2, 2014.
- *Optimal Estimators for Threshold-Based Quality Measures* (with Aaron Abrams, Henry Landau, Zeph Landau, James Pommersheim, and Eric Zaslow). *Journal of Probability and Statistics*, Vol. 2010, Article ID 752750, 2010.
- *UNTANGLE: Knots in Combinatorial Game Theory* (with Alex Meadows). *Geombinatorics*. Vol. 18, Iss. 3, 101–108, Jan. 2009.
- *Chirality vs. HOMFLY and Kauffman Polynomials* (with Amy Kapp*). *Journal of Knot Theory and its Ramifications*, Vol. 17, No. 12, p. 1519–1524, 2008.
- *Ends of 4-Manifolds*. *Topology Proceedings*, Vol. 30, No. 1, p. 223–236, 2006.
- *New Bounds for Forbidden Numbers of Knots* (with Ellen Lehet*, Cristina Lopez*, Gilbert Magallon*, and Alyson Thompson*). In preparation.
- *On a 4-Braid Criterion of Jones*. In preparation.
- *Oriented Local Moves and Unknotting Operations* (with Alyson Conover*). In preparation.
- *S-Equivalence and Divisibility of Homflypt Polynomials* (with Audrey Benson*, Sean House*, Ryan Knight*, and Nhat-Dinh Nguyen*). In preparation.
- *Knots with Composite Colors* (with Caroline VanBlargan*). Submitted.
- *Revisiting Alexander Polynomials and Whitehead Doubles*. Submitted.

Books

- *Mathematics Research for the Beginning Student, Volume 1: Accessible Projects for Students Before Calculus* (with Eli Goldwyn and Aaron Wootton, Eds.). Springer series: Foundations for Undergraduate Research in Mathematics. Birkhäuser Cham, Springer Nature Switzerland AG 2022.
- *Mathematics Research for the Beginning Student, Volume 2: Accessible Projects for Students After Calculus* (with Eli Goldwyn and Aaron Wootton, Eds.). Springer series: Foundations for Undergraduate Research in Mathematics. Birkhäuser Cham, Springer Nature Switzerland AG 2022.

Other Publications

- Crossword Puzzles
 - The New York Times. Tuesday, November 15, 2022.
 - The New York Times. Thursday, March 23, 2017.
- *Making Your Mathematics Program Vibrant* (with D. Kung). *MAA Focus*, Vol. 30, No. 6, Dec. 2010/Jan. 2011.
- Complexity of Exotic \mathbb{R}^4 s. Ph.D. Thesis, Rice University, 2000.

*Undergraduate coauthor.

GRANTS

- NSF grant: Emerging Scholars Program REU, PI, 2016–2022, \$283,864.
- NSF grant: Emerging Scholars Program REU, Co-PI, 2011–2013, \$278,000.
- MAA/NSF/NSA SUMMA grant: summer REU for minority mathematics achievement, PI, 2009, \$27,000.
- MAA SUMMA grant: summer REU for minority mathematics achievement, Co-PI, 2008, \$25,000.
- MAA SUMMA grant: summer REU for minority mathematics achievement, Co-PI, 2007, \$25,000.
- MAA SUMMA grant: summer REU for minority mathematics achievement, Co-PI, 2006, \$25,000.

INVITED ADDRESSES

- Joint Mathematics Meetings (National Meeting of the AMS and the MAA), Washington D.C. *Mentoring Undergraduate Research in Mathematics at Two Year Colleges and Similar Institutions*, January 2021.
- Sectional meeting of the AMS, University of Virginia, *Virtual Mosaic Knot Theory*, March 2020.
- UNKNOT IV, Seattle, WA. *Local Moves and Link Polynomials*, July 2019.
- Washington and Lee University, Mathematics Faculty Seminar. *Jones-HOMFLYPT-Kauffman Ideals and Elementary Combinatorics of Links*, May 2019.
- Joint Mathematics Meetings, Baltimore, MD. *Restrictions on Homflypt and Kauffman Polynomials Arising from Local Moves*. January 2019.
- Sectional meeting of the AMS, Greensboro, NC. *Ideals Generated by Local Moves in Link Diagrams*. November, 2014.
- Washington and Lee University, Mathematics Colloquium. *Open Problems in Knot Theory that Everyone Can Try to Solve*. March, 2014.
- Joint Mathematics Meetings, Baltimore, MD. *Undergraduate Research: Getting Started*. January, 2014.
- National Meeting of the MAA, Hartford, CT. *The Forbidden Number of a Knot*. August 2013.
- UNKNOT II, Denison University. *Unknots in Combinatorial Game Theory*. July 2012.
- Trinity College, Faculty Colloquium, Division of Natural Sciences. *Building a Better Math Program Community*. May 2012.
- Joint Mathematics Meetings, Boston, MA. *Are We Selling Mathematics as a Major Community?* January 2012.
- National Meeting of the MAA, Lexington, KY. *Building a Better Math Program Community*. August 2011.
- National Meeting of the MAA, Portland, OR. *Hot Jones!* August 2009.
- St. Mary's College of Maryland, Natural Sciences and Mathematics Colloquium. *Knots, Mirrors and Mutants*. November 2008.
- James Madison University, Knot Theory Seminar. *An Actual Introduction to Virtual Knot Theory*. June 2007.
- James Madison University, REU Seminar. *Knots, Mirrors and Mutants*. June 2007.
- St. Mary's College of Maryland, Mathematics Research Seminar. *Invariants of Graphs, Links and Manifolds*. November 2005.
- Lewis & Clark College, Undergraduate Mathematics Colloquium. *Knots and Mirror Images*. February 2005.
- James Madison University, Mathematics Colloquium. *4-Manifolds: From Beginning to Ends*. February 2005.
- Claremont Colleges Mathematics Colloquium. *4-Manifolds: From Beginning to Ends*. January 2004.
- Sectional Meeting of the AMS, Chapel Hill, NC. Special Session on Knots, Links and Embedded Graphs. *Ends of 4-Manifolds*. October 2003.
- University of Georgia, VIGRE Seminar. *4-Manifolds: From Beginning to Ends*. January 2003.
- Claremont Colleges, Topology Seminar. *Ends of 4-Manifolds*. October 2002.
- Claremont Colleges, Mathematics Colloquium. *Coxeter Groups and Artin Groups: A Topologist's Perspective*. February 2002.
- Rice University, Topology Seminar. *Complexity of Exotic \mathbb{R}^4 's*. April 2000.

INVITED PEER REVIEW

- Journal of Knot Theory and its Ramifications
- Involve, a Journal of Mathematics

MEMBERSHIPS

- American Mathematical Society, since 1994
- Association for Women in Mathematics, since 1999

COLLEGE SERVICE

- College Evaluation Committee (tenure/promotion), 2009–2011, 2020–present
 - Chair, 2022–present
- Parliamentarian, 2013–2016, 2020–present
- Math/CS Department Chair, 2011–2012, 2015–2017
- Math/CS Department Search Committee, 2009, 2010, 2011, 2013, 2015, 2016, 2017, 2018, 2022, 2023
 - Chair, 2010, 2011, 2015, 2016, 2017
- Ad Hoc Committee on faculty merit compensation, 2016–2017
- Faculty Senate, 2006–2008, 2013–2015
- Faculty Issues Committee, 2013–2015
 - Chair, 2013–2015
- Interim Provost/VPAA Search Committee Chair, 2014
- DeSousa-Brent Advisor, 2011–2012, 2013–2014
- PEACE professor, University of The Gambia, 2012–2013
- Physics Department Evaluation Committee, 2012
- Curriculum Review Committee, 2007–2008
- Admissions Advisory Group, 2007–2008
- Faculty Advisor for SMCM climbing club, 2012–present
- Faculty Advisor and coach for Women's and Men's Ultimate (Frisbee) teams, 2005–present

CLASSES TAUGHT

Lower-level

- Survey of Mathematics: S07, S10, S17
- Calculus I: F05, F06, F07, S09, F09, F10, F11, S12, S15, F16, F20, F22, S23
- Calculus II: F99^f, F01^P, F02^P, F04^P, S05^P, F05, S06, F06, S07, F07, F09, F11, S12, F19, S21, F21
- Discrete Mathematics^c: S18, S22, S23
- Vector Calculus: Su98^f, S02^P, S10, F20
- Linear Algebra: F01^P, F02^P, S03^P, F03^P, S04^P, F04^P, S06, S07, F08, S11, S12, F14, S17, S20, F20, S21
- Foundations of Mathematics: F09, S10, S13^g, F13, S14, S15, F16, S17, F19, F22
- Algorithms and Data Structures^c: F21

Upper-level

- Topics in Educational Studies: S13^g
- Set Theory: F03^P
- Analysis I: S03^P
- Abstract Algebra I: F07, F08, F14, F15, F17, F21
- Abstract Algebra II: S08, S09, S15, S16, S18, S22
- Graph Theory^c: S22
- Combinatorics: F13
- Topology: S02^P, F06, S09, S11, S13^g, S21, S23
- Differential Topology: S05^P
- Knot Theory: F05, F10, S14, F19, F22
- Complex Analysis: S20

Graduate-level

- Topology of 4-Manifolds: S01^f

^fRice University, ^PPomona College, ^gUniversity of The Gambia, all others at SMCM, ^cComputer Science course

ADDITIONAL INFORMATION

- Computing: Maple, MATLAB, Sage, Mathematica, \LaTeX , TikZ, HTML, Python, Pascal, BASIC
- Gymnastics: All-American, 1992; Academic All-American 1991, 1992
- Martial Arts: Jujutsu 四段 (ATAMA), Judo 初段 (USJA)
- Ultimate: World Beach Cup champion 2000, 2003, 2004; UPA Nationals 1996–2002; WFDF Championships 1999, 2002; WGGMBUCC 2022
- SCUBA: PADI Advanced Open Water Diver Certification
- Citizenship: USA