ELIZABETH MUNCH

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Dept of Computational Mathematics, Science, and Engineering ⋄ Dept of Mathematics

Michigan State University ⋄ East Lansing, MI

EDUCATION

Duke University, *Durham, NC*
Ph.D. Dept. of Mathematics   May 2013
   · Thesis: Applications of Persistent Homology to Time Varying Systems
M.A. Dept. of Mathematics   Dec 2010

University of Rochester, *Rochester, NY*
B.S. Mathematics, Summa Cum Laude, School of Arts and Sciences   May 2008
B.M. Harp Performance with High Distinction, Eastman School of Music   May 2008

RESEARCH EXPERIENCE

Michigan State University, *East Lansing, MI*
Dept. of Computational Mathematics, Science and Engineering
Dept. of Mathematics
Assistant Professor   Aug 2017 – Present

University at Albany – SUNY, *Albany, NY*
Dept. of Mathematics & Statistics
Assistant Professor   Sept 2014 – July 2017
Dept. of Computer Science
Affiliated Faculty   July 2015 – July 2017

University of Minnesota, *Minneapolis, MN*
Institute for Mathematics and Its Applications
Postdoctoral Fellow   Sept 2013 – Aug 2014

Duke University, *Durham, NC*
Dept. of Mathematics
Visiting Assistant Professor   June 2013 – Aug 2013
Graduate Research Assistant   Sept 2008 – May 2013

AWARDS AND HONORS

Jo Rae Wright Fellowship for Outstanding Women in Science, Duke University, 2012-2013
Phi Beta Kappa, University of Rochester, May 2008
Performer's Certificate in Harp, May 2008
Lois S. Rogers Scholarship, Eastman School of Music, 2004-2008
Performer's Certificate, Eastman School of Music, 2008
Presser Scholarship, Eastman School of Music, 2007

PUBLICATIONS

Journal Articles

[1]   Elizabeth Munch. "A User's Guide to Topological Data Analysis". In: *Journal of Learning Analytics* 4.2 (2017). DOI: 10.18608/jla.2017.42.6. URL: http://www.learning-analytics.info/journals/index.php/JLA/article/view/5196.

[2]   Paul Bendich, Sang Peter Chin, Jesse Clark, Jonathan Desena, John Harer, Elizabeth Munch, Andrew Newman, David Porter, David Rouse, Nate Strawn, and Adam Watkins. "Topological and statistical behavior classifiers for tracking applications". In: *IEEE Transactions on Aerospace and Electronic Systems* 52.6 (2016), pp. 2644–2661. DOI: 10.1109/taes.2016.160405. URL: http://ieeexplore.ieee.org/document/7855573/.

[3]   Vin de Silva, Elizabeth Munch, and Amit Patel. "Categorified Reeb Graphs". In: *Discrete & Computational Geometry* (2016), pp. 1–53. ISSN: 1432-0444. DOI: 10.1007/s00454-016-9763-9. URL: http://link.springer.com/article/10.1007/s00454-016-9763-9.

[4]   Firas A. Khasawneh and Elizabeth Munch. "Chatter detection in turning using persistent homology". In: *Mechanical Systems and Signal Processing* 70-71 (2016), pp. 527–541. ISSN: 0888-3270. DOI: 10.1016/j.ymssp.2015.09.046. URL: http://www.sciencedirect.com/science/article/pii/S0888327015004598.

[5]   Elizabeth Munch, Katharine Turner, Paul Bendich, Sayan Mukherjee, Jonathan Mattingly, and John Harer. "Probabilistic Fréchet means for time varying persistence diagrams". In: *Electron. J. Statist.* 9 (2015), pp. 1173–1204. DOI: 10.1214/15-EJS1030. URL: https://projecteuclid.org/euclid.ejs/1433195858.

[6]   Elizabeth Munch, Michael Shapiro, and John Harer. "Failure filtrations for fenced sensor networks". In: *The International Journal of Robotics Research* 31.9 (2012), pp. 1044–1056. DOI: 10.1177/0278364912451671. URL: http://journals.sagepub.com/doi/abs/10.1177/0278364912451671.

Conference Proceedings

[7]   Elizabeth Munch and Bei Wang. "Convergence between Categorical Representations of Reeb Space and Mapper". In: *32nd International Symposium on Computational Geometry (SoCG 2016)*. Ed. by Sándor Fekete and Anna Lubiw. Vol. 51. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2016, 53:1–53:16. ISBN: 978-3-95977-009-5. DOI: http://dx.doi.org/10.4230/LIPIcs.SoCG.2016.53. URL: http://drops.dagstuhl.de/opus/volltexte/2016/5945.

[8]   Ulrich Bauer, Elizabeth Munch, and Yusu Wang. "Strong Equivalence of the Interleaving and Functional Distortion Metrics for Reeb Graphs". In: *31st International Symposium on Computational Geometry (SoCG 2015)*. Ed. by Lars Arge and János Pach. Vol. 34. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2015, pp. 461–475. DOI: 10.4230/LIPIcs.SOCG.2015.461. URL: http://drops.dagstuhl.de/opus/volltexte/2015/5146/.

[9]   David Rouse, Adam Watkins, David Porter, John Harer, Paul Bendich, Nate Strawn, Elizabeth Munch, Jonathan DeSena, Jesse Clarke, Jeffrey Gilbert, Peter Chin, and Andrew Newman. "Feature-aided multiple hypothesis tracking using topological and statistical behavior classifiers". In: *Proc. SPIE*. Vol. 9474. 2015, pp. 94740L–94740L–12. DOI: 10.1117/12.2179555. URL: http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=2299664.

[10] Firas A. Khasawneh and Elizabeth Munch. "Exploring equilibria in stochastic delay differential equations using persistent homology". In: *Proceedings of the ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, August 17-20, 2014, Buffalo, NY, USA*. 2014. DOI: 10.1115/DETC2014-35655. URL: http://proceedings.asmedigitalcollection.asme.org/proceeding.aspx?articleid=2091179.

[11] Firas A. Khasawneh and Elizabeth Munch. "Stability Determiniation in Turning using Persistent Homology and Time Series Analysis". In: *Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition, Montreal, Canada.* 2014. DOI: 10.1115/IMECE2014-40221. URL: http://proceedings.asmedigitalcollection.asme.org/proceeding.aspx?articleid=2204834.

Book Chapters

[12] Firas A. Khasawneh and Elizabeth Munch. "Utilizing Topological Data Analysis for Studying Signals of Time-Delay Systems". In: *Time Delay Systems: Theory, Numerics, Applications, and Experiments.* Ed. by Tamás Insperger, Tulga Ersal, and Gábor Orosz. Cham: Springer International Publishing, 2017, pp. 93–106. DOI: 10.1007/978-3-319-53426-8_7. URL: https://www.springerprofessional.de/en/utilizing-topological-data-analysis-for-studying-signals-of-time/12191012.

Other Published Work

[13] Vin de Silva, Elizabeth Munch, and Anastasios Stefanou. "A Hom-Tree Lower Bound for the Reeb Graph Interleaving Distance". In: *Extended Abstract, Fall Workshop on Computational Geometry* (2015).

[14] Elizabeth Munch and Bei Wang. "Reeb Space Approximations with Guarantees". In: *Extended Abstract, Fall Workshop on Computational Geometry* (2015).

[15] Elizabeth Munch. "Applications of Persistent Homology to Time Varying Systems". PhD thesis. Duke University, 2013.

[16] Elizabeth Munch, Ian Gilby, Susan Alberts, Anne Pusey, and John Harer. "Using Vineyards to Verify results of an Agent-Based Model of Primate Group Fission and Fusion". In: *YRF'12: Young Researchers Forum at CG Week.* Chapel Hill, NC, 2012.

[17] Elizabeth Munch and C. Douglas Haessig. "Counting prime paths in fractals built from triangles". In: *Journal for Undergraduate Research, University of Rochester* (2008).

Preprints

[18] Magnus Botnan, Justin Curry, and Elizabeth Munch. "The Poset Interleaving Distance". Preprint. 2017.

[19] Erin Wolf Chambers, Sean Dougherty, Elizabeth Munch, and Taylor Watson. "Drawing restricted classes of Planar Reeb Graphs". Conference paper. In submission. 2017.

[20] Vin de Silva, Elizabeth Munch, and Anastasios Stefanou. "Interleavings for Merge Trees". 2017.

[21] Vin de Silva, Elizabeth Munch, and Anastasios Stefanou. "Theory of interleavings on $[0, \infty)$-actegories". In: *arXiv:1706.04095v1* (2017). arXiv: 1706.04095v1 [math.CT]. URL: http://arxiv.org/pdf/1706.04095v1.

[22] William Dong, Elizabeth Munch, Jason Dunion, Kristen Corbosiero, and Ryan Torn. "Using Persistent Homology to Quantify a Diurnal Cycle in Hurricanes". Preprint. 2017.

[23] Firas A. Khasawneh, Elizabeth Munch, and José Perea. "Using Machine Learning and Persistent Homology to Classify Chatter in a Turning Model". Preprint. 2017.

FUNDED PROPOSALS

Collaborative Research: A Unified Framework for the Investigation of Time Series Using Topological Data Analysis

- April 2016-Mar 2019
- Role: Principal Investigator
- Collaborative with
  - Firas Khasawneh, Mechanical Eng., SUNY Polytechnic Institute, Utica, NY
- National Science Foundation (NSF)
  Dynamics, Control and Systems Diagnostics (DCSD)
  Division of Civil, Mechanical, and Manufacturing Innovation (CMMI)
- Total award amount: $375,235
  - NSF CMMI-1562012: (UAlbany) $178,736 (PI Munch)
  - NSF CMMI-1562459: (SUNY Poly) $196,499 (PI Khasawneh)

CDS&E: Collaborative Research: Machine Learning on Dynamical Systems via Topological Features

- Sept 2016-Aug 2019
- Role: Principal Investigator
- Collaborative with
  - Firas Khasawneh, Mechanical Eng., SUNY Polytechnic Institute, Utica, NY
  - José Perea, Depts. of Math, & CMSE, Michigan State University, East Lansing, MI
- National Science Foundation (NSF)
  Mathematical & Physical Systems (MPS)
  Division of Mathematical Sciences (DMS)
- Total award amount: $375,235
  - NSF DMS-1622320: (UAlbany) $101,672 (PI Munch)
  - NSF DMS-1622301: (MSU) $105,000 (PI Perea)
  - NSF DMS-1622293: (SUNY Poly) $93,111 (PI Khasawneh)

Kaleidoscope: Turning System Design Inside-Out

- Aug 2016-July 2017
- Role: Technical POC
- Collaborative with
  - Raytheon BBN Technologies Corp., Boston, MA
- DARPA

TALKS AND PRESENTED WORK

Introduction to Categorical Approaches in Topological Data Analysis II. Topology, Computation and Data Analysis, Schloss Dagstuhl, Wadern, Germany, July 17, 2017.

Reeb graphs, Mapper graphs, and Metrics. 47th Annual John H. Barrett Memorial Lectures, University of Tennessee - Knoxville, TN, Mar 2, 2017.

The Convergence of Mapper. AWM Research Symposium, UCLA, Los Angeles, CA, Apr 8, 2017.

The Convergence of Mapper. Brown University, Providence, RI, Mar 9, 2017.

A Topological Approach to Data Science. Dept. of Mathematics, Montana State University, Bozeman, MT, Feb 13, 2017.

A Topological Approach to Data Science. Dept. of Computational Mathematics, Science, and Engineering, Michigan State University, East Lansing, MI, Jan 11, 2017.

The interleaving distance for posets. Joint Mathematics Meetings, Atlanta, GA, Jan 4, 2017.

The Convergence of Mapper. New York Applied Topology Meetings, Columbia University, New York, NY, Dec 9, 2016.

The interleaving distance for posets. Union College Mathematics Conference, Schenectady, NY, Dec 3, 2016.

The Reeb graph interleaving distance. Computer Science Seminar, St. Louis University, Oct 12, 2016.

Utilizing Topological Data Analysis to Detect Periodicity. International Workshop on Topological Data Analysis in Biomedicine at ACM-BCB, Seattle, WA, Oct 2, 2016.

The interleaving distance. Geometry and Topology Seminar, Math Department, University at Buffalo, Buffalo, NY, Sep 23, 2016.

Applications of Persistence to Time Series Analysis. Topology, Geometry, and Data Analysis Conference (TGDA), Ohio State University, Columbus, OH, May 20, 2016.

Topological Data Analysis. Junior STEM Idea Exchange (JUSIE): Lightning event, Albany, NY, May 10, 2016.

What Does it Mean for Data to Have Shape?. Workshop on the Shape of Educational Data, Fairfax, VA, April 7, 2016.

The Reeb Graph Interleaving Distance and its Application to Data Analysis. Combinatorics Seminar, SUNY Binghamton, Binghamton, NY, Mar 15, 2016.

Topological Data Analysis and its Application to Atmospheric Science Data. Dept of Atmospheric and Environmental Sciences Colloquium, UAlbany, Albany, NY, Feb 15, 2016.

Topological Data Analysis. Math Department Student Seminar, Union College, Schenectady, NY, Jan 19, 2016.

Applied Category Theory and the Reeb Graph Interleaving Distance. Geometry and Topology Seminar, NCSU, Raleigh, NC, Jan 13, 2016.

Complexity of the Reeb Graph Interleaving Distance. CS Theory Seminar, NCSU, Raleigh, NC, Jan 11, 2016.

Reeb Graph Approximation with Guarantees. Joint Mathematics Meetings, Seattle, WA, Jan 9, 2016.

Reeb Graph Approximation with Guarantees. Fall Workshop on Computational Geometry (FWCG), Buffalo, NY, Oct 23, 2015.

The Reeb Graph Interleaving Distance . UAlbany - Algebra/Topology Seminar, Sep 3 (Part I) and Sep 10 (Part II), 2015.

A New Metric for $\mathbb{R}$-graph Comparison. AFRL Annual Applied Topology Workshop, Rome, NY, Aug 7, 2015.

Demo: Using Perseus to Compute Persistent Homology. UAlbany Applied Topology Reading Group, Aug 6, 2015.

The Interleaving Distance. CG Week, Symposium on Computational Geometry (SoCG), Eindhoven, Netherlands, June 25, 2015.

Strong Equivalence of the Interleaving and Functional Distortion Metrics for Reeb Graphs. Symposium on Computational Geometry (SoCG), Eindhoven, Netherlands, June 24, 2015.

Using Topology to Understand Big Data. Junior STEM Idea Exchange (JUSIE), University at Albany - SUNY, Mar 25, 2015.

Strong Equivalence of Reeb Graph Metrics. Invited Lecture, TU Munich, Munich, Germany, Mar 17, 2015.

The Cosheaf-Less Reeb Graph Interleaving Distance. Seminar on Computational Geometry, Schloss Dagstuhl, Wadern, Germany, Mar 12, 2015.

The Interleaving Distance for Reeb Graphs. Applied Algebraic Topology Research Network - Online Seminar, Feb 25, 2015.

Using Topology to Understand Big Data. Women in Science and Engineering (WISH) Lunch, University at Albany, Albany, NY, Jan 15, 2015.

Towards Predicting and Preventing Machine Chatter Using Persistent Homology. Invited lecture, Workshop on Topology : Identifying Order in Complex System, Rutgers, New Brunswick, NJ, Oct 18, 2014.

Using Topology to Understand Big Data. Invited lecture, Modern Math Workshop, Los Angeles, CA, Oct 16, 2014.

Interleavings of Reeb Graphs. Invited Lecture, AIM Workshop on Generalized Persistence and Applications, Sept 18, 2014.

Interleavings of Reeb Graphs. Invited Lecture, ATMCS 6, Vancouver, Canada, May 29, 2014.

Topological Data Analysis :: Persistent Homology and Applications. Invited Lecture, Systems Information Learning Optimization (SILO), University of Wisconsin - Madison, Madison, WI, April 23, 2014.

A Distance Measure on Reeb Graphs. Invited Lecture, Topology, Geometry and Data Seminar, Ohio State University, Columbus, OH, April 11, 2014.

Using Persistence to Explore Equilibria of Delay Equations. Invited Lecture, Spring Topology and Dynamics Conference, University of Richmond, Richmond, VA, March 14, 2014.

Categorification of Reeb Graphs. Invited Lecture, Workshop on Topological Systems : Communication, Sensing, and Actuation, IMA, Minneapolis, MN, March 6, 2014.

Using Persistence to Explore Equilibria of Delay Equations. Poster: Workshop on Algebraic Topology in Dynamics, Differential Equations, and Experimental Data, IMA, Minneapolis, MN, February 11, 2014.

Categorification of Reeb Graphs. Invited Lecture, SAMSI Workshop, LDHD: Topological Data Analysis, Durham, NC, February 5, 2014.

Extending Statistical Methods to Computational Topology. Invited Lecture, SIAM Minisymposium on Applied and Computational Geometry, JMM, Baltimore, MD, January 17, 2014.

A Statistical Approach for Improving Topological Data Analysis. Invited Lecture, University of Rochester, Rochester, NY, January 10, 2014.

Categorification of Reeb Graphs. Invited Lecture, Topology Seminar, Tulane University, New Orleans, LA, November 5, 2013.

Categorification of Reeb Graphs. IMA Postdoc Seminar, University of Minnesota, Minneapolis, MN, October 22, 2013.

A Continuous Mean for Finite Sets of Persistence Diagrams. Invited Lecture, Workshop: Topological Data Analysis, IMA, University of Minnesota, Minneapolis, MN, October 10, 2013.

A Continuous Mean for Distributions of Persistence Diagrams. Invited Lecture, SIAM Conference on Applied Algebraic Geometry, Fort Collins, CO, August 2, 2013.

An Introduction to Topological Data Analysis. Invited Lecture, SUNYIT, Utica, NY, June 11, 2013.

Applications of Persistent Homology to Time Varying Systems. PhD Defense, Duke University, March 28, 2013.

Using Persistent Homology to Analyze Behavior in Dynamic Point Clouds. SIAM Student Chapter Lecture Series, Colorado State University, Fort Collins, CO, November 5, 2012.

Using Persistent Homology to Analyze Dynamic Point Clouds. Data Research Training Grant Seminar, Duke University, Durham, NC, October 22, 2012.

An Intro to Persistent Homology and Some Applications. Graduate/Faculty Seminar, Duke University, Durham, NC, September 7, 2012.

Metrics on Vineyards. Computational Geometry Week, Chapel Hill, NC, June 20, 2012.

Using vineyards to verify results of an agent-based model of primate group fission and fusion. Poster: Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, Newark, NJ, May 18-20, 2012.

Primates and Vineyards. Duke University Math Slam, Duke University, Durham, NC, March 23, 2012.

Utilizing Ideas from Persistent Homology to Compute Probabilistic Sensor Network Coverage. Algebra/Combinatorics Seminar, NC State University, Raleigh,NC, January 13, 2012.

Applied Topology: Basic Ideas and a Mess of Applications. Graduate/Faculty Seminar, Duke University, Durham, NC, October 14, 2011.

Using Persistent Homology to Compute Probabalistic Failure of a Sensor Network. SIAM Conference on Applied Algebraic Geometry, Raleigh, NC, October 6, 2011.

Computing Probabilistic Sensor Network Coverage via Algorithms Utilizing Persistent Homology. Geometry and Topology Reading Group, Institute of Science and Technology, Klosterneuburg, Austria, June 20, 2011.

Computing Probabilistic Sensor Network Coverage via Algorithms Utilizing Persistent Homology. Computational Geometry Seminar, UNC Chapel Hill, Chapel Hill, NC, February 3, 2011.

Failure Filtrations and Coverage of Fenced Sensor Networks. Graduate/Faculty Seminar, Duke University, November 19, 2010.

TEACHING EXPERIENCE

Course	Title	Institution	Semesters	Eval.
CMSE 201	Intro to Computational Modeling	MSU	Spring, 2018	
CMSE 491/890	Topological Analysis of Large Datasets	MSU	Fall, 2017	
AMAT 840	Applied Topology	UAlbany	Spring, 2015	4.50/5
AMAT 587	Graph Theory	UAlbany	Fall, 2015	5.00/5
AMAT 540B	Topology II	UAlbany	Spring, 2017	4.60/5
AMAT 502	Modern Computing for Mathematicians	UAlbany	Spring, 2016	5.00/5
AMAT 363	Statistics	UAlbany	Fall, 2014	4.96/5
			Fall, 2015	4.87/5
			Spring, 2016	4.84/5
			Spring, 2017	4.67/5
TIP	Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion	Duke TIP	July, 2012	4.82/5
Math 32L	Laboratory Calculus II	Duke	Spring, 2011	4.00/5
Math 31L	Laboratory Calculus I	Duke	Fall, 2009	3.00/5
Math 25L	Laboratory Calculus and Functions I	Duke	Fall, 2008	

STUDENTS ADVISED

Graduate Students

Anastasios Stefanou, PhD student, UAlbany, Oct 2015 - present.
Project title: *Interleavings for Reeb Graphs and Merge Trees with an Application to Phylogenetic Trees*

Dylan Molho, PhD student, MSU CMSE, Sept 2016 - present.
Project title: *Applications of category theory to modeling systems of systems.*

Christopher Sukhu, PhD Student, MSU CMSE, May 2017 - Present

Sarah Tymochko, PhD Student, MSU CMSE, Sept 2017 - Present

Undergraduate and High School Students

Brian Bollen, Undergraduate Student, UAlbany, May 2016 - Aug 2016.
Project title: *Characterizing Chaos using Persistent Homology*

Akanksha Atrey, Undergraduate Student, UAlbany, Jan 2015 - June 2016
Project title: *Reeb Graph Based Validation of Statistical Predictive Models for the Spread of AIDS*

Bill Dong, High School Student, UAlbany, Jun 2015 - Aug 2016
Project title: *Using Persistent Homology to Quantify a Diurnal Cycle in Hurricanes*

SERVICE

Departmental and University Service

Math Dept. Graduate Committee, UAlbany	Sept 2016 - Aug 2017
Math Dept Representative, UAlbany Undergraduate Research Information Session and Forum	Mar 2016
Faculty Speaker, UAlbany Math Department Graduation Ceremony	May 2015
Organizer, UAlbany Reading Group on Applied Topology	Summer 2015
Organizer, Coffee for Women in Math with Jill Pipher, Invited Speaker	Apr 2015
UAlbany Math Dept Colloquium Committee	Sept 2014-Aug 2017
Organizer for the IMA Postdoc Seminar	Sept 2013-Aug 2014
President, Noetherian Ring of Duke University	Sept 2012-May 2013
Mathbio Seminar Organizer, Duke Math Dept	Spring 2012
Project Mentor: Duke Workshop on Applications of Math to Physiology and Medicine	May 16-20, 2011
Tea Organizer for Duke Mathematics Dept	Sept 2010 - May 2011
Panelist for Duke Math Dept on Getting a job after your PhD	Mar 2013
Panelist for Duke Math Dept Recruitment Weekend Info Session	March 2010, March 2011
Graduate Student Representative for Duke Math Department	Jan 2009 - Dec 2009

Professional Service

Steering Committee Member, ATMCS	Mar 2017 - present
Steering Committee Member, Women in Computational Topology	Sep 2016 - present
Program Committee Member, Symposium on Computational Geometry (SoCG)	2018
Organizer for Special Session on Sheaves in TDA at the Joint Math Meetings	Jan 2017
Program Committee Member, Fall Workshop on Computational Geometry	2014, 2016
Scientific Committee, ATMCS7, Torino, Italy Applied Topology: Methods, Computation, and Science	Jul 2016
Organizer, The 4th Annual Minisymposium on Computational Topology, CG Week at the Symposium on Computational Geometry	Jun 2015
Session Organizer, AWM Research Symposium	Apr 2015
Organizer for Special Session at the Joint Math Meetings	Jan 2013

Community Outreach

Interview for The Girls Angle Bulletin, ISSN 2151-5700	Oct/Nov 2015
NYS Master Teacher Program Application Review Committee	Sept 2014
Volunteer for FEMMES Capstone Events	April 2011, April 2012

Review and Referee

Journal of Machine Learning Research	2017
International Symposium on Algorithms and Computation (ISAAC)	2017
SIAM Journal on Applied Algebra and Geometry (SIAGA)	2017
Symposium on Discrete Algorithms	2017
NSF	2016
PLOS ONE	2015, 2016
Computational Geometry: Theory and Applications	2016
Symposium on Computational Geometry	2014, 2016
Discrete and Computational Geometry	2015

PROFESSIONAL AFFILIATIONS

American Mathematical Society (AMS)
Society for Industrial and Applied Mathematics (SIAM)
Association for Women in Mathematics (AWM)
Association for Computing Machinery (ACM)
American Harp Society (AHS)

TECHNICAL STRENGTHS

Software and Coding	Python, MATLAB, R, LaTeX, Inkscape, HTML, CSS
Operating Systems	Linux, Windows, Android