Dr. Laura Taalman

laurataalman@gmail.com / taalmala@jmu.edu / mathgrrl.com

POSITIONS

Academic

James Madison University, Harrisonburg, VA
Department of Mathematics & Statistics
Professor of Mathematics: Assistant 2000-2006, Associate 2006-2011, Full Professor 2011-present

Brown University, Providence, RI
Institute for Computational and Experimental Research in Mathematics (ICERM)
Simons Foundation Funded Research Fellow, Illustrating Mathematics, Fall 2019

National Museum of Mathematics (MoMath), New York City, NY
Mathematician in Residence**,** 2014-2015

Duke University, Durham, NC
Graduate Instructor, Ph.D. in Mathematics 2000, M.A. in Mathematics 1997

University of Chicago, Chicago, IL
Teaching Assistant, B.S. in Mathematics 1994

Industry

Shapeways, Inc., New York City, NY
Shapeways Magazine and New York Public Library Programming, 2017-2018

Ultimaker North America, New York City, NY
Strategic Research Consultant for Education, 2016-2017

Digital Harbor Foundation, Baltimore, MD
Content Strategist, 2015-2016

MakerBot Industries, Brooklyn, NY
Senior Product Manager for Education, 2015

SCHOLARSHIP

Research Publications

Mathematical research interests include singular algebraic geometry, knot theory, algebraic and combinatorial analysis of games, puzzles, patterns, 3D design, and art. Recent scholarship centers around computational design and interdisciplinary collaboration.

Knit Knots: Large-scale soft conformations of minimum-ropelength knots and links
Proceedings of Bridges 2023: Mathematics, Art, Music, Architecture, Culture, to appear 2023.

Ideal spatial graph configurations
With Stephen Lucas
Journal of Mathematics and the Arts, special issue on Mathematical Illustration, Vol. 16, Issue 1-2, pp. 121-132, 2022.

Modeling dynamical systems for 3D printing
With Stephen Lucas and Evelyn Sander (George Mason University)
- *Notices of the American Mathematical Society*, cover article, Vol. 67, No. 11, p. 1692-1705, 2020, and
- *The Best Writing in Mathematics 2021*, No. 19, pp.82-106, Princeton University Press, 2022

Categorizing Celtic knot designs
With Roger Antonsen (University of Oslo)
Proceedings of Bridges 2021: Mathematics, Art, Music, Architecture, Culture, p. 87-94, 2021

Wallpaper patterns for lattice designs
With Carolyn Yackel (Mercer University)
Proceedings of Bridges 2020: Mathematics, Art, Music, Architecture, Culture, p. 223-230, 2020

Optimizing Morton's tritangentless knots for rolling
With Stephen Lucas and student Abigail Eget
Proceedings of Bridges 2020: Mathematics, Art, Music, Architecture, Cultures, p. 367-370, 2020

Opportunity costs in the game of best choice
With Brant Jones and students Madeline Crews, Kaitlyn Myers, Michael Urbanski, and Breeann Wilson
Electronic Journal of Combinatorics, Vol. 26, Issue #1, 2019

Sequences of spiral knot determinants,
With students Ryan Stees and Charlie Kim
Journal of Integer Sequences, Vol. 19, Issue #1, 2016

Nest graphs and minimal complete symmetry groups for magic Sudoku variants
With Beth Arnold, Rebecca Field, John Lorch (Ball State University), and Stephen Lucas
Rocky Mountain J. Mathematics, Vol. 45, No.3, 2015

Heartless Poker
With Dominic Lanphier (Western Kentucky University)
MOVES: Research in Recreational Math, Princeton University Press, Volume 1, 2015

Solitaire Mancala and the Chinese Remainder Theorem
With Brant Jones and Anthony Tongen
American Mathematical Monthly, Vol. 120, No. 8, 2013

Mancala matrices
With Anthony Tongen and students Ben Warren, Fanya Wyrick-Flax, and Iris Yoon
College Math Journal, Vol. 44, No. 4, 2013

Minimal complete Shidoku symmetry groups
With Beth Arnold, Rebecca Field, and Stephen Lucas
Journal of Combinatorial Mathematics and Combinatorial Computing, Vol. 87, 2013

Spiral Knots
With Len Van Wyk and students Nathan Brothers, Sean Evans, Debbie Witczak, and Carolyn Yarnall
Missouri Journal of Mathematical Sciences, Vol. 22, Issue #1, 2010

Grobner basis representations of Sudoku
With Beth Arnold and Stephen Lucas
College Math Journal, Vol. 41, No. 2, 2010

p-Coloring classes of torus knots
With students Anna-Lisa Breiland and Layla Oesper
Missouri Journal of Mathematical Sciences, Vol. 21, Issue #2, 2009

An exact sequence of weighted Nash complexes
Illinois Journal of Mathematics, Vol. 52, No. 2, 2008

Counting m-coloring classes of torus knots
With students Kathryn Brownell and Kaitlyn O'Neil
Pi Mu Epsilon Journal, Vol. 12, No. 5, 2006

The Nash sheaf of a complete resolution
Manuscripta Mathematica, Vol. 106, No. 2, 249-270, 2001

Exhibits and Residencies

Each exhibition was either invited or competitively juried, and all residencies were invited and/or paid, unless otherwise indicated. Pieces that were shown in multiple exhibitions are grouped together.

Knit Knots

- Bridges Conference Art Exhibition, Halifax, Nova Scotia, July 2023

Catalan Wireframe: Pentagonal Hexecontahedron (with student Carolyn Angelillo)

- Polyplanes installation at Rugters University, Studio Infinity, contributed, April 2023

Scutoid Table (with Patrick Cain Designs)

- Light-weight recycled concrete pair of scutoid tables using mathgrrl code and blueprints, West Elm collaboration with Patrick Cain Designs studio, Los Angeles, 2022-23

Rolling Knots (with Stephen Lucas and student Abigail Eget)

- Bridges Aalto Art Exhibition (remotely), August 2020

Coding for generative design

- 2020 Distinguished Visitor, working with Robert Bosch, Oberlin College, February 2020

Steel Knot Conformations and Chaotic Attractors (with Stephen Lucas)

- Construct3D Art Exhibition, Flatland Gallery, Houston, TX, February 2020
- Women Making with Math Exhibition, Dana Hall Art Gallery, Wellesley, MA, December 2019

Math + Art: Illustrating Mathematics

- ICERM Mathematical Artist-in-Residence, Providence, RI, Fall 2019

Perko Morph, Spiky Perko Knot, Steel Knots, and Chaotic Attractors (with Stephen Lucas)

- ICERM Illustrating Mathematics Exhibition, September-December 2019

Puente Encriptado (with Francesca Rodriguez and Ashley Zelinskie)

- International Contemporary Art Festival at Art.MO, Monumental Callou, FUGAZ Residency, Lima, Peru, April 2018

Type 9 (with Alicia Tam Wei as AABSTRACT Design)

- International Design Event, Wanted Design Manhattan, New York, NY, May 2016
- Astor Place Design Pavillion, American Design Club Manhattan, New York, NY, May 2016

Pentagonal Hexecontahedron, Low-Voxel Stanford Bunny, Algorithmic Snowflakes, Pentagonal Tessellation Type 15, Minimum Rope Conformation Knot

- Cedarhurst Center for the Arts, part of the Tom Burtonwood exhibition *Transmissions*, Mount Vernon, IL, February-May 2016

3D Printing: From Abstract to Concrete

- Denison University, Artist-in-Residence, working with Lew Ludwig and Chis Faur, April 2016

Infinity Knit Pi Scarf

- Joint Mathematics Meetings, Washington, DC, Fibre Art and Mathematics, January 2009

Design Work

mathgrrl Designs on Shapeways

- Over 150 original 3D-printable designs optimized for various high-end materials, including nylon, stainless steel, and cast metal, 2013-present

mathgrrl Designs on Thingiverse

- Nearly 250 original 3D-printable designs optimized for desktop machines, shared free for anyone to download and print; over 13K followers, 23K views/month, 2013-present

TEACHING AND MENTORING

Mentored Undergraduate Research Projects

Mathematics Research
Supervised over 30 undergraduate students in mathematical research, leading to multiple student presentations and journal publications:

- **Best Choice Games** (with Brant Jones), JMU NSF Mathematics REU, 2018
- **Spiral Knot Determinants,** JMU Honors Thesis, 2014-2015
- **Singular Knots** (with Len Van Wyk), JMU NSF Mathematics REU, 2013
- **Knot Theory,** Advanced Undergraduate Research, 2012-2013
- **Knot Determinant Patterns,** JMU Internal Math/Stat REU, 2012
- **Mancala/Tchoukaillon** (with Anthony Tongen), JMU NSF Mathematics REU, 2011
- **Mancala/Tchoukaillon** (with Anthony Tongen), JMU M^3 NREUP, 2010
- **Spiral Knots** (with Len Van Wyk), JMU NSF Mathematics REU, 2007
- **Multiple Gerechte Designs, JMU** Honors Thesis, 2006-2007
- **Torus Knot Colorings,** JMU NSF Mathematics REU, 2004
- **Pretzel Knot Colorings,** JMU NSF Mathematics REU, 2003

Mathematical 3D Printing and Design Research
Supervised over 35 undergraduate students in interdisciplinary design research projects in 3D printing, 3D design, and mathematical visualization:

- **Stick Knot Conformations** (with Beth Arnold), JMU Experimental Mathematics Lab, 2021-22
- **Optimized Tritangentless Trefoils** (with Stephen Lucas), JMU Math MakerLab, 2018-2020
- **3D Graph Conformations** (with Stephen Lucas), JMU Math MakerLab, 2018-2020
- **Rocket Exhaust Trench Modeling** (with Caroline Lubert), JMU Math MakerLab, 2018
- **3D Graphs and Discrete Geometry** (with John Bowers), Ars Geometrica Seminar, 2017-2018
- **Homotopy and 3D Printing,** Introduction to Research, 2017
- **Spatial Graphs and 3D Printing** (with John Bowers), Introduction to Research, 2017

- **Pushing 3D Printing Boundaries** (with John Bowers), Ars Geometrica Seminar, 2017
- **Modeling Knot Conformations,** Introduction to Research, 2014
- **Multi-material 3D Printing,** STAR Student Program, 2013-2014
- **3D Printing Laboratory,** JMU Internal Math/Stat REU, 2013

Teaching Experience

Mathematics Courses
Experience includes extensive General Education curriculum development for unique liberal arts math classes and STEM Calculus with Precalculus. List of mathematics courses taught:

- The Nature of Mathematics: Sudoku, SET, and Knots
- The Nature of Mathematics: 3D Printing
- The Nature of Mathematics: Games and Puzzles
- The Nature of Mathematics: Origami
- Fundamentals of Mathematics
- Algebra Gateway
- Calculus with Functions I and II
- Calculus I and II
- Introduction to Proof and Discrete Mathematics
- Graph Theory
- Abstract Algebra
- Advanced Linear Algebra
- Algebraic Topology

Design and Digital Fabrication Courses
Interdisciplinary courses taught through JMU 3SPACE, the JMU College of Education, and the JMU General Education program, including:

- Special Studies: rAnDomNEsS
- Special Studies: Fabrication and Analysis of 3D Puzzles
- Special Studies: Representing the World in 3D
- Mathematical 3D Fabrication
- Laboratory Introduction to 3D Printing
- Mathematics Methods: Desktop Fabrication

Faculty Institutes, Sandboxes, Workshops (with Jamie Calcagno-Roach)
Semester and summer programs for JMU faculty interested in incorporating 3D printing and design into their own curriculum and scholarship, taught with support from JMU Libraries:

- Introduction to 3D Printing
- Introduction to 3D Scanning
- Virtual Reality with Sketchup and Oculus Rift
- Digital Fabrication with Carvey and ShopBot
- 3D Design in Color with MeshMixer, DaVinci Color, and Mosaic Palette
- 3D Printing Beyond Plastic: Food Printing

- Design Beyond Tinkercad: MeshMixer and Fusion 360
- Design It, Print It, Share It: Fusion 360 and Shapeways
- Integrative Design Technology Fellows, Semester Institute

OTHER PUBLICATIONS

Textbooks

Taalman/Kohn Calculus, with Peter Kohn, a 3-semester Calculus textbook. Freeman/Macmillan, 2013. About 14,000 copies sold as of 2019, with adoption or previous use at the following schools:

- Alabama A&M University
- Allan Hancock College
- Boise State University
- Catawba Valley CC
- City College of NY, Touro
- Clayton State University
- Colby College
- College of New Rochelle
- Columbia Basin College
- Davidson County CC
- DeVry University
- Florida High Schools
- Framingham State College
- Georgia College
- Graceland College
- Haywood CC
- Isothermal CC
- James Madison University
- Massachusetts High Schools
- McDaniel College
- Mercer University
- New Jersey High Schools
- New Mexico Mining & Tech
- New York University
- N. Central Michigan College
- Nova Scotia Agricultural
- Skagit Valley College
- Southwestern University
- SUNY College at Potsdam
- Texas Bexar
- Texas Harris
- Trinity College
- UC Santa Barbara
- UNC Greensboro
- U. Birmingham, UK
- University of Toronto
- U. Wisconsin, Stevens Point
- Wheaton College
- York County CC

Taalman Calculus I with Integrated Precalculus, a two-semester textbook that combines first semester STEM Calculus with precalculus and algebra. First edition published by Houghton Mifflin, 2004; winner of a Texty Award, 2006; new edition published by Freeman/Macmillan, 2013. About 5,000 copies sold as of 2019, with adoption or previous use at the following schools:

- Boston College
- Cal. State Long Beach
- Centre College
- Colby College
- Connecticut High Schools
- Drexel University
- Gustavus Adolphus College
- Harvard University
- Hope College
- James Madison University
- Kansas High Schools
- Knox College
- Loyola University Chicago
- Meredith College
- Miami Dade CC
- Monash University
- New Jersey High Schools
- New Mexico High Schools
- New Mexico Mining & Tech
- New York University
- North Central College
- Northwestern University
- Oxford College of Emory U.
- Trinity College Hartford
- Tulane University
- St. Catherine University
- SUNY College at Potsdam
- University of the Redlands
- University of St. Thomas
- Univ. Wisconsin-Stout
- Urbana University
- Westfield State University
- Wheeling Jesuit College

Puzzle Books and Puzzles

Taking Sudoku Seriously: The Mathematics Behind the World's Most Popular Pencil Puzzle, with Jason Rosenhouse, hardcover sales to date of over 5,000 copies, reviewed in the Wall Street Journal and The Guardian, and winner of a PROSE Award:

- Published by Oxford University Press, 2012
- Chinese translation by Machinery Industry Press, 2014
- Japanese translation by Seidosha Press, 2014

Brainfreeze Puzzles books, with Philip Riley, eight nationally published books with combined total sales to date of over 60,000 copies, published by Sterling Publishing and Puzzlewright Press:

- **Rainbow Sudoku,** popular and colorful Sudoku variants, 2016
- **Ninecraft,** 9×9 puzzles with 8-bit themes and missing nines, 2016
- **Double Trouble Sudoku,** 8× 8 and 10× 10 Sudoku variants with polyomino regions, 2014
- **Fifty Shades of Sudoku,** 10×10 Sudoku variants with 50 shaded cells, 2014
- **Beyond Sudoku,** popular variations of Sudoku puzzles, 2012
- **No-Frills Sudoku,** symmetric minimal-clue Sudoku puzzles, 2011.
- **Naked Sudoku,** arithmetic Sudoku variants, 2009
- **Color Sudoku,** popular and colorful Sudoku variants, 2007

Custom made Sudoku variant puzzles, with Philip Riley as Brainfreeze Puzzles, custom and solicited puzzles for books, magazines, and other publications; a full list of publication venues would be too long for this document but highlights include the following, 2006-present:

- **Mathematics of Games and Puzzles: From Cards to Sudoku,** by Art Benjamin, Great Courses
- **Mathematics for Human Flourishing,** book by Francis Su, Yale University Press
- **American Mathematical Society Page-a-Day Calendar,** Evelyn Lamb, AMS Press
- **Mathematical Association of America,** magazine and newsletter features, promotions, contests, websites, back-page features, and printed conference programs, for FOCUS, Math Horizons, the MAA Carriage House, MathFest, and the Joint Mathematics Meetings
- **Cambridge University,** Millennium Mathematics Project, +plus Magazine
- **For All Practical Purposes,** a COMAP textbook published by W.H. Freeman
- **Mythematics,** book by Michael Huber, Princeton University Press
- **Text and Academic Authors Association,** website and Conference Program
- **The BIG Notebook,** MAA Business, Industry, and Government SIGMAA
- **The Addict's Guide to Sudoku,** book by Fiorella Grossi, FairWinds Press
- **Suki and the Beasts, a Sudoku Odyssey,** book by Galewski, Chapman, and Schuman

Sudoku syndication puzzles, with Philip Riley as Brainfreeze Puzzles, provided weekly Sudoku syndication for the following college newspapers, 2007-2011:

- *The Breeze,* James Madison Univ.
- *GW Hatchet,* George Washington U.
- *The Temple News,* Temple Univ.
- *The Scarlet,* Clark University
- *The Bucknellian,* Bucknell Univ.
- *The Collegian,* Kansas State Univ.
- *The New Hampshire,* UNH
- *The Manitou Messenger,* St. Olaf College
- *The Oswegonian,* SUNY Oswego
- *The Utah Statesman,* Utah State Univ.

- *The Reveille,* NebraskaWesleyan U.
- *The Davidsonian,* Davidson College
- *The Globe,* Point Park University
- *The Trinitonian,* Trinity University
- *The Oregon Daily Emerald,* U. Oregon
- *The Daily O'Collegian,* Oklahoma S.U.
- *The Skyline,* Sul Ross State University
- *The Mesa Journal,* UT Permian Basin
- *The Crusader,* Holy Cross
- *The Maroon,* University of Chicago
- *The Creightonian,* Creighton Univ.
- *The Voice,* Westfield State College
- *The Lance,* Evangel University
- *The Review,* University of Delaware
- *George-Anne Daily,* Georgia Southern
- *The Lafayette,* Lafayette College
- *The Daily Pennsylvanian,* U. Penn
- *The Lode,* Michigan Technological U.
- *The Bona Venture,* St. Bonaventure U.

Expository Articles and other Media

Hacktastic
Hundreds of blog posts and tutorials on math, failure, and 3D design, with over 900K unique pageviews and over 180K unique visitors per year, mathgrrl.com/hacktastic, 2013-present

Perko Morph
Photograph and description of this 3D design was featured as the March page of the widely-circulated 2021 Mathematical Imagery Calendar, American Mathematical Society, 2021

Hitting the Wall
Chapter in the book "Living Proof: Stories of Resilience Along the Mathematical Journey", American Mathematical Society, 2019; republished as a feature in MAA Math Horizons, Volume 27, Issue 3, 2020; again republished in the Notices of the American Mathematical Society, August 2020

Regular column at Shapeways Magazine
Over 50 articles on technical 3D design, Shapeways, Inc., 2017-2019

Parametric OpenSCAD Designs for Exploring Sierpinski-Like Carpet Fractals
Construct3D Conference Proceedings, October 2018

College-level math exploration in 3D at JMU 3SPACE
Ultimaker Education, April 2018

Book Reviews: Visualizing Mathematics with 3D Printing, and Pasta By Design
The American Mathematical Monthly, Volume 125, Issue 4, March 2018

Creating a community of 3D educators at Construct3D
Ultimaker Education, May 2017

3D printed fractals at JMU 3SPACE
Ultimaker Education, May 2017

JMU 3SPACE: Building a 3D printing classroom
Ultimaker Education, January 2017

Thingiverse Jumpstart: Tinkercad, OpenSCAD, Sculptris
MakerBot Industries, Thingiverse Digital Products, August 2015

MakerBot in the Classroom: A Resource for Educators
MakerBot Industries, published resource for K12 and higher education, May 2015

The Mathematics behind xkcd: A conversation with Randall Munroe
Math Horizons, Mathematical Association of America, cover article, September 2012

Taking Sudoku Seriously
Math Horizons, Mathematical Association of America, September 2007

Puzzling Over Sudoku
Madison Magazine, James Madison University, Fall 2007

Simplicity is not simple: Tessellations and modular architecture
With Eugenie Hunsicker (Lawrence University)
Math Horizons, Mathematical Association of America, winner of the MAA Trevor Evans Award, cover article, September 2002

PRESENTATIONS

Talks and Keynotes

Presentations on similar topics have been grouped into categories with generic titles, although content evolves over time and changes to match audiences. The majority are invited talks and addresses, while some are contributed talks.

Mathematical Technocraft

- Bridges Conference plenary address, Halifax, Nova Scotia, July 2023

Mathematical knit knots and computational crochet color pooling

- An Evening of Unnecesssary Detail, Caveat Theatre, New York City, July 2023

Tritangentless trefoils, ideal graph configurations, and chaotic attractors

- North Carolina State Banquet Dinner for the Southeast Section of the MAA, October 2022
- With Steve Lucas, JMU Mathematics & Statistics colloquium, August 2022
- With Steve Lucas, Heidelberg Experimental Geometry Lab, Germany (remotely), June 2022

Categorizing Celtic Knot Designs

- With Roger Antonsen, Bridges Aalto 2021, Finland (remotely), August 2021

3D Printed Hinged Dissections and Foldable Polyhedra

- FUNDAPROMAT speaker series, Panama (remotely), May 2021
- Gathering 4 Gardner Celebration of Mind, invited speaker (remotely), April 2021

Coding and technical design software for mathematical 3D printing

- Geometry Labs United, invited seminar speaker (remotely), October 2020

Design x Code: Generative design for 3D printing

- Institute for Mathematics and its Applications (IMA), Public Lecture (remotely), Feb 2021
- Willamette University, Dept. of Mathematics Colloquium (remotely), April 2020
- Oberlin College, "Fuzzy Lance" Distinguished Visitor Public Lecture, March 2020
- Brown University, Undergraduate Mathematics Seminar, December 2019
- City University of New York, Graduate Center, Data Science Seminar, November 2019
- 3DPrint.com, Advanced Design for 3D Printing, course livestream, March 2019
- Sol Plaatje University, Kimberly, South Africa, Embassy Program, May 2018
- University of Pretoria, SciEnza Lecture, South Africa, Embassy Program, May 2018
- University of Witwatersrand, Johannesburg, South Africa, Embassy Program, May 2018
- James Madison University, Computer Science Research Seminar, March 2018

Level Up: Growing a campus-wide curriculum in a dedicated 3D printing classroom

- Construct3D Conference in Houston, TX (with Jamie Calcagno-Roach), February 2020

Math x Art: Finding internal and external support for interdisciplinary work

- James Madison University, CFI Faculty Semester Sketch, January 2020

Managing unreasonable meshes and infinitely thin surfaces

- ICERM, Brown University, Illustrating Mathematics Technical Seminar, October 2019

Parametric design with OpenSCAD

- ICERM, Illustrating Mathematics Technical Seminar (with Sylviana Amethyst), October 2019
- Trinity Upper School, NYC, Open Lunch-and-Learn Session, April 2019
- Construct3D Conference, Duke University, Durham, NC (with Marius Kintel), May 2017
- ICERM Illustrating Mathematics Workshop, Providence, RI, June 2016

3D Printed Mathematics: Student design and creation of mathematical objects

- MAA MD/DC/VA Section Meeting at Hood College, MD, April 2019
- Joint Mathematics Meetings in Baltimore, MD, Contributed Paper Session, January 2019
- Construct3D Conference at Georgia Tech, Atlanta, GA, October 2018

Math by Design: 3D printing for the working mathematician

- Trinity Upper School, NYC, James H. Fogelson Memorial Symposium, April 2019
- James Madison University, Mathematics and Statistics Colloquium, September 2018
- College Board AP Calculus Reading in Kansas City, MO, Professional Night Speaker, June 2018
- SIAM Conference on Industrial and Applied Geometry, Pittsburgh, PA, July 2017
- Joint Mathematics Meetings, MAA Invited Address, Atlanta, GA, January 2017
- University of Missouri, Kansas city Mathematics Technology Expo Keynote, October 2016
- Smithsonian Associates, Invited Seminar Series, Washington, DC, September 2016
- CEPT University, Maker Fest Main Auditorium Talk, Ahmedabad, India, January 2016

Mastery Based Grading: Infinity War

- MAA MD/DC/VA Section Meeting, University of Mary Washington, November 2018

FAIL: A mathematician's apology

- MAA MathFest in Denver, CO, Invited Address, Chan Staneck Student Lecture, August 2018
- Northwestern University, Invited address at Undergraduate Awards Ceremony, May 2018
- MAA MD/DC/VA Section Meeting in Frostburg, MD, Invited Banquet Address, April 2017

Welcome to 3D Printing: A tour of design, math, and failure

- Essex High School Honors Program, Essex Junction, VT (remotely), June 2020
- U.S. State Department Speaker Program, Afghanistan (remotely in Pashto), August 2018
- U.S. State Department Speaker Program, Afghanistan (remotely in Dari), August 2018
- Math & Science Leadership Academy in Kimberly, South Africa, Embassy Program,, May 2018
- University of Cape Town, Graduate School of Business, Embassy Program, May 2018
- Western Cape Department of Education, South Africa, Embassy Program, May 2018
- Council for Scientific and Ind. Research, Pretoria, South Africa, Embassy Program, May 2018
- Rosa Parks Library & Innovation Studio in Soweto, South Africa, Embassy Program, May 2018
- Walt Whitman High School, Nifty Fifty USA Science & Engineering Speaker, May 2015
- Friends Seminary High School, MoMath Speaker, New York City, NY, November 2014

– Sacred Heart Middle and High School, MoMath Speaker, New York City, NY, November 2014

Printing Perfect Pentagons

- Gathering for Gardner Conference G4G13, Atlanta, GA, April 2018

Math as Design Engine: Leveraging mathematics to create 3D printed art

- Joint Mathematics Meetings in San Diego, MAA Arts and Mathematics Session, January 2018
– MAA MD/DC/VA Section Meeting, Christopher Newport University, November 2017

From Print to Product: Design Resources and Shop Strategies

- New York Public Libraries, Shapeways Design Exhibition, New York, NY, September 2017

3D Printing with mathgrrl

- Woodbridge Technology Innovation Lab, invited discussion, Manassas, VA, October 2016

Designing 3D printed mathematical knots

- UnKnot Conference III at Denison University, Invited Address, Denison, OH, August 2016
- AMS Section Meeting, Knot Theory Special Session, UNC Greensboro, November 2014
- MakerBot Thingiverse Make-a-Thon, Brooklyn, NY, October 2014

Bringing Abstract Mathematics into Reality: 3D printed Catalan wireframes

- UNC Greensboro Mathematics and Statistics Conference, November 2015
- New York University Courant, Martin Gardner Celebration of Mind Keynote, October 2015
- MakerBot Industries,Tech Exchange, Brooklyn, NY, August 2015
- MAA MathFest in Washington, DC, MAA Themed Paper Session, August 2015
- Two Sigma Investments, Invited Speaker Series, New York City, NY, June 2015

Engaged Learning: Make stuff, do it yourself, learn to fail

- JMU Institute for Visual Studies, Madison Catalyst Series, November 2015

Leveling Up: 3D Printing and Higher Education

- MakerBot Industries, Webinar Series, New York City, NY, August 2015

3D Printed Research: Combining math and art to introduce students to knot theory

– Joint Mathematics Meetings in San Antonio, MAA Math and the Arts Session, January 2015

Kick-starting undergraduate research

– Joint Mathematics Meetings in San Antonio, MAA Undergrad Research Session, January 2015

Making Mathematics Real: Knot theory, experimental math, and 3D printing

- James Madison University, SUMS Conference Keynote, September 2014
- NYU Courant Institute GSTEM Program, New York, August 2014
- New Jersey City University, Opening the Gate Summer Institute, July 2014
- National Museum of Mathematics, Math Encounters Lecture, July 2014
- USA Mathematics Olympiad, Award Presentations, Washington, DC, June 2014
- Virginia Council of Teachers of Mathematics, Invited Conference Address, March 2014
- MAA National Headquarters, Carriage House Distinguished Lecture Series, February 2014
- James Madison University, CFI January Symposium, January 2014
- UNC, Greensboro, Helen Barton Computational Lecture, November 2013
– James Madison University, Teaching and Learning with Technology Conference, October 2013

Menger, Menger, Menger

- Gathering for Gardner Conference G4G11, Atlanta, Georgia, March 2014

JMU 3SPACE: 3D printing in the classroom

- MAA MD/DC/VA Section Meeting, Longwood College, Longwood, VA, October 2013

Spiral knots, singular knots, and exploratory mathematics

- MAA MathFest in Hartford, Open & Accessible Problems in Knot Theory, August 2013
- James Madison University, Institute for Visual Studies Lecture Series, March 2013

Patterns, Proofs, and Purity: Or how I learned to stop worrying and love computers

- University of Tennessee, UT Undergraduate Math Conference, April 2013
- Maggie Walker Governor's School, Mu Alpha Theta Induction, February 2013
- Longwood College, Mathematical Colloquium Series, January 2013

16 Is Not Enough: The minimum clue conjecture for Sudoku

- Gathering for Gardner Conference G4G10, Atlanta, Georgia, March 2012

Sudoku: Questions, variations, and research

- Mount St. Mary's University, Pi Mu Epsilon Induction Ceremony, March 2012
- Moravian College, Student Mathematics Conference, February 2012
- University of Mary Washington, Invited Speaker Series, November 2010
- Notre Dame, Lectures for Undergraduates Series, September 2010
- MAA Allegheny Section Meeting, University of Pittsburgh at Johnstown, April 2010
- JSR Community College, GRCTM High School Math Conference, March 2010
- Western New England College, NE MAA Section Meeting, November 2009
- MAA Illinois Section Meeting, Bradley University, Peoria, IL, March 2009
- University of Chicago, Association for Women in Mathematics Lecture, March 2009
- Columbia College, Invited Lecture Series, Chicago, IL, March 2009
- MAA EPaDel Section Meeting, Gettysburg College, PA, March 2009
- Brigham Young University, CURM/MAA Conference, Provo, UT, March 2009
- V2CTM Teachers Conference, Rockingham County, VA, November 2008
- Roanoke College, MAA Conversation Series, VA November 2008
- AMTNYS Summer Institute for Math Teachers, Syracuse, NY, August 2008
- MAA MathFest in Madison, WI, Invited Lecture for Students, August 2008
- University of Virginia, Public Lecture Series, Charlottesville, VA, April 2008
- US Naval Academy, Service Academy Student Math Conference, April 2008
- St. Mary's College of Maryland, Natural Science & Math Colloquium, February 2008
- Maggie Walker Governor's School, Mu Alpha Theta Series, Richmond, VA, December 2007
- Maggie Walker Governor's School, Student Research Group, Richmond, VA, December 2007
- Gettysburg College, Undergraduate Colloquium Series, Gettysburg, PA, November 2007
- Eastern Mennonite University, Student Research Group, September 2007
- James Madison University, Mathematics and Statistics Colloquium, September 2007
- Madison Area Technical College, Sudoku Master Competition, Madison, WI, April 2007
- MAA Carriage House Opening Ceremonies, Washington, DC, April 2007
- American University, Fool's Feast Celebration, Washington, DC, March 2007
- Sam Houston State University, Piney Woods Lecture Series, Huntsville, TX, March 2007
- Longwood University, Mathematics Colloquium, Farmville, VA, March 2007
- Harvey Mudd College, Invited Lecture Series, Claremont, CA, January 2007

- University of Maryland, Graduate Minicourse Series, VA, November 2006
- Washington and Lee University, Colloquium, Lexington, VA, November 2006
- MAA MathFest in Knoxville, TN, Gems of Recreational Mathematics, August 2006
- Wake Forest University, Mathematics Colloquium Series, April 2006
- MAA MD/DC/VA Section Meeting, Loyola College, April 2006
- MAA Kentucky Section Meeting, Project NExT, Centre College, March 2006
- MAA MD/DC/VA Section Meeting, Project NExT, Montgomery College, November 2005

Homework is Dead, Long Live Homework

- MAA MD/DC/VA Section Meeting, Christopher Newport University, November 2011

Integrated Calculus: A combination course for STEM majors

- MAA Kentucky Section Meeting, Closing Keynote Address, March 2011
- MAA MathFest in Knoxville, TN, Contributed Paper Session, August 2006
- Joint Mathematics Meetings in Phoenix, AZ, Contributed Paper Session, January 2004
- Joint Mathematics Meetings, San Diego, Contributed Paper Session, 2002
- MAA MD/DC/VA Section Meeting, Project NExT Session, Virginia Military Institute, April 2001

Teaching proofs at the undergraduate level

- James Madison University, Center for STEM Education and Outreach, November 2009

Spiral Knots

- UnKnot Conference at Denison University, Invited Address (with Len VanWyk), July 2009
- Joint Mathematics Meetings in San Diego, Contributed Paper Session, January 2008

Mathematical projects for science fairs and symposia

- V2CTM Teachers Conference (with Carla Martin and Peter Kohn), November 2007

Problem Zero: Encouraging students to read math and make it their own

- MAA MD/DC/VA Section Meeting, University of Virginia, November 2005
- MAA MathFest in Providence, RI, Concepts Through Writing Session, August 2004

An exact sequence of weighted Nash complexes

- MAA MathFest in Albuquerque, NM, Contributed Paper Session, August 2005

Brainwashing and Great Expectations: Persuasion, bribes, and humor in the classroom

- MAA MD/DC/VA Section Meeting, Project NExT, Montgomery College, November 2005
- MAA MathFest in Albuquerque, NM, Alder Awards Sessions, August 2005

How not to give a talk

- James Madison University, Research Experiences for Undergraduates Seminar, July 2005

The Nash bundle and the Nash sheaf

- James Madison University, Mathematics Colloquium, October 2002

Complete resolutions, Hsiang-Pati coordinates, and the Nash sheaf

- AMS Western Section Meeting, San Francisco State University, October 2000

Poster Presentations

Exploring minerals at the nanoscale using 3D printing (with Jamie Calcagno-Roach and Chiara Elmi) Construct3D Conference, February 2020

Workshops

Hands-on 3D printing outreach workshops at JMU 3SPACE

- James Madison University, MakerGirl Workshop for University of Illinois, June 2019
- James Madison University, College of Science and Mathematics STEM Day, June 2018
- James Madison University, Expanding Your Horizons, (with Rebecca Field), March 2017
- James Madison University, First LEGO League Gyro Maker Workshop, December 2016
- Raw Learning Education Group, JMU 3SPACE, Harrisonburg, VA, March 2014
- James Madison University, First LEGO League State Championships, December 2013
- Loudon County Mercer Middle School, JMU 3SPACE, Harrisonburg, VA, November 2013

Introduction to 3D Design Software and 3D Printing

- Math & Science Leadership Academy in Kimberly, South Africa, Embassy Program, May 2018
- Central Cape Town Library, American Corner, South Africa, Embassy Program, May 2018
- Brooklyn Research, Lady Tech Guild Design Workshop, Brooklyn, NY, August 2017
- James Madison University, TLT Conference (with Jamie Calcagno-Roach), October 2016
- Tarrant County College, Professional Development Week Speaker, Hurst, TX, August 2016
- Fat Cat Fab Lab, 3D Printing and Hacking Guest Lecture, New York City, NY, April 2016
- Two Sigma Investments Hacker Lab, New York City, NY, June 2015
- MAA MathFest in Washington, DC, Project NExT Invited Workshop, August 2015
- MAA MD/DC/VA Section Meeting at JMU, Invited Faculty Workshop, April 2014

3D Printing Beyond Plastic

- James Madison University, TLT Conference, October 2017

Designing Large: Z-Unlimited

- Fat Cat Fab Lab, 3D Printing and Hacking Guest Lecture, New York City, NY, May 2016

Designing with Code

- CEPT University, Maker Ring Workshop, Lady Tech Guild, Ahmedabad, India, January 2016
- CEPT University, Thermaform Bracelets Workshop, LTG, Ahmedabad, India, January 2016

Introduction to 3D Printing: Penny Traps and Math Gyros

- National Museum of Mathematics (MoMath), fall workshops, New York City, NY, Fall 2014

Intermediate 3D Printing: Trigonometry bracelets with OpenSCAD

- National Museum of Mathematics (MoMath), fall workshops, New York City, NY, Fall 2014

High Resolution 3D Printing: Trigonometry sculptures with OpenSCAD and FormLabs

- National Museum of Mathematics (MoMath), fall workshops, New York City, NY, Fall 2014

MegaMenger Project

- Worldwide Distributed Fractal Build, Queen Mary University London (remotely), October 2014

- National Museum of Mathematics, two-week build, New York City, NY, October 2014

Functioning in Calculus: Supporting STEM calculus students with precalculus and algebra

- MAA MathFest in Madison, WI, Project NExT Invited Workshop, August 2012
- MAA MathFest in Pittsburgh, PA, Project NExT Invited Workshop, August 2010
- Houghton Mifflin Mathematics Faculty Workshop, Chicago, IL, June 2004

Topology and the Euler characteristic

- James Madison University, Expanding Your Horizons Conference Workshop, April 2010
- James Madison University, Expanding Your Horizons Conference Workshop, April 2009
- James Madison University, Expanding Your Horizons Conference Workshop, April 2008
- James Madison University, Conversations Between Mathematicians Project, January 2008
- James Madison University, Conversations Between Mathematicians Project, January 2006

Math ⇔ Patterns

- James Madison University Institute for Visual Studies, Seminar Class, April 2009
- James Madison University, Bridge Summer Camp, June 2010
- James Madison University, Bridge Summer Camp, June 2009
- James Madison University, Bridge Summer Camp, June 2008

Modular origami polyhedra

- James Madison University, Content Teaching Academy Workshop, June 2009

Demonstrations

Mathematics in 3D

- ICERM, Waterfire public event and Big Bang Science Fair, October 2019

Name That Polyhedron: 3D printed Catalan solids

- Trinity Upper School, NYC, interactive demonstration with 3D printed models, April 2019
- Joint Mathematics Meetings in Baltimore, MD, Gathering for Gardner event, January 2019

Yosizawa/Miura Press

- CUNY Graduate Center, MOVES Conference on Recreational Mathematics, August 2019

Cube Puzzles and Girih Tiles

- Maker Faire Bay Area booth exhibit, Featured Educator, Ultimaker, San Mateo, CA, May 2016
- USA Science & Engineering Festival in DC, Featured Educator, Ultimaker, April 2016
- South by Southwest, Create/Interactive Featured Educator, Ultimaker, Austin, TX, March 2016

Fidget Stars

- World Maker Faire, New York Hall of Science, Featured Thingiverse Designer, September 2015

Trigonometric Bracelets

- Joint Mathematics Meetings in San Antonio, MoMath Exhibit Booth, January 2015

Panel Sessions

The Pedagogy of Classroom Voting/Polling
MAA Project NExT Webinar, April 2021

Getting Started with Mastery Based Grading
MAA MathFest, Project NExT (remotely), July 2020

Math + Art
ICERM, Brown University, and Rhode Island Institute of Design, October 2019

Exploring 3D Design Software and Best Practices
Construct3D Conference, Duke University, Durham, NC, May 2017

Refocusing Your Career: Making Time and Space
Joint Mathematics Meetings in Atlanta, MAA Panel Session, January 2017

3D Printing in Education
Inside 3D Printing Conference, New York, NY, April 2014

Benefits of hosting a Regional Undergraduate Mathematics Conference
Joint Mathematics Meetings in New Orleans, January 2011

Obtaining funding for and maintaining REU Programs
MAA MathFest in Pittsburg, Project NExT, August 2010

Making the math major work for the underprepared student
Joint Mathematics Meetings in San Diego, Project NExT, January 2008

Teaching Issues in Calculus
Thomson/Brooks-Cole/Cengage LearningWorkshop, San Francisco, CA, September 2007

Getting your first textbook published
Joint Mathematics Meetings in New Orleans, Project NExT, January 2007

Strategies for establishing a research/scholarship agenda
JMU Center for Faculty Innovation, Faculty Workshop Series, September 2006

Tenure and Pre-Tenure Review
MAA MathFest, Project NExt Meeting, Knoxville, TN, August 2006

Finding your classroom style
MAA Kentucky Section Meeting, Project NExT Session, Centre College, March 2006

SERVICE

Conferences and Sessions Organized

Park City Mathematics Institute (PCMI) Graduate Summer Program, Illustrating Mathematics
Organizing Committee, for week-long NSF-funded remote summer course open to graduate students and the larger mathematical community. 2021

JMU 3DPAC
Member of Organizing Committee for this new regional academic 3D printing conference, postponed due to COVID-19, to be held later when circumstances allow, 2020

Construct3D
Organizing Committee for this academic 3D printing conference, and also Steering Committee for the

inaugural conference at Duke University, May 2017; Higher Education Program Chair, Georgia Tech, October 2018; Higher Education Committee, Rice University, February 2020

ICERM Illustrating Mathematics Semester Program
Program Organizer of this semester-long program at the Institute for Computational and Experimental Mathematics that brought together over 250 research mathematicians and artists, 50 of which were in residence for the semester, Fall 2019

Computational Textiles Working Group
Co-organized this week-long workshop conference as part of the ICERM Illustrating Mathematics Semester Program, Brown University, Fall 2019

Illustrating Mathematics Technical Seminars Program
Co-organized this semester-long series of technical talks and workshops as part of the ICERM Illustrating Mathematics Semester Program, Brown University, Fall 2019

MAA Paper Sessions
Organizer or Co-Organizer for invited and contributed paper sessions, each involving 8–21 speakers:

- **Technical Tools for Mathematical 3D Printing,** Joint Math Meetings, Atlanta, 2017
- **What Can a Mathematician Do With a 3D Printer?,** MathFest, Washington, DC, 2015
- **Knot Theory and its Applications,** AMS Section Meeting, UNC Greensboro, 2014
- **The Mathematics of Sudoku and other Pencil Puzzles,** Joint Math Meetings, Boston 2012
- **The Mathematics of Games and Puzzles,** Joint Math Meetings, New Orleans, 2011
- **Open and Accessible Problems in Knot Theory,** MathFest, Portland, 2009
- **The Mathematics of Games and Puzzles,** Joint Math Meetings, Washington, DC, 2009
- **The Mathematics of Sudoku and Other Puzzles,** Joint Math Meetings, New Orleans, 2007

Illustrating Mathematics Workshop
Co-Organizer of this week-long conference on mathematics and 3D digital media at the Institute for Computational and Experimental Mathematics, June 2016

Shenandoah Undergraduate Mathematics and Statistics (SUMS) Conference
Conference Director (with Elizabeth Brown), each year we hosted 200-360 attendees, 25–45 student talks, 20–30 student posters, and two invited keynote addresses, for nine years, 2005–2014

MOVES Conference on Recreational Mathematics
Conference Director for the inaugural year; this conference drew 250 mathematicians and educators from around the world to see two keynote addresses, six featured talks, 38 research talks, 17 family track activities, and mathematical evening entertainment, in conjunction with the National Museum of Mathematics (MoMath), August 2013

MAA MD/DC/VA Section Meetings
Program Chair for Fall and Spring regional conferences for the Mathematical Association of America, each involving 100–200 attendees, 20–40 faculty and student talks, and 3–4 invited speakers, 2006-2007 and 2007-2008. Also organizer of the undergraduate portion of the Spring Meeting in 2009

MAA and Project NExT Panel Sessions
Organizer or Co-Organizer for the following panel sessions:

- **Integrating Calculus, Precaluclus, and Algebra,** Joint Math Meetings, Baltimore, 2003
- **Project NExT Pedagogy Swap,** Joint Math Meetings, New Orleans, 2001

External Committees and Service to the Profession

Illustrating Mathematics Steering Committee
This committee identifies and organizes future workshop and semester opportunities for collaborative research between mathematicians and artists, 2019-present

SMI-SCULPT Program Committee
Papers Committee for Shape Modeling International (SMI) and Shape Creation Using Layouts, Programs, & Technology (SCULPT) 2022 forum and symposium, with proceedings in a special issue of Computer & Graphics Journal, Elsevier, 2022-present

Bridges Programme Committee
Reviewer of short and long papers for the competitive Proceedings of the Bridges Conference on Mathematics, Art, Architecture, Education, and Culture, 2020-present

MAA Polya/NAM/AWM Section Lecturers Committee
National committee of the Mathematical Association of America, council of prizes and awards, 2020-2022

MAA MD/DC/VA Award Committee
Selection committee for yearly awards given by the Mathematical Association of America, including the Sister Helen Christiansen Meritorious Service Award, John M. Smith Teaching Award, and nominations for the national Haimo award, 2018-present

Jury Member, Journal for Mathematics and the Arts
Committee for selecting the annual Outstanding Paper Award for the journal, 2016–2019

Founding Board Member, Lady Tech Guild
The Lady Tech Guild is a collective of professional women from New York City and around the globe who are 3D artists, designers, biohackers, educators and entrepreneurs, 2014-present

Project NExT Mentor and Consultant
Mentor and consultant for Project NExT Fellows at the section and national levels, 2006–2013, 2018-2020

Peer Reviews of Mathematical Articles
For many professional journals, including the College Math Journal, Math Horizons, Mathematics Magazine, and the American Mathematical Monthly, 2001–present

MAA Social Media Task Force
Member of this committee reporting to the Executive Committee and Board of Governors of the Mathematical Association of America, 2016–2017

Puzzle Editor, FOCUS
Editor of puzzle column in each issue of the magazine of the Mathematical Association of America, 2011-2015

Math Horizons Editorial Board
Undergraduate magazine of the Mathematical Association of America, 2008-2013

Allendorfer Award Committee
National award committee of the Mathematical Association of America, 2008–2011

Columnist, *College Math Journal*
Regular contributor for the Media Highlights section of the journal, 2008–2009

Carriage House Advisory Board
National committee of the Mathematical Association of America headquarters, 2005–2009

Freelance Mathematical Accuracy-Checker
Including Calculus (Smith and Minton), Elementary Linear Algebra (Anton and Rorres), Visual Linear Algebra (Herman and Pepe), The Art and Craft of Problem Solving (Zeitz), College Algebra (Young), and Technical Mathematics (Calter), 2001–2009

Program Chair, MAA MD/DC/VA Section
Regional conference organizer for the Mathematical Association of America 2006–2007; Program Chair-Elect, 2005; Outgoing Program Chair, 2008

MATHCOUNTS Proofreader and Mathematical Accuracy-Checker, for Handbook problems and National and State competition problems, 2002–2008

Trevor Evans Award Committee
National awards committee of the Mathematical Association of America, 2005–2008

Manuscript Reviewer, including Precalculus: Concepts in Context (Moran, Davis, and Murphy) and Applied Calculus, (Hughes-Hallet, et al), 2000–2002

JMU Committees and Service

Entrepeneurship Faculty Fellow
Representative of the Gilliam Center for Entrepreneurship for the JMU College of Science and Mathemamtics, to spread the entrepreneurial mindset to students across the university, starting June 2023.

Leadership Team, JMU 3SPACE
Part of a small team that advises JMU Libraries and helps create curriculum and training for the JMU 3SPACE 3D Printing Classroom, which I founded, and which is now part of and managed by Carrier Library, 2013-present.

College and University Committees
Includes service on Diversity Council, Academic Integrity Task Force, Honor Board, Judicial Board, Goldwater Scholarship Committee, Academic Programs, Faculty Senate Alternate, and Search Committee for CSM Scientific Computing Specialist, various years 2000–present.

Departmental Committees
Includes service on Technology, Website, Pure Math, MATH 231 Coordinator, Acting Pure Math Chair, Recruitment and Activities, Diversity, Search Committees, Search Committee Chair, Program Review, Mentoring, Service Courses, and Calculus committees, various years 2000–present

Reader for JMU Honors Thesis papers
Selected reader/reviewer for various student research projects in the JMU Department of Mathematics and Statistics and the JMU Department of Computer Science, 2008-present

Shenandoah Valley Science Fair Judge
Volunteer judge for Mathematics, Computer Science, and Consumer Science categories, James Madison University, 2003–2009

Editor, Problem of the Week, James Madison University Department of Mathematics and Statistics, 2003–2008

Editor, *Online Journal of Undergraduate Papers in Knot Theory*
Self-managed resource hosted at James Madison University where undergraduates interested in knot theory could find papers written by their peers, 2003-2008

Editor, JMU High School Mathematics Contest, James Madison University Department of Mathematics and Statistics, 2003 and 2004

HONORS

Grants and Funding

Tensor SUMMA (Strengthening Undergraduate Minority Mathematics Achievement) Grant from the Mathematical Association of America, with Beth Arnold, **$6,000** for projects designed to encourage the pursuit and enjoyment of mathematics by students who are members of groups historically underrepresented in the field of mathematics, to support student leaders, tutors, supplies, and trips in the Haynes Residential Learning Community, FY 2021-22.

JMU Faculty Senate Mini-Grant, with Beth Arnold, **$4,500** to support materials, student advisory committee, and faculty consultants for development of the Haynes Residential Learning Community, Spring 2021.

JMU Provost's Faculty Diversity Curriculum Development Grant, with Beth Arnold, **$3,000** to support faculty curriculum development for the academic component of the Haynes Residential Learning Community, Spring 2021.

JMU Center for Global Engagement, International Development Grant
For building connections in Estonia to develop a new study abroad program, **$500** (Funding granted but postponed due to COVID-19), 2020

JMU Center for Global Engagement, International Development Grant
For conference travel to Finland to present multiple recent research collaborations, **$500** (Funding granted but postponed due to COVID-19), 2020

Faculty Associate for JMU Libraries
Multi-year appointment with **$3,500**/semester release time to work with the office of JMU Innovation Services and Instructional Technology to support the JMU 3SPACE Classroom, Rose Library 5th floor experimental 3D printing hardware, 3DPAC Conference Development, Integrative Design Technology Fellows Program, and upcoming Estonia Study Abroad Program, 2016-2020

ICERM Illustrating Mathematics Semester Research Fellow
Brown University, **$20,000**, Fall 2019; supported by National Science Foundation Grant No. DMS-1439786 and the Alfred P. Sloan Foundation award G-2019-11406, and by a Simons Foundation Targeted Grant award 507536, 2019

JMU Math MakerLab Equipment Funds
Ongoing end-of-financial-year support from the Department of Mathematics and Statistics, in particular **$3,000** and facilities support in 2013; **$5,000** for new equipment in 2018

Regional Undergraduate Mathematics Conference (RUMC)
National Science Foundation grant via the Mathematical Association of America, with Elizabeth Brown, **$2,500–$3,000** yearly for the SUMS Conference each year 2005–2015

Shapeways Education Grant
Educational grant of **$,1000** awarded to student Jonathan Gerhard to support work in the JMU Math MakerLab under my direction, 2018

Ultimaker Equipment Sponsorship for the JMU 3SPACE Classroom
Sponsorship of eight Ultimaker 3D printers worth **$29,440** for increasing capacity and capability in the JMU 3SPACE General Education classroom and at JMU Libraries, 2017

JMU 3SPACE 3D Printing classroom
Funds from Dean Brakke and a university donor, **$35,000** for 3D printers, computers, and facilities, 2013; **$5,000** for equipment upgrades, 2014

Creating a Group Learning Classroom
Grant of **$3,000** from the Center for Faculty Innovation at James Madison University for the purchase of tables to convert a classroom to a group learning environment, Fall 2011.

National Research Experience for Undergraduates Program (NREUP)
MAA grant funding of **$27,499** for *M3: Mentoring for Minorities in Mathematics, Mancala-type games and numerical solution of ODEs*, co-PI under Anthony Tongen, 2010.

CCLI (Phase II) National Science Foundation Grant,
Grant for JMU Center for Assessment & Research Studies, **$498,765** for *Advancing Assessment of Scientific and Quantitative Reasoning*, co-PI under Donna Sundre; renewed November 2009

Awards and Accolades

US State Department Embassy Speakers Program
Part of a selected group of American experts and specialists who engage with foreign audiences around the world through lectures, workshops, and seminars, 2018-2020

JMU Purple Star Award for Community Service and Volunteerism
With Harrisonburg Makers Help and James Madison University Libraries, created over 3,000 3D printed and lasercut COVID-19 face shields for PPE donations to local medical facilities, 2020

JMU Department of Mathematics and Statistics Distinguished Scholar Award
Recognition for active scholarly work in research publications, 2014

SCHEV Outstanding Faculty Award
The Commonwealth's highest honor for faculty at Virginia's public and private colleges and universities, for superior accomplishments in teaching, research, and public service, from the State Council of Higher Education for Virginia, 2013

PROSE Award
The American Publishers Awards for Professional and Scholarly Excellence, for the book Taking Sudoku Seriously in the category of Best Popular Science and Mathematics book, 2012

JMU College of Science and Mathematics Distinguished Teacher Award
Given annually to one faculty member in the college, 2008

Textbook Excellence ("Texty") Award
From Text and Academic Authors Association (TAA), for the textbook "Integrated Calculus: Calculus with Precalculus and Algebra", 2006

JMU "Be the Change" Representative
One of many James Madison University people whose profiles are featured as part of the national Be the Change campaign, and one of twelve people on the 2007 JMU calendar, 2006–present

JMU Department of Mathematics and Statistics Distinguished Teacher Award
Recognition for excellence in teaching and curriculum development, 2006

MAA Alder Award
This national MAA award that recognizes talented young mathematics teachers whose teaching has had influence beyond their own classrooms, 2005

MAA Trevor Evans Award
This national MAA award for exceptional articles that are accessible to undergraduates and published in the magazine Math Horizons, 2003

MAA Project NExT Fellow
Competitive fellowship for new mathematicians and teachers of mathematics, part of the New

Experiences in Teaching professional development program of the Mathematical Association of America, Fellowship year 2000–2001

L.P. and Barbara Smith Award for Excellence in Teaching
The highest graduate teaching award given by the Duke University Mathematics Department, 1998 and 1999

Duke University Dean's Award for Excellence in Teaching
One of two recipients (on two occasions) of this university-wide annual award from the Duke University Graduate School, 1997 and 1999

Duke University Mathematics Teaching Award
Annual graduate student award given by the Duke University Mathematics Department, 1997

PROFESSIONAL DEVELOPMENT

Continuing Education

DEI Workshop for REU Directors and Faculty, Minorities in the Mathematical Sciences, May 2021

The Nature of Code: p5.js, Kadenze, taken for certificate, Summer 2020

Surface Design II, Rhode Island Institute of Design, taken for grade (A), Summer 2020

WebAssign Coding Webinar, Cengage WebAssign technical series, July 2020

Surface Design, Rhode Island Institute of Design, taken for grade (A), November-December 2019

Applied Color, Rhode Island Institute of Design, taken for grade (A), September-October 2019

CS 180E: Python, James Madison University, taken for grade (A), May 2019

Machine Knitting 102: Texture + Patterns, Brooklyn Studio, Textile Arts Center, August 2018

Machine Knitting 101, Brooklyn Studio, Textile Arts Center, April 2018

Rhino: Introduction to NURBS Modeling, Magnetic Visions, Brooklyn, NY, February 2016

Parametric Design with Grasshopper, Cooper Union, New York City, NY, January 2016

Digital Ideation with Maya, Pratt Institute, Brooklyn, NY, February 2015

Instructional Training at JMU

Kognito Mental Health Training, Fall 2022

JMU IRB Social/Behavioral Research Course, Stage 1, completed and passed March 2021

EVERFI Diversity Training, Laura Taalman, completed Spring 2021

jmuDESIGN Institute, Virtual Edition, Center for Faculty Innovation, June 2020

Best Practices and Resources for Temporary Remote Teaching, Innovation Services, March 2020

JMU Green Dot Training, College of Science and Matheamatics, January 2020

Cascade Open Lab, for technical issues building the Mathematics & Statistics website, July 2019

Cascade Version 8, for web development on the university content management system, March 2019

DIY Instructional Videos, for creating short, quick-cut videos for tutorials, November 2018

Teaching and Learning with Technology, Conferences and workshops, 2016, 2017, and 2018

Madison Maker Fellows, digital fabrication community development for JMU faculty, September 2017

Professional Memberships

Mathematical Association of America

National Association of Mathematicians

American Association of University Professors, JMU Chapter

MAA SIGMAA-REC

Lady Tech Guild