SARAH PERCIVAL

perciva9@msu.edu ◇ sperciva.github.io
Dept of Biochemistry and Molecular Biology
Michigan State University ◇ East Lansing, MI

EDUCATION

Purdue University, *West Lafayette, IN*
Ph.D. Dept. of Mathematics **August 2021**
- **Advisor: Saugata Basu**
- **Thesis: Efficient Computation of Reeb Spaces and First Homology Groups**

Rice University, *Houston, TX*
B.A. Mathematics, School of Natural Sciences **May 2014**
B.A. Statistics, School of Engineering **May 2014**

RESEARCH EXPERIENCE

Michigan State University, *East Lansing, MI*
Dept. of Biochemistry and Molecular Biology
Research Associate (Postdoc) **August 2021 – Present**

Purdue University, *West Lafayette, IN*
Dept. of Mathematics
Graduate Research Assistant **Jan 2017 – May 2018**

SCHOLARSHIP

Mathematical Research Community, 2022
Participated in the Models and Methods for Sparse (Hyper)Network Science MRC

GAANN Fellowship, 2020-2021
The US Department of Education awards this fellowship through the Graduate Assistance in Areas of National Need program to graduate students of superior ability who demonstrate financial need.

Ross Fellowship, Purdue University, 2014-2015
This fellowship is awarded to incoming doctoral applicants at Purdue University who demonstrate academic excellence.

Summer Mathematics Program for Women Undergraduates, 2012
Participated in program for undergraduate women in mathematics at Carleton College

PUBLICATIONS

Due to working in an interdisciplinary setting, my work follows two different conventions for authorship. Theoretical mathematics tends to be published alphabetically. Biology tends to be published in descending order of contribution, with graduate students and postdocs listed first, followed by PIs.

Preprints

[1] Rose A. Marks, Erik J. Amézquita, Sarah Percival, Alejandra Rougon-Cardoso, Claudia Chibici-Revneanu, Shandry M. Tebele, Jill M. Farrant, Daniel H. Chitwood, and Robert VanBuren. "Global disparities in plant science: a legacy of colonialism, patriarchy, and exclusion". In: *bioRxiv* (2022), Provisionally accepted to *PNAS*. DOI: 10.1101/2022.10.15.512190. eprint: https://www.biorxiv.org/content/early/2022/10/18/2022.10.15.512190.full.pdf.

[2] Sourabh Palande, Joshua A.M. Kaste, Miles D. Roberts, Kenia Segura Aba, Carly Claucherty, Jamell Dacon, Rei Doko, Thilani B. Jayakody, Hannah R. Jeffery, Nathan Kelly, Andriana Manousidaki, Hannah M. Parks, Emily M. Roggenkamp, Ally M. Schumacher, Jiaxin Yang, Sarah Percival, Jeremy Pardo, Aman Y. Husbands, Arjun Krishnan, Beronda L. Montgomery, Elizabeth Munch, Addie M. Thompson, Alejandra Rougon-Cardoso, Daniel H. Chitwood, and Robert VanBuren. "The topological shape of gene expression across the evolution of flowering plants". In: *bioRxiv* (2022). DOI: 10.1101/2022.09.07.506951. eprint: https://www.biorxiv.org/content/early/2022/09/09/2022.09.07.506951.full.pdf.

[3] Saugata Basu and Sarah Percival. *Efficient computation of a semi-algebraic basis of the first homology group of a semi-algebraic set*. 2021. DOI: 10.48550/ARXIV.2107.08947.

Journal Articles

[4] Saugata Basu, Nathanael Cox, and Sarah Percival. "On the Reeb Spaces of Definable Maps". In: *Discrete and Computational Geometry* 68.2 (July 2022), pp. 372–405. DOI: 10.1007/s00454-022-00400-0.

Other Published Work

[5] Henry Hugh Adams, Hana Dal Poz Kouřimská, Teresa Heiss, Sarah Percival, and Lori Ziegelmeier. "How to Tutorial-a-thon". In: *Notices of the American Mathematical Society* 68.09 (Oct. 2021), p. 1. DOI: 10.1090/noti2349.

INVITED SPEAKER

Talk titles with hyperlinks have recordings or supplementary material available.

11. ***Using Mapper to Reveal Morphological Relationships in Passiflora Leaves.*** **SIAM-MDS, San Diego, CA, Sep 30, 2022.**

10. ***Computation of Reeb Graphs in a Semi-Algebraic Setting.*** **Applied Algebraic Topology Research Network (AATRN), Online Seminar, July 27, 2022.**

9. ***An Efficient Algorithm for the Computation of Reeb Spaces from Roadmaps.*** **AWM Research Symposium, University of Minnesota, Minneapolis, MN, June 18, 2022.**

8. ***Efficient Computation of a Semi-Algebraic Basis of the First Homology Group of a Semi-Algebraic Set.*** **AMS Spring Western Virtual Sectional Meeting, May 15, 2022.**

7. ***Efficient Computation of a Semi-Algebraic Basis of the First Homology Group of a Semi-Algebraic Set.*** **AWM Special Session on Women in Computational Topology, Joint Mathematics Meetings, Online due to COVID-19, April 9, 2022.**

6. ***Using Mapper to Reveal Morphological Relationships in Passiflora Leaves.*** **AMS Spring Central Virtual Sectional Meeting, March 26, 2022.**

5. ***Computation and Applications of Reeb Graphs.*** **Colorado State University Data Science Seminar, Virtual, February 24, 2022.**

4. ***An Efficient Algorithm for the Computation of Reeb Graphs from Roadmaps.*** **University of Florida Topological Data Analysis Conference, Gainesville, FL, Jan 20, 2022.**

3. ***An Efficient Algorithm for the Computation of Reeb Graphs from Roadmaps.*** **Applied Topology in Albany Seminar, Virtual, Oct 29, 2021.**

2. ***Efficient Computation of Reeb Spaces.*** **Michigan State University TDA Seminar, Virtual, September 8, 2021.**

1. ***Reeb Spaces of Definable Maps.*** **Purdue University Topology Seminar, West Lafayette, IN, Oct 16, 2018.**

CONTRIBUTED TALKS

10. ***An Efficient Algorithm for the Computation of Reeb Spaces from Roadmaps.*** **Symposium on Computational Geometry Young Researchers Forum, Virtual, June 7, 2022.**

9. ***Efficient Computation of a Semi-Algebraic Basis of the First Homology Group of a Semi-Algebraic Set.*** **Union College Mathematics Conference, Schenectady, NY, June 4, 2022.**

8. ***Using Mapper to Reveal Morphological Relationships in Passiflora Leaves.*** **Topological Data Visualization Workshop, University of Iowa, Iowa City, IA, May 19, 2022.**

7. ***Getting Started with Python for TDA.*** **AATRN Tutorial-a-thon, Virtual, Feb 22, 2021.**

6. ***An Algorithm for the Computation of Reeb Graphs from Roadmaps.*** **Graduate Students Reminisce Online on Topology Seminar, Virtual, Aug 5, 2020.**

5. ***An Algorithm for the Computation of Reeb Graphs from Roadmaps.*** **Graduate Student Topology and Geometry Seminar, Indiana University, Bloomington, IN (canceled due to COVID-19).**

4. ***Reeb Graphs and Their Applications.*** **MAA Indiana Section, University of Indianapolis, Indianapolis, IN, April 5, 2019.**

3. ***Reeb Graphs and Their Applications.*** **Student Colloquium, Purdue University, West Lafayette, IN, Feb 27, 2019.**

2. ***An Introduction to Topological Data Analysis.*** **Student Colloquium, Purdue University, West Lafayette, IN, Jan 24, 2018.**

1. ***An Introduction to Topological Data Analysis.*** **Graduate Research Day, Purdue University, West Lafayette, IN, Nov 11, 2017.**

POSTERS

Poster titles with hyperlinks have supplementary material available.

2. ***Using Mapper to Reveal Morphological Relationships in Passiflora Leaves.*** **ATMCS, University of Oxford, Oxford, UK, June 20, 2022.**

1. ***Reeb Spaces of Definable Maps.*** **TGDA@OSU, The Ohio State University, Columbus, OH, May 21, 2018.**

TEACHING EXPERIENCE

Course	Title	Role	Institution	Semesters
HRT 841	Foundations in Computational Plant Science	Assistant Instructor	MSU	Fall, 2022
MA 162	Calculus II	Instructor	Purdue	Summer, 2019 Summer, 2018
MA 162	Calculus II	Teaching Assistant	Purdue	Fall, 2015 Spring, 2016 Spring, 2019
MA 161	Calculus I	Teaching Assistant	Purdue	Fall, 2018
MA 158	Precalculus	Instructor	Purdue	Fall, 2016
STAT 201	Elementary Statistics	Undergraduate Teaching Assistant	Rice	Fall, 2013 Spring, 2014

MENTORSHIP

Xinyi (Elena) Wang, PhD Student, MSU CMSE — **Feb 2022 - Present**

SERVICE

Departmental and University Service

- **CMSE DEI Committee, MSU** — **Aug 2022 - Present**
- **Graduate Student Representative for Purdue Math Department** — **May 2020 - May 2021**
- **AWM Cabinet Member, Purdue** — **August 2015 - August 2021**

Professional Service

- **Organizer, Minisymposium on TDA with Mapper, SIAM MDS 22** — **Sep 2022**
- **Organizer, Graduates Achieving Inclusion Now Conference** — **October 2021**
- **Organizer, AATRN Tutorial-a-thon** — **March 2021**

Review and Referee

- **International Conference on Machine Learning (ICML)** — **2022**
- **Symposium on Computational Geometry (SoCG)** — **2023**

PROFESSIONAL AFFILIATIONS

American Mathematical Society (AMS)
Society for Industrial and Applied Mathematics (SIAM)
Association for Women in Mathematics (AWM)
National Association of Mathematicians (NAM)

TECHNICAL STRENGTHS

Software and Coding	**Python, Javascript, R, LaTeX, Inkscape**
Languages	**English (native), French (conversational)**