Susan Goldstine

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Education

▶ Ph.D. in Mathematics, Novermber 1998. Harvard University

Dissertation title: Spin Representations and Lattices.

A. M. in Mathematics, June 1996.

Amherst College ■ A. B. in Mathematics and French (summa cum laude), June 1993.

Academic Appointments

St. Mary's College of Maryland ■ Steven Muller Distinguished Professorship in the Sciences,

August 2019 - May 2022.

Professorship, August 2015 − present.

■ Associate Professorship, August 2008 – July 2015.

Assistant Professorship, August 2004 – July 2018.

Amherst College **▼ Visiting Assistant Professorship**, July 2003 – June 2004.

The Ohio State University Ross Assistant Professorship, September 2000 – June 2003.

McMaster University ■ Britton Postdoctoral Fellowship, September 1998 – June 2000.

Recent Publications

Peer-Reviewed Proceedings Papers and Journal Articles

- A Mathematical Analysis of Mosaic Knitting: Constraints, Combinatorics, and Color-Swapping Symmet ries, Journal of Mathematics and the Arts, DOI: 10.1080/17513472.2022.2058819 (with Carolyn Yackel).
- Eight Heptagons: The Double Torus Revisited, Bridges 2020: Mathematics, Art, Music, Architecture, Education, Culture: Conference Proceedings, Tessellations Publishing, July 2020, pp. 413–416.
- Self-Diagramming Lace, Bridges Stockholm: Mathematics, Art, Music, Architecture, Education, Culture: 2018 Conference Proceedings, Tessellations Publishing, July 2018, pp. 519–522.
- A Survey of Symmetry Samplers, Bridges Waterloo: Mathematics, Art, Music, Architecture, Education, Culture: Conference Proceedings, Tessellations Publishing, July 2017, pp. 103–110.
- A Recursion in Knitting, Bridges Finland: Mathematics, Music, Art, Architecture, Culture: Conference Proceedings, Tessellations Publishing, July 2016, pp. 395–398.
- Capturing Eight-Color Double-Torus Maps, Bridges Seoul: Mathematics, Music, Art, Architecture, Culture: Conference Proceedings, Tessellations Publishing, July 2014, pp. 377–380.
- Bead Crochet Bracelets: What Would Escher Do?, Bridges Towson: Mathematics, Music, Art, Architecture, Culture: Conference Proceedings, Tessellations Publishing, July 2012, pp. 567–572 (with Ellie Baker).
- Building a better bracelet: Wallpaper patterns in bead crochet, Journal of Mathematics and the Arts 6 (2012), no. 1, pp. 5–17 (with Ellie Baker).

Recent Publications (continued)

Other Journal Articles

- Ars Mathemalchemica: From Math to Art and Back Again, Notices of the American Mathematical Society, 69 (2022), no. 7, pp. 1220–1229 (with Liz Paley and Henry Segerman).
- Report: The 2014 Joint Mathematics Meetings Exhibition of Mathematical Art, Journal of Mathematics and the Arts, 9 (2015), no. 1-2, pp. 54-61.
- Review: Beyond Rubik's Cube Exhibit, The College Mathematics Journal, 45 (September 2014), no. 4, pp. 254–256 (with Calvin Armstrong).
- Beading the Seven Color Map Theorem, Math Horizons, September 2013, pp. 22–24 (with Ellie Baker and Sophie Sommer).
- Fibonacci Mobiles, Math Horizons, November 2008, pp. 24–25 (with Alison Frane).

Books and Chapters

- Crafting Conundrums: Puzzles and Patterns for the Bead Crochet Artist, A.K. Peters/CRC Press, December 2014 (with Ellie Baker).
- Perfectly Simple: Squaring the Rectangle, Chapter 7 of Crafting by Concepts, editors sarah-marie belcastro and Carolyn Yackel, A.K. Peters, April 2011, pp. 141–148

Recent Mathematical Artworks

Award-Winning Works

- Map Coloring Jewelry Set, Bead crochet and bead woven necklace, bracelet, and earrings, 2014.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Bridges 2015 Art Exhibition, Baltimore, July 2015.
 - Best Textile, Sculpture, or Other Medium, Joint Mathematics Meetings Exhibition of Mathematical Art, San Antonio, January 2015.
- Tessellation Evolution, Bead crochet necklace with parquet deformation, 2012.
 - Honorable Mention, Joint Mathematics Meetings Exhibition of Mathematical Art, San Diego, January 2013.

Juried and Invited Exhibition Works

- Seed Values II, Digital print showing photos of a daisy seed head overlaid with color-coded seed-growth numbers, 2021.
 - Bridges 2022 Art Exhibition, Aalto, Finland, August 2022.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
- Seed Values I, Digital print showing photos of a daisy seed head overlaid with color-coded seed-growth numbers, 2021.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
- A Tree for Virahanka, Two-color brioche knitting with recursive branching on copper wire, 2021.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
- Virahanka's Thoughts Overflow, Negatively-curved two-color brioche knitting with recursive branching on copper wire, 2021.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.

Recent Mathematical Artworks (continued)

- Symmetry Flow, Wire-and-paper mobile flowchart of wallpaper symmetries, 2020.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Joint Mathematics Meetings Virtual Exhibition of Mathematical Art, January 2021.
 - Bridges 2020 Virtual Art Exhibition, August 2020.
- Makeri Mosaic, Mosaic knitting with frieze designs, 2019.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Denver, January 2020.
- Float Free, Bumblebee, Mosaic knitting with two-color frieze designs, 2019.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Denver, January 2020.
 - Bridges 2019 Art Exhibition, Linz, Austria, July 2019.
 - Mathematical Beauty, AAAS Gallery, Washington D.C., March-June 2019.
- Fundamental Frieze Scroll II, Knitted-lace ornamented Truchet tiles forming all possible frieze symmetries, marked by colored beads, 2018.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Mathematical Beauty, AAAS Gallery, Washington D.C., March-June 2019.
 - Bridges 2019 Art Exhibition, Linz, Austria, July 2019.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Baltimore, January 2019.
- Fundamental Frieze Scroll I, Knitted-lace Truchet tiles forming all possible frieze symmetries, marked by colored beads, 2018.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Baltimore, January 2019.
- The Symmetries Diagram Themselves, Lace knitting with frieze symmetries marked by colored beads, 2018.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Bridges 2018 Art Exhibition, Stockholm, July 2018.
- Coded Symmetries, Lace knitting with frieze symmetries marked by colored beads, 2018.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Scientific Methods (Art + Science), Blue Spiral 1 Gallery, Asheville, May–June 2018.
- Serpentine Symmetries, Bead crochet and bead woven necklace, bracelet, and earrings with wallpaper symmetries, 2017.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Bisect, Frances Sewell Plunkett Gallery, Macon, March 2019.
 - Bridges 2018 Art Exhibition, Stockholm, July 2018.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, San Diego, January 2018.
- Linear Lace in Burgundy, Knitted lace with all possible frieze symmetries, 2017.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, San Diego, January 2018.

Recent Mathematical Artworks (continued)

- Linear Lace Pendant, Knitted lace with all possible frieze symmetries, 2017.
 - Bridges 2017 Art Exhibition, Waterloo, Ontario, July 2017.
- The Double Knitting Groups, Double-knit wall hanging with wallpaper group designs, 2016.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Bridges 2017 Art Exhibition, Waterloo, Ontario, July 2017.
 - Adjacent, Frances Sewell Plunkett Gallery, Macon, February–March 2017.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Atlanta, January 2017.
- Fibonacci Downpour, Negatively curved lace knitting with recursive branching, 2015.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Mathematical Beauty, AAAS Gallery, Washington D.C., March-June 2019.
 - Bridges 2016 Art Exhibition, Jyväskylä, Finland, August 2016.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Seattle, January 2016.
- Knit Bifurcation, Lace knitting with branched doubling, 2015.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Mathematical Beauty, AAAS Gallery, Washington D.C., March–June 2019.
 - Scientific Methods (Art + Science), Blue Spiral 1 Gallery, Asheville, May–June 2018.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Seattle, January 2016.
- Frieze Frame, Framed bead crochet disk with frieze designs, 2015.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Mathematical Beauty, AAAS Gallery, Washington D.C., March-June 2019.
 - Bridges 2015 Art Exhibition, Baltimore, July 2015.
- Hyperbolic Constellation, Bead crochet surface of constant negative curvature, 2014.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Bisect, Frances Sewell Plunkett Gallery, Macon, March 2019.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, San Antonio, January 2015.
- Eight-Color 8, Bead crochet double-torus pendant with map coloring, 2014.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Bisect, Frances Sewell Plunkett Gallery, Macon, March 2019.
 - Bridges 2014 Art Exhibition, Seoul, August 2014.
- Toroidal Tessellations, Bead crochet bracelets with regular tessellations, 2012 (with Ellie Baker).
 - Bridges 2012 Art Exhibition, Towson, July 2012.
- Crystallographic Bracelet Series, Bead crochet bracelets with wallpaper group designs, 2011 (with Ellie Baker).
 - Joint Mathematics Meetings Exhibition of Mathematical Art, Boston, January 2012.
- Tea for Eight, Ceramic tea set with map coloring, 2010.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, New Orleans, January 2011.

Recent Mathematical Artworks (continued)

- Seven-Color Torus Series in Bead Crochet, Bead crochet bracelets with map colorings, 2009 (with Ellie Baker and Sophie Sommer).
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January– March 2022.
 - Joint Mathematics Meetings Exhibition of Mathematical Art, San Francisco, January 2010

Juried Fashion Show Pieces

- Fourteen Ciphers, Mosaic-knitted shawl with all two-color frieze types compatible with mosaic knitting, 2019.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Bridges Math + Fashion Show, Linz, July 2019.
- Seven Peaks, Mosaic-knitted cardigan with designs for all the frieze symmetry types, 2019.
 - Bridges Math + Fashion Show, Linz, July 2019.
- Crystalline, Double-knitted scarf with designs for all nine wallpaper groups compatible with double knitting, 2016.
 - Fundamental Regions: The Math/Art of Susan Goldstine, Boyden Gallery, SMCM, January–March 2022.
 - Bridges Math + Fashion Show, Linz, July 2019.

Collaborative Installation

- Mathemalchemy, Large-scale multimedia collaborative mathematical art installation, 2021.
 - National Academy of the Sciences Gallery, Washington DC, January–June 2022.
 - Juniata College, Pennsylvania, June–November 2022.

Recent Presentations

Plenary Addresses

- When Mathematics Says No: The Aesthetics of Impossibility," Invited Address, Rose-Hulman Undergraduate Mathematics Conference, Terre Haute, April 2019.
- A Survey of Symmetry Samplers," Plenary Lecture, Bridges 2017, Waterloo, Ontario, July 2017.
- "Fortunatus's Purse: a many-colored story," Keynote Address, Michigan REU Conference, Central Michigan University, June 2009.

Invited and Conference Talks

- Adventures in Brioche Knitting," Bay Area Art and Math!, Zoom Conference, August 2022.
- Mosaic Knitting Friezes: seventeen symmetries, minus three," Gathering for Gardner 14, Atlanta, April 2022.
- Seed Values: Confessions of a Number Addict," Bay Area Art and Math!, Zoom Conference, June 2021.
- "When Mathematics Says No: The Aesthetics of Impossibility," Albion College Mathematics and Computer Science Colloquium, March 2021.
- Maps of Strange Worlds: Beyond the Four-Color Theorem," Gathering for Gardner Celebration of Mind, Zoom, January 2021.
- "Eight Heptagons: The Double Torus Revisited," Bay Area Art and Math!, Zoom Conference, July 2020.

Recent Presentations (continued)

- Symmetry Flow: The Perils of Staring at Flowcharts," Bay Area Art and Math!, Zoom Conference, June 2020.
- Color Swaps in Mosaic Knitting," MAA Session on Mathematics and the Arts, Joint Mathematics Meetings, Denver, January 2020.
- ▼ "Yarn, Stitch, Fabric: Searching for a Theory of Knitted Lace Symmetry," Computational Textiles Workshop, ICERM, Providence, September 2019.
- "Color Swaps in Mosaic Knitting," MOVES Conference, Museum of Mathematics, New York, August 2019.
- Color Swaps in Mosaic Knitting," MAA MD-DC-VA Section Meeting, Frederick County Community College, April 2019.
- "Bichromatic Symmetries in Mosaic Knitting," Mathematics Colloquium, American University, Washington, D.C., February 2019.
- Self-Diagramming Lace: Minimalist Edition", MAA Session on Mathematics and the Arts, Joint Mathematics Meetings, Baltimore, January 2019.
- Symmetry Samplers," Gathering for Gardner 13, Atlanta, March 2018.
- "The Fabric of Symmetry: Connecting Mathematics and Fiber Arts," Math Encounters, National Museum of Mathematics, New York, February 2018.
- "Knitting Symmetries: Yarn, Stitch, and Fabric", MAA Session on Arts and Mathematics: The Interface, Joint Mathematics Meetings, San Diego, January 2018.
- "Knitting Symmetries: Preliminary Needling," MAA MD-DC-VA Section Meeting, Christopher Newport University, November 2017.
- Symmetric Threads: Classifying Symmetries in the Fiber Arts," Graduate-Student AMS Chapter Lecture, Rutgers University, November 2017.
- Symmetric Threads: Classifying Symmetries in the Fiber Arts," Symmetry Festival, Vienna, July 2016.
- "Thinking Outside the Torus: Geometric explorations in bead crochet," MAA Session on Mathematics and the Arts, Joint Mathematics Meetings, Seattle, January 2016.
- "You can never have too many bracelets: Adventures in mathematical beading," Undergraduate Lecture, American University, Washington, D.C., October 2015.
- "You can never have too many bracelets: Adventures in mathematical beading," Undergraduate Lecture, McDaniel College, Westminster, MD, September 2015.
- "Maps of Strange Worlds: Beyond the Four-Color Theorem," MathFest, Washington DC, August 2015.
- "Thinking Outside the Torus: New directions in bead crochet," AMS-EMS-SPM Meeting, Porto, Portugal, June 2015.
- "You can never have too many bracelets: Adventures in mathematical beading," Longwood University Undergraduate Colloquium, November 2014.
- "Building a Better Bracelet: Wallpaper Patterns in Bead Crochet," Bridges Conference, Seoul, August 2014.
- "Beading the Seven-Color Torus," Gathering for Gardner XI, Atlanta, March 2014.
- "Tessellations on Bead Crochet Bracelets," MAA MD-DC-VA Section, Longwood University, November 2013.
- "Tessellations on Bead Crochet Bracelets," MOVES Conference, Museum of Mathematics, New York, August 2013.
- "Fortunatus's Purse and the wealth of the world," PME Induction Ceremony, Randolph-Macon College, April 2012.

Recent Presentations (continued)

- Fortunatus's Purse: a many-colored story," Gathering for Gardner X, Atlanta, March 2012.
- "Building a Better Beaded Bracelet: Transformations, Tesselations and Tori," MAA Session on Mathematics and the Arts, Together Again, Joint Mathematics Meetings, Boston, January 2012.
- "Building a better bracelet: Wallpaper patterns in bead crochet," MathFest (National MAA Meeting), Lexington, KY, August 2011.
- "Fortunatus's Purse and the wealth of the world," Mathematics Colloquium, Montgomery College, Germantown, November 2010.
- "The Discovery of Non-Euclidean Geometry," Mathematics Colloquium, Virginia Commonwealth University, April 2009.

Conference Workshops

- "Teaching Mathematics with Bead Crochet," MAA minicourse on the mathematics of bead crochet lead with Ellie Baker, MathFest, Washington DC, August 2015.
- "Bead Crochet Bracelets: What Would Escher Do," Bead crochet workshop lead with Ellie Baker, Bridges Conference, Towson University, July 2012.

Campus and Community Talks

- "Math + Art + Zoom = Mathemalchemy," Natural Sciences and Mathematics Colloquium, March 2022.
- Steven Muller Lecture/Artist's Talk for the exhibit "Fundamental Regions: The Math/Art of Susan Goldstine," Boyden Gallery, February 2022.
- Symmetric Threads: the language of symmetry in the fiber arts," Natural Sciences and Mathematics Colloquium, February 2020.
- "Too many bracelets: Further adventures in mathematical beading," Natural Sciences and Mathematics Colloquium, February 2015.
- "Serial Geometries," (workshop lead together with Fred Scharmen), Big Table Connections, Baltimore Museum of Art, August 2014.
- "You can never have too many bracelets: Adventures in mathematical beading," Southern Maryland Sticks and Stitches, Lexington Park, August 2012.
- "You can never have too many bracelets: Adventures in mathematical beading," Natural Sciences and Mathematics Colloquium, April 2012.
- "The Geometries of Escher," Natural Sciences and Mathematics Colloquium, February 2010.

Recent Teaching and Mentoring

Teaching Award

■ John Smith Teaching Award, MD-DC-VA Section of the Mathematical Association of America, 2020.

Four-Credit Courses (2008 - 2022)

Math 151 (Calculus I), 23 sections; Math 152 (Calculus II), 5 sections, Math 131 (Survey of Mathematics: Mathematics and the Arts), 1 section.

200-level Math 281 (Foundations of Mathematics), 13 sections; Math 200 (Discrete Mathematics), 1 section; Math 256 (Linear Algebra), 1 section.

Recent Teaching and Mentoring (continued)

300-level Math 321 (Abstract Algebra I), 8 sections; Math 322 (Abstract Algebra II), 5 sections.

Math 421 (Combinatorics), 1 section; Math 422 (Abstract Algebra II), 3 sections; Math 485 (Topics in Mathematics: Galois Theory), 1 section, Math 485 (Topics in Mathematics: On Beyond Euclid), 1 section.

Recent Student Research

Summer 2019 Mentor for Kyler Crank's St. Mary's Undergraduate Research Fellowship project, "Developing Analogous Models of the 3x+1 Conjecture."

Summer 2013 Advisor for Demara Austin, Randalle Engstrom-Nadeau, Aye Mi San, and Mario Sanchez's NSF Research Experience for Undergraduates project, "Small Universe, Infinite Possibilities: Restricting Conway's Game of Life to a Finite Universe."

Summer 2012 Instructor for Intro to Research Seminar, NSF Research Experience for Undergraduates.

Summer 2009 Instructor for Intro to Research Seminar, MAA National Research Experience for Undergraduates.

2008 − 2022 Advisor for 8 St. Mary's Projects and 7 Senior Projects.

Recent Professional Service

Department Service

■ WeBWorK Administrator.

■ WeBWorK Administrator.

Spring 2014 Computer Science Search Committee Chair.

2013 − 2017 Math TA Coordinator,

Summer 2013 Mathematics Search Committee Chair.

2012 – 2013 Mathematics Search Committee Chair.

2009 − 2010 📕 Mathematics Search Committee.

2008 − 2009 Mathematics Search Committee.

College Service

Summer 2015 📕 Faculty Co-leader, Greece Summer Study Tour.

2013 − 2016 Natural Sciences and Mathematics Colloquium Committee.

Recent Professional Service (continued)

Fall 2009 Physics Department Evaluation Committee

■ Faculty Issues Committee.

■ Faculty Seminar Committee (Chair 2009 – 2010).

2008 − 2009 Nitze Scholars Program Committee

■ Natural Sciences and Mathematics Colloquium Committee

Mathematical Community Service

2019 − ■ Member of the Bridges Organization Board of Directors.

2018 − 2019 Ridges 2019 Program Chair.

2017 - Chair and Founder of the Bridges Fashion Show Committee.

2016 – 2022 Associate Editor, Journal of Mathematics and the Arts.

August 2015 Hexaflexagon Table, Mathematical Carnival at the MAA Centennial, MathFest, Washington DC.

November 2013 Member of Section NExT Panel on tenure and promotion, MAA MD-DC-VA Section Meeting, Longwood University.

January 2012 Member of Project NExT Panel "Building a Tenure Portfolio," Joint Mathematics Meetings, Boston.

2008 − 2017 Member of the Editorial Board, College Mathematics Journal.