

Nicholas A. Scoville

Curriculum Vitae

101K Pfahler
Ursinus College
Collegeville, PA

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URL: <https://nscoville.github.io/website/>

POSITIONS HELD

Ursinus College

Full Professor	fall 2021- present
Joseph Beardwood III Chair of Mathematics	fall 2017-present
Associate Professor	fall 2016- spring 2021
Chair of Mathematics and Computer Science	spring 2016-present
Assistant Professor	fall 2010-spring 2016

Faulkner University

Adjunct Professor	2015
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Regina Luminis Academy

Adjunct Instructor	2020-present
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EDUCATION

Dartmouth College

Ph.D., Mathematics	June 2010
Masters of Arts, Mathematics	June 2007

Western Michigan University

Masters of Science, Mathematics	June 2005
Bachelors of Science, Mathematics	August 2003

Grand Rapids Community College

Associates, Architectural Drafting	May 2001
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TEACHING EXPERIENCE

Ursinus College,

Math 400: Mathematics for Human Flourishing
Math 335: Abstract Algebra
Math 491: Algebraic Topology
Math 451: Discrete Morse Theory
Math 361: Graph Theory
CIE 100: Common Intellectual Experience
Math 421: Topology
Math 211: Multivariable calculus
Math 235: Linear Algebra
Math 10: Problem Solving
Math 322: Geometry
Math 341: Probability
Math 236W: Discrete Mathematics
Stat 141Q: Statistics I
Math 111: Calculus I
Math 112: Calculus II

Adjunct Professor, Faulkner University

Math 1312: Mathematics Spring 2015

Other teaching experience,

<i>Teaching Assistant: Dartmouth College</i>	Summer 2009
<i>Instructor: Dartmouth College</i>	2007-2009
<i>Teaching Assistant: Dartmouth College</i>	2005-2007
<i>Instructor: Western Michigan University</i>	2003-2005
<i>Undergraduate Teaching Assistant: Western Michigan University</i>	2002-2003

INDEPENDENT STUDIES

Ursinus College,

Category theory, Tony Delgado	Spring 2023
Star clusters and homotopy type, Connor Donovan	Fall 2022
Cohomology, Connor Donovan	Fall 2022
Category theory, Tony Delgado	Fall 2022
Discrete Morse theory and knots, Connor Donovan	Spring 2021
Discrete Morse theory, Elvi Sopiqoti	Spring 2020
Discrete plates and Olives, Matthew Furgele	Spring 2020
Analyzing heart data, Ben Minardi	Spring 2019
Algebraic topology, Nick Tulio	Spring 2019
Strong collapsibility and the Morse complex, Max Lin	Spring 2019
Group of strong self-homotopy equivalences, Vince Sergi, Ryan Quick	Spring 2019
Boolean functions, Ryan Quick	Fall 2018
Algebraic topology, Jason Bennett	Fall 2018
Generating Discrete Morse Functions from Point Data, Ashlyn Welch	Spring 2018
Random discrete Morse theory, Nikolai Peralta	Spring 2018
Homotopy theory, Karthik Yegnesh	Fall 2016 Spring 2017, Fall 2017, Spring 2018
Topology, Ian Rand	Spring 2017
Discrete Morse theory and Persistent homology, Yuqing Liu	Spring 2017

Random discrete Morse theory, Nikolai Peralta, Chase Babrich	Fall 2016, Spring 2017
Algebraic topology, Matan Peleg	Fall 2016, Spring 2017
Category theory, Michael Vennettilli	Spring 2015
Multiplication in discrete Morse theory, Rose Blanchard	Spring 2015
Number theoretic notions in discrete Morse theory, Ian Rand	Spring 2015
Discrete Morse theory, Tyler Helms	Fall 2014
Estimating the discrete LS category, Brian Green	Fall 2013
Homology and Cohomology, Seth Aaronson, Brian Green, Michelle Tanco	Spring 2013
Discrete LS category, Seth Aaronson	Spring 2013
Counting discrete Morse functions, Seth Aaronson	Spring 2012
Lie Groups, Brian Green	Spring 2012
Discrete Morse Theory, Mike Agiorgousis	Spring 2012
Markov Chains, Jayant Velagala	Spring 2012
Probability, Jayant Velagala	Fall 2011
Knot Theory, Will Molden	Fall 2011
Discrete Morse Theory, Seth Aaronson	Spring 2011

STUDENT POSTERS AND PRESENTATIONS

Jose Arbelo, Tony Delgado, Charley Kirk, Zach Schlamowitz <i>“The Dope metric is SIC: A stable, informative, and computable metric on time series,”</i> Mathfest, Philadelphia, Pennsylvania	August 2022
Connor Donovan <i>“Towards the homotopy type of the Morse complex,”</i> Exploring Innovation in Appalachia, (virtual), won third place in the math/physics/astronomy category,	August 2021
Connor Donovan <i>“Towards the homotopy type of the Morse complex,”</i> Mathfest, (virtual)	August 2021
Benjamin Johnson <i>“Merge trees in discrete Morse theory,”</i> Mathfest, Cincinnati, Ohio	August 2019
Yuqing Liu <i>“Persistence equivalence of discrete Morse functions on trees,”</i> Mathfest, Denver, Colorado	August 2018
Karthik Yegnesh <i>“Families of Objects in Categories and Elementary Topoi,”</i> AMS/MAA Joint Math Meetings, Atlanta, Georgia	January 2017
Karthik Yegnesh <i>Cosheaf theoretical constructions in networks and persistent homology,</i> 68 th annual Delaware Valley Science Fair, Oaks, Pennsylvania (won “first place” in Mathematics)	March 2016
Karthik Yegnesh <i>Cosheaf theoretical constructions in networks and persistent homology,</i> 59 th annual Montgomery County Science Research Competition, Collegeville, Pennsylvania (won “first place” in math category)	March 2016
Matt Belle <i>Arboricity,</i> AMS/MAA Joint Math Meetings, Baltimore, Maryland	January 2014
Brian Green <i>Estimating the discrete Lusternik–Schnirelmann category,</i> AMS/MAA Joint Math Meetings, Baltimore, Maryland	January 2014

Seth Aaronson *Lusternik–Schnirelmann category for cell complexes*,
AMS/MAA Joint Math Meetings, San Diego, California January 2013

Mike Agiorgousis, Brian Green, and Alex Onderdonk *Discrete Morse Functions and Homology*,
AMS/MAA Joint Math Meetings, San Diego, California (won “Outstanding Presentation” award) January 2013

Mike Agiorgousis, Brian Green, and Alex Onderdonk *Discrete Morse Functions and Homology*,
Undergraduate Science Research Symposium, Haverford College September 2012

Mike Agiorgousis, Brian Green, and Alex Onderdonk *Discrete Morse Functions and Homology*,
Mathfest, Madison, Wisconsin August 2012

Mike Agiorgousis, Brian Green, Alex Onderdonk, and Kim Rich *Discrete Morse Functions and Homology*,
Disappearing Boundaries Summer Research Meeting, Lebanon Valley College July 2012

Seth Aaronson and Marie Meyer, “*Graph Isomorphisms in Discrete Morse Theory*”, *AMS/MAA Joint Meetings*,
Boston, MA January 2012

PUBLICATIONS

Gregory Lupton, Nicholas A. Scoville, P. Christopher Staecker, “The Face Group of a Simplicial Complex,” *submitted*

Nikola Milićević, Nicholas A. Scoville, “The directed Vietoris–Rips complex and homotopy and singular homology groups of finite digraphs,” *submitted*

Kevin P. Knudson, Nicholas A. Scoville, “Discrete Morse theory for open complexes,” *submitted*

Julian Brüggemann and Nicholas A. Scoville, “On cycles and merge trees,” *Journal of Pure and Applied Algebra*,
Volume 229, Issue 7, July 2025, 107967

Christopher J. Tralie, Zachary Schlamowitz, Jose Arbelo, Antonio I. Delgado, Charley Kirk, Nicholas A. Scoville, “The DOPE Distance is SIC: A Stable, Informative, and Computable Metric on Time Series And Ordered Merge Trees,”

Dominic Klyve and Nicholas A. Scoville, “Summation graphs and discrete Morse theory,” *submitted*

Gregory Lupton, Oleg Musin, Nicholas A. Scoville, P. Christopher Staecker, Jonathan Treviño-Marroquin, “A Second Homotopy Group for Digital Images,” *Algebr Comb* (2024). <https://doi.org/10.1007/s10801-024-01352-9>

Connor Donovan and Nicholas A. Scoville, “Star clusters in the Matching, Morse, and Generalized complex of discrete Morse functions,” *New York J. Math.*, 29 (2023) 13931412.

Nicholas A. Scoville, “The Closure Operation as the Foundation of Topology: A Mini-Primary Source Project for Topology Students,” *Convergence* (June 2023)

Gregory Lupton, John Oprea, and Nicholas A. Scoville, “The digital Hopf construction,” *Topology and its applications*, 2023, 108405, ISSN 0166-8641, <https://doi.org/10.1016/j.topol.2022.108405>.

Benjamin Johnson and Nicholas A. Scoville, “Merge trees in discrete Morse theory,” *Research in the Mathematical Sciences* 9, 49 (2022). <https://doi.org/10.1007/s40687-022-00347-x>

Gregory Lupton and Nicholas A. Scoville, “Digital Fundamental Groups and Edge Groups of Clique Complexes,” *Journal of Applied and Computational Topology*, (2022). <https://doi.org/10.1007/s41468-022-00095-5>

Desamparados Fernandez-Ternero, Enrique Macias-Virgos, David Mosquera-Lois, Nicholas A. Scoville, and Jose-Antonio Vilches, “Fundamental Theorems of Morse theory on posets,” *AIMS Mathematics* 2022, Volume 7, Issue 8: 14922-14945. doi: 10.3934/math.2022818

Gregory Lupton, John Oprea, and Nicholas A. Scoville, “Subdivision of Maps of Digital Images,” *Discrete and Computational geometry*, 67, 698742 (2022). <https://doi.org/10.1007/s00454-021-00350-z>

Nicholas A. Scoville and Matthew C. B. Zaremsky, “Higher connectivity of the Morse complex,” *Proceedings of the AMS Series B*, 9 (2022), 135149.

Connor Donovan, Maxwell Lin, and Nicholas A. Scoville, “On the homotopy and strong homotopy type of complexes of discrete Morse functions, *Canadian Mathematical Bulletin*, 1-19, 2022, doi:10.4153/S0008439522000121

Maxwell Lin and Nicholas A. Scoville, “On the automorphism group of the Morse complex,” *Advances in Applied Mathematics*, Volume 131, October 2021, 102250

Gregory Lupton, John Oprea, and Nicholas A. Scoville, “Homotopy Theory in Digital Topology,” *Discrete and Computational geometry*, 67 (2022), no. 1, 112165, doi.org/10.1007/s00454-021-00336-x

Gregory Lupton, John Oprea, and Nicholas A. Scoville, “A Fundamental Group for Digital Images,” *Journal of Applied and Computational Topology*, 5 (2021), no. 2, 249311.

Nicholas A. Scoville, “Topology from Analysis: A Mini-Primary Source Project for Topology Students,” *Convergence* (June 2020)

Desamparados Fernandez-Ternero, Enrique Macias-Virgos, Nicholas A. Scoville, and Jose-Antonio Vilches, “Strong discrete Morse theory and simplicial LusternikSchnirelmann category: A discrete version of the Lusternik-Schnirelmann Theorem,” *Discrete and Computational Geometry*, 63 (2020), no. 3, 607623.

Ian Rand and Nicholas A. Scoville, “Discrete Morse functions, vector fields, and homological sequences on trees,” *Involve, A Journal of Mathematics* Involve, a Journal of Mathematics 13-2 (2020), 219–229. DOI 10.2140/involve.2020.13.219

Yuqing Liu and Nicholas A. Scoville, “The realization problem for discrete Morse functions on trees,” *Algebra Colloquium*, 27 : 3 (2020) 455–468 DOI: 10.1142/S1005386720000371

Nicholas A. Scoville, “The Cantor Set Before Cantor: A Mini-Primary Source Project for Analysis and Topology Students,” *Convergence* (May 2019)

Mike Agiorgousis, Brian Green, Alex Onderdonk, Nicholas A. Scoville, and Kim Rich, “Homological sequences in discrete Morse theory,” *Topology Proceedings*, 54 (2019) 283–294

Colin Adams, Allison Henrich, Kate Kearney and Nicholas A. Scoville, “Knots Related by Knotoids,” *American Mathematical Monthly* Volume 126, 2019 - Issue 6, 483–490

Nicholas A. Scoville and Karthik Yegnesh “A Persistent Homological Analysis of Network Data Flow Malfunctions,” *Journal of Complex Networks*, Issue 6, 1 December 2017, Pages 884-892

Nicholas A. Scoville, “Connecting Connectedness: A Mini-Primary Source Project for Topology Students,” *Convergence* (October 2017)

Nicholas A. Scoville and Willie Swei “On the Lusternik–Schnirelmann category of a simplicial map,” *Topology and its applications* 216 (2017), 116-128

Brian Green, Nicholas A. Scoville, and Mimi Tsuruga, “Estimating the discrete Lusternik–Schnirelmann category,” *Topological Methods in Nonlinear Analysis*, 45, No. 1 (2015), 103–116

Akshaye Dhawan, Michelle Tanco, and Nicholas A. Scoville, “A Distributed Greedy Algorithm for Constructing Connected Dominating Sets in Wireless Sensor Networks,” *SENSORNETS*, Lisbon, Portugal January 2014

Nicholas A. Scoville, “Metric Structures for CW Complexes,” *Topology Proceedings*, 44 (2014) 117–131

Seth Aaronson, Marie Meyer, Nicholas A. Scoville, Mitchell T. Smith, and Laura Stibich, “Graph Isomorphisms in discrete Morse theory,” *AKCE Int. J. Graphs Comb.*, 11, No. 2 (2014), 163–176

Seth Aaronson and Nicholas A. Scoville, “Lusternik–Schnirelmann category for cell complexes,” *Illinois J. of Mathematics*, 57, No. 3 (2013), 743–753

Nicholas A. Scoville, “Georg Cantor at the Dawn of Point-Set Topology,” *Loci*, (March 2012), DOI: 10.4169/loci003861

Nicholas A. Scoville, “Lusternik–Schnirelmann Category and the Connectivity of X ,” *Algebraic & Geometric Topology*, 12 (2012) 435-448

Nicholas A. Scoville, “Mapping Cone Sequences and a Generalized Notion of Cone Length,” *JP Journal of Geo. and Top.*, 11(2011), Issue 3, 209-233

Nicholas A. Scoville, “A Metric for Homotopy Types,” Ph.D. Thesis, Dartmouth College, Spring 2010

Rob Nendorf, Nicholas A. Scoville, Jeff Strom, “Categorical Sequences,” *Algebraic & Geometric Topology*, 6 (2006) 809–838

BOOKS

Discrete Morse theory, AMS/MAA Press, 2019

BOOK CHAPTERS

Nicholas A. Scoville, “Sometimes when your hopes have all been shattered,” *Living Proof: Stories of resilience along the mathematical journey*, Edited by Henrich et al., AMS/MAA Press, 2019

ARTICLES

Nicholas A. Scoville, “Course on Mathematics for Human Flourishing” *MAA FOCUS* February/March 2023

BOOK REVIEWS

Nicholas A. Scoville, “A Brief Quadrivium” by Peter Ulrickson, *The American Mathematical Monthly* Volume 131, 2024 - Issue 6

Nicholas A. Scoville, “Never a dull moment: Hassler Whitney, Mathematics Pioneer” by Keith Kendig, *The American Mathematical Monthly* Volume 126, 2019 - Issue 9

PRESENTATIONS

<i>A McCord theorem for closure spaces</i>	December, 2024
Joint Meeting of the NZMS, AustMS and AMS, University of Auckland, New Zealand	
<i>Discrete Morse theory for open simplicial complexes</i>	July, 2024
AMS-UMI Joint Math meetings, Palermo University (invited talk)	
<i>Discrete Morse theory as an introduction to topology</i>	April, 2024
Towson University undergraduate conference, Plenary talk (invited talk)	
<i>Tools of discrete Morse theory</i>	February, 2024
Applied and Combinatorial topology workshop, Dagstuhl Germany (invited talk)	
<i>A McCord theorem for closure spaces</i>	October, 2023
Topology seminar, Notre Dame University (invited talk)	
<i>The Moore Method, Flatland, and alternate topology axioms</i>	July, 2023
Innovative Pedagogy in Geometry and Topology, Oberlin College (invited talk)	
<i>Discrete Morse theory as an introduction to topology</i>	July, 2023

Euler Circle (invited talk)	
<i>Discrete Morse theory as an introduction to topology</i>	April, 2023
University of Arizona undergraduate seminar (invited talk)	
<i>Towards a new digital homotopy theory</i>	March, 2023
Discrete homotopy workshop, American Institute of Mathematics, San Jose (invited talk)	
<i>Discrete Morse theory: three approaches</i>	October, 2022
Michael Penn math Patreon Seminar (invited talk)	
<i>Some recent results on the homotopy type of the Morse complex</i>	July, 2022
Applied Topology in Bedlewo, Bedlwo Poland (semi-plenary lecture)	
<i>The homotopy type of the Morse complex for some collections of trees</i>	June, 2022
Union College Mathematics Conference 2022, Union College	
<i>The homotopy type of the Morse complex for some collections of trees</i>	April, 2022
Virtual AMS/MAA Joint Meetings (invited talk)	
<i>Towards a new digital homotopy theory</i>	December, 2021
Virtual University of Regina seminar (invited talk)	
<i>Discrete Morse theory as an introduction to topology</i>	November, 2021
Virtual Rutgers undergraduate seminar (invited talk)	
<i>Higher connectivity of the Morse complex</i>	January, 2021
Virtual AMS/MAA Joint Meetings (invited talk)	
<i>Discrete Morse theory as an introduction to topology</i>	March, 2020
Juniata College math colloquium (invited talk)	
<i>Towards a new digital homotopy theory</i>	February, 2020
University of Albany Geometry/Topology seminar (invited talk)	
<i>Digital topology: A smooth introduction</i>	November, 2019
Westminster College, Fulton Missouri (invited talk)	
<i>Towards a new digital homotopy theory</i>	November, 2019
University of Missouri Geometry/Topology seminar (invited talk)	
<i>Strong discrete Morse theory and an application to simplicial Lusternik–Schnirelmann category</i>	November, 2019
Topological Complexity and Related topics, AMS Southeastern Sectional Meeting, University of Florida (invited talk)	
<i>On the automorphism group of the Morse complex</i>	November, 2019
General Contributed Paper Session, AMS Southeastern Sectional Meeting, University of Florida	
<i>On the automorphism group of the Morse complex</i>	September, 2019
Union College Mathematics Conference 2019, Union College	
<i>A new digital homotopy theory</i>	June, 2019
Lehigh Geometry/Topology Conference	
<i>Towards a new digital homotopy theory</i>	May, 2019
Lehigh University Algebraic Topology seminar (invited talk)	
<i>Build your own topology</i>	January, 2019

- General Contributed Paper Session on Research in Topology, Joint Math Meetings, Baltimore
Digital Topology: A smooth introduction October, 2018
 Western Michigan University (invited talk)
- Strong discrete Morse theory* July, 2018
 ICART 2018, Rabat Morocco
- Digital Topology: A smooth introduction* March, 2018
 Colloquium, Elon University (invited talk)
- S^1 and S^2 and S^3 , oh fy! *A digital Hopf fibration* January, 2018
 Math Colloquium, Montana State University (invited talk)
- S^1 and S^2 and S^3 , oh fy! *A digital Hopf fibration* November, 2017
 Colloquium, Catholic University of America (invited talk)
- Digital Topology: A smooth introduction* November, 2017
 Colloquium, Bard College (invited talk)
- S^1 and S^2 and S^3 , oh fy! *A digital Hopf fibration* November, 2017
 Colloquium, Dartmouth College (invited talk)
- Digital Topology: A smooth introduction* October, 2017
 Colloquium, Seattle University (invited talk)
- Digital Topology: A smooth introduction* October, 2017
 Colloquium, Central Washington University (invited talk)
- Simplicial Lusternik–Schnirelmann category and strong discrete Morse theory* October, 2017
 Topology Seminar, University of Florida (invited talk)
- S^1 and S^2 and S^3 , oh fy! *A digital Hopf fibration* October, 2017
 Colloquium, University of Florida Colloquium (invited talk)
- Digital Topology: A smooth introduction* September, 2017
 Math Club, Cleveland State University (invited talk)
- A Persistent Homological Analysis of Network Data Flow Malfunctions* August, 2017
 Applied Algebraic Topology in Sapporo, Sapporo Japan
- A Persistent Homological Analysis of Network Data Flow Malfunctions* June, 2017
 Applied Topology in Bedlewo, Bedlwo Poland
- A Simplicial Lusternik–Schnirelmann Theorem (poster)* June, 2017
 Topological Data Analysis: Theory and Applications, Macalester College
- Towards a new digital homotopy theory* April 2017
 Colloquium, Cleveland State University (invited talk)
- Collaborative Research: Transforming Instruction in Undergraduate Mathematics via Primary Historical (TRIUMPHS)* January, 2017
 MAA Invited Paper Session on Research in Improving Undergraduate Mathematical Sciences Education Program, AMS/MAA Joint Meetings, Atlanta (invited talk)
- (Strong) discrete Morse theory as an introduction to topology* September, 2016
 Colloquium, Butler University (invited talk)

<i>Georg Cantor at the dawn of point-set topology</i> Butler University (invited talk)	September, 2016
<i>A Simplicial Lusternik–Schnirelmann Theorem (poster)</i> ATMCS 7, Torino Italy	July, 2016
<i>The Cantor Set before Cantor</i> AMS/MAA Joint Meetings, Seattle Washington	January, 2016
<i>Discrete Morse theory as an introduction to Topology</i> Colloquium, University of Sevilla (invited talk)	December 2015
<i>Graph isomorphisms in discrete Morse theory</i> Colloquium, Lehigh University (invited talk)	October, 2015
<i>Estimating the discrete Lusternik–Schnirelmann category</i> Homology: Theoretical and Computational Aspects, Genoa, Italy	February, 2015
<i>Discrete Morse theory at the service of Number Theory</i> MAA General Contributed Paper Session on Research in Topology, AMS/MAA Joint Meetings, San Antonio	January, 2015
<i>Graph isomorphisms in discrete Morse theory</i> Colloquium, Seattle University (invited talk)	October, 2014
<i>Lusternik–Schnirelmann category, categorical sequences, and rational numbers</i> Topology seminar, University of Michigan (invited talk)	September, 2014
<i>Topology and its history- must there be a separation?</i> Pohle Colloquium, Adelphi University (invited talk)	May, 2014
<i>Lusternik–Schnirelmann category, categorical sequences, and rational numbers</i> Geometry/Topology seminar, University of Pennsylvania (invited talk)	February, 2014
<i>Topology and its history- must there be a separation?</i> PASHoM Seminar, Villanova University (invited talk)	January, 2014
<i>Graph isomorphisms via discrete Morse theory</i> AMS Special Session on Trends in Graph Theory, AMS/MAA Joint Meetings, Baltimore	January, 2014
<i>Topology and its history are connected under the classroom topology</i> Special Session on History of Mathematics and Its Use in Teaching, AMS Southeastern Sectional meeting, University of Louisville (invited talk)	October, 2013
<i>Computing the Discrete Lusternik–Schnirelmann category of a simplicial complex</i> Applied Topology in Bedlewo, Bedlewo, Poland	July, 2013
<i>Discrete Lusternik–Schnirelmann category</i> General Contributed Paper Session, AMS Southeastern Sectional Meeting, Tulane University	October, 2012
<i>Discrete Morse theory and the homology of simplicial complexes</i> General Contributed Paper Session, Mathfest, Madison	August, 2012
<i>Fun with Pi</i> Pi Day Celebration, Ursinus College	March, 2012
<i>Lusternik–Schnirelmann Category and the Connectivity of X</i> Research in Algebra and Topology, AMS/MAA Joint Meetings, Boston	January, 2012

<i>Graph Isomorphisms in Discrete Morse Theory</i> Colloquium, Saint Joseph's University (invited talk)	November, 2011
<i>Graph Isomorphisms in Discrete Morse Theory</i> Colloquium, Swarthmore College(invited talk)	October, 2011
<i>Graph Isomorphisms in Discrete Morse Theory</i> Colloquium, Gettysburg College (invited talk)	September, 2011
<i>Discrete Morse Functions on Graphs</i> Pure Mathematics Session, Mathfest, Lexington	August, 2011
<i>The Advent of Point-Set Topology</i> General Topology Session, AMS/MAA Joint Meetings, New Orleans	January, 2011
<i>Pick's Theorem: How to compute the area of a polygon</i> ϵ -talk Seminar, Ursinus College	October, 2010
<i>Rethinking the way we teach Point-Set Topology</i> The History of Mathematics and Its Uses in the Classroom, Mathfest, Pittsburgh	August 2010
<i>Irrational Numbers</i> Colloquium, St. Mary's University (invited talk)	February 2010
<i>2 Equations Attributed to Euler</i> Colloquium, Mount Saint Mary's College (invited talk)	February 2010
<i>What makes Topological Spaces different?</i> Colloquium, Ursinus College (invited talk)	January 2010
<i>A Metric for Homotopy Types</i> Geometry/Topology Session III, AMS/MAA Joint Meetings, San Francisco	January 2010
<i>Generalized Cone and Killing Lengths</i> Graduate Student Seminar, Dartmouth College	November 2008
<i>Hopf Invariants and the Reduced Diagonal</i> Topology Seminar, Western Michigan University	April 2004
<i>Something About the Quartic</i> History of Math Seminar, Western Michigan University	February 2004
<i>Diophantine Equations</i> Student Seminar, Western Michigan University	February 2004
<i>Beginning Invariant Theory and the Fundamental Theorem of Symmetric Polynomials</i> Algebra Seminar, Western Michigan University	January 2004
<i>Two Special Cases of Ganea's Conjecture</i> Topology Seminar, Western Michigan University	December 2003
<i>Applications of Groebner Bases and Elimination Theory</i> Algebra Seminar, Western Michigan University	November 2003
<i>Category-Type Invariants of Maps</i> Topology Seminar, Western Michigan University	November 2003
<i>Hardy, Littlewood, and Ramanujan-the REAL Triple Threat!</i>	September 2003

History of Math Seminar, Western Michigan University

WORKSHOPS RUN

<i>Open problems in discrete Morse theory</i>	September, 2023
BIGS Young Researcher Networking: Meeting on Topology and Applications, Bonn Germany (invited workshop)	
<i>Discrete Morse theory: Breadth and depth</i>	July, 2022
Adam Mickiewicz University, Poznan Poland (invited workshop)	
<i>MAA Workshop: Teaching Undergraduate Mathematics via Primary Source Projects.</i>	January, 2020
AMS/MAA Joint Math Meetings, Denver Colorado	
<i>TRIUMPHS Graduate student training Workshop</i>	July 19-20, 2019
New Mexico State University	
<i>TRIUMPHS Training Workshop</i>	September 13-15, 2018
University of Colorado Denver	
<i>Teaching Undergraduate Mathematics via Primary Source Projects</i>	January 2018
AMS/MAA Joint Math Meetings, San Diego CA	
<i>Teaching Mathematics with Primary Historical Sources</i>	April 1, 2017
MAA EPADEL sectional meeting, Kutztown PA	
<i>TRIUMPHS Training Workshop</i>	September 8-10, 2016
University of Colorado Denver	
<i>Connecting Past to Present: An approach to teaching topology via original resources</i>	July, 2016
HPM 2016, Montpellier France	

HONORS AND AWARDS

AMS-Simons Research Enhancement Grants for PUI Faculty	July 2023-June 2026
Laughlin Professional Achievement Award for distinguished service to Ursinus college through significant contribution to scholarship	May 2023
Paul R. Halmos-Lester R. Ford Award for article of expository excellence published in The American Mathematical Monthly	August 2020
REU SITE: Exploration and Professional Excellence in the Mathematical Sciences NSF Grant 1851948 (April 2020- March 2023)	\$225,469
Western Michigan University Department of Mathematics Alumni Achievement Award	October 2018

**Collaborative Research: RUI: Transforming Instruction
in Undergraduate Mathematics via Primary History Sources**

NSF IUSE Grant 1524065 (Aug. 2015- Sept. 2020) PIs at Colorado State,
Central Washington, NMSU, Xavier, U Colorado, Denver, U Florida

\$71,002

Best oral presentation at HTCA conference in Genoa, Italy
sponsored by Gruppo Italiano Ricercatori in Pattern Recognition.

February 2015

Mellon travel grant

July 2013

Mellon travel grant

May 2012

Project NExT Fellow

Aug. 2010 – Aug. 2011

ADDITIONAL SKILLS

Mathematical Software: LATEX, MATLAB, Maple, BlackBoard, WeBWork, HTML, Minitab, Derive, Java.

MATHEMATICAL ACTIVITIES

Organized Special Session “Applied and computational topology
with Kate Turner, Joint Meeting of the NZMS, AustMS and AMS,
University of Auckland, New Zealand

December 2024

MAA Dolciani Mathematical Expositions , editorial board

January 2024-present

Served on PhD thesis committee for David Mosquera Lois
“Morse Theory on Finite Spaces”
University of Santiago de Compostela,

February 2022

Served on MA math thesis committee for Marwa Mosallam
“On cup-products of cofibers of maps between Moore spaces,
Hopf invariant, and Lusternik–Schnirelmann category”
Western Michigan University,

July 2021

Served on virtual panel “Teaching and the Liberal Arts”
University of Tennessee, Knoxville

April 2020

Referee for several journals

2013-present

Member of NSF's College of Reviewers for Undergraduate Education

2018-2021

Scientific Committee, ESU8, Oslo Norway	July 2018
Scientific Committee, ICART 2018, Rabat Morocco	July 2018
Organized Special Session “AMS Special Session on Open & Accessible Problems for Undergraduate Research, ” with Allison Henrich and Michael Dorff at AMS/MAA Joint Math Meetings	January 2018
Focus Magazine, editorial board	November 2017-2022
Served on NSF panel review	2016, 2017, 2018
Served on MAA Basic Library List Committee	January 2017-January 2020
Organized Special Session “AMS Special Session on Open & Accessible Problems for Undergraduate Research, ” with Allison Henrich and Michael Dorff at AMS/MAA Joint Math Meetings	January 2017
Served on panel “The Research and Teaching Pendulum: January 2017 Finding a Stable Equilibrium” at AMS/MAA Joint Math Meetings	January 2017
Organized Special Session “Applied and Computational Topology, ” with Matthew Wright and Paweł Dłotko at AMS/MAA Joint Math Meetings	January 2016
Organized panel “Finding a thesis topic and advisor, ” at AMS/MAA Joint Math Meetings	January 2016
Reviewed applications for Posters on the Hill	Fall 2015
Reviewer for MathSciNet Mathematical Reviews	February 2015-present
Organized panel “Graduate school: Choosing one, getting in, staying in, ” at AMS/MAA Joint Math Meetings	January 2015
Reviewed applications for Posters on the Hill	Fall 2014
Book reviewer for online MAA book reviews	2014-Present
Faculty representative for Ursinus MAA student chapter	2014-Present

CUR Councilor in the Mathematics and Computer Sciences Division	2014-Present
Served on panel “You published your dissertation: now what?” at AMS/MAA Joint Math Meetings	January 2013
Organized panel “The on-campus interview survival guide” at AMS/MAA Joint Math Meetings	January 2013
Reviewer for mathematical publication database Zentralblatt	August 2012-present
Senior Personal, Ursinus College REU (NSF Grant No. DMS-1003972)	June 2012-August 2012
Organized Panel “Hit the Ground Running! Interview like a Pro and land the job” at AMS/MAA Joint Math Meetings	January 2012
Senior Personal, Ursinus College REU (NSF Grant No. DMS-1003972)	June 2011-August 2011
Judge for MAA Student Paper Session 3, MathFest	August 2011
Judge of research abstracts for Young Mathematicians Network Conference applicants	July 2011
Judge for MAA Student Poster Session, Joint Mathematics Meetings	January 2011
Calculus Committee, Ursinus College; Member	August 2010-present
Statistics Committee, Ursinus College; Member	August 2010-present
Organizer for Ursinus College ϵ -talks	Fall 2010-Fall 2016
Treasurer for YMN (Young Mathematicians Network)	2010-2015
Judge for MAA Student Paper Session 11, MathFest	August 2010
Reader/Reviwer for “Introduction to Homotopy Theory” by Martin Arkowitz	2007-2008
Student Seminar Organizer	2004-2005
WMU Pi Mu Epsilon Graduate Representative	2003-2005
Grader	Summer 2004, Summer 2003

ADDITIONAL ACTIVITIES

- Equipment manager** RLA Cross Country and Track August 2024-present
Berwyn, PA
- Completed Level 19 on high speed in *Dr Mario*** January 2022
Dr. Mario, Nintendo Entertainment System, 1990
- Tutor for Critical Point Test Prep** Fall 2020-present
Berwyn, PA
- Director of Religious Education** Fall 2019-Fall 2023
Sacred Heart Parish, Royersford PA.
- Second Grade PREP Teacher** Fall 2016-Spring 2019
Taught hour-long once weekly religious formation/catechism class to second grade students at Sacred Heart Parish, Royersford PA.
- First Grade PREP Teacher** Fall 2015-Spring 2016
Taught hour-long once weekly religious formation/catechism class to first grade students at Sacred Heart Parish, Royersford PA.
- Fourth Grade PREP Teacher** Fall 2014-Spring 2015
Taught hour-long once weekly religious formation/catechism class to fourth grade students at Sacred Heart Parish, Royersford PA.
- Ursinus College Newman Society Faculty Advisor** Fall 2011-present
- Sixth Grade PREP Teacher** Fall 2011-Spring 2014
Taught hour-long once weekly religious formation/catechism class to sixth grade students at Sacred Heart Parish, Royersford PA.
- Beat *Silver Surfer*** September 2011
Finished NES game *Silver Surfer* (Arcadia Systems, 1990), considered by many to be the most difficult game in NES history.
- Sixth Grade Religious Education Teacher** Fall 2010-Spring 2011
Taught hour-long once weekly religious formation/catechism class to sixth grade students at St. Norbert Parish, Paoli PA.
- Seventh Grade Religious Education Teacher** Fall 2009-Spring 2010
Taught hour-long once weekly religious formation/catechism class to seventh grade students at St. Denis Parish, Hanover NH.
- Contra Speedrun** Fall 2008
Defeated NES video game Contra in 11 minutes and 4 seconds without cheats or turbos, Hanover NH
- Youth Group Leader at St. Denis Parish** Fall 2008-Spring 2009
Gave lectures, organized activities, participated in service projects