

Michael Lesnick

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<https://www.albany.edu/~ml644186/>

Education

Ph.D. Institute for Computational and Mathematical Engineering, Stanford University

Sept. 2012

Thesis: Multidimensional Interleavings and Applications to Topological Inference.

Winner, Gene Golub Dissertation Award.

Advisor: Gunnar Carlsson, Department of Mathematics.

Research focus: Theoretical foundations of topological data analysis; novel tools and algorithms for exploratory analysis and visualization of data; applications to biology.

B.S. Mathematics with Honors, Brown University

May 2004

Awards

PI, Simons Foundation Collaboration Grant

2022-2027

Award: \$42,000.

Project title: "Multiparameter Persistence: Theory, Algorithms, and Applications."

Co-PI, NSF Grant

2015-2018

Award: \$210,217. Joint with Matthew Wright. Program in *Computational and Data-Enabled Science & Engineering*.

Project title: "Computation and Visualization of Multi-Parameter Topological Invariants of Data."

Best Software Demo Award, "Algebraic Topology: Methods, Computation, & Science"

2016

Demonstrated software, co-authored with Matthew Wright, for interactive visualization of 2-D persistent homology.

Award shared with Ulrich Bauer.

Gene Golub Dissertation Award

2012

Departmental award for best Ph.D thesis.

NDSEG Fellowship in Mathematics

2005

One of 13 students nationwide to receive three year fellowship in mathematics.

Honorary Stanford Graduate Fellow

2005

Offered Stanford's three year internal graduate fellowship (declined).

Fellowship is offered to approximately top 20% of Stanford Ph.D. admits in math, science, and engineering.

Professional Experience

Assistant Professor, University at Albany, SUNY

Sept. 2018-

Department of Mathematics

Associate Research Scholar, Princeton University

Jan. 2016-Sept. 2018

Princeton Neuroscience Institute

Visitor, Institute for Advanced Study

Sept. 2016-April 2017

Simons Center for Systems Biology, School of Natural Sciences

Visitor, Columbia University

Jan.-Dec. 2015

Department of Bioinformatics

Postdoctoral Fellow, Institute for Mathematics and its Applications

Sept. 2013-Aug. 2015

Participant in the 2013-2014 thematic program "Scientific and Engineering Applications of Algebraic Topology"

Member, Institute for Advanced Study

Sept. 2012-Aug. 2013

School of Mathematics

Software

2-parameter persistent cohomology, C++ software to efficiently compute minimal presentations of function-Rips bifiltrations. Designed by Fabian Lenzen, Ulrich Bauer, and Michael Lesnick. Code written by Lenzen.

<https://gitlab.com/flenzen/2-parameter-persistent-cohomology>. 2023.

Muphasa, C++ software to compute presentations of multi-parameter persistent homology. Designed by Matías R.

Bender, Oliver Gäfvert, and Michael Lesnick. Code written by Bender and Gäfvert.
<https://github.com/olivergafvert/muphasa>. 2022.

RIVET, C++ software for the visualization and analysis of 2-parameter persistent homology. Designed by Michael Lesnick and Matthew Wright, developed by the “RIVET development team.” <https://github.com/rivetTDA/rivet>. 2014-2020.

Book in Preparation

Notes on Multiparameter Persistence, unfinished, currently 189 pages.
https://www.albany.edu/~ML644186/840_2022/Math840_Notes_22.pdf. 2019-2023.

Preprints

ℓ_p -Metrics on Multiparameter Persistence Modules w/ Håvard Bjerkevik. In revision, 2021. arXiv:2106.13589. 49 pages.

A Formal Framework for Cognitive Models of Multitasking, w/S. Musslick, B. Dey, J.D. Cohen. PsyArXiv. 15 pages.

PHoS: Persistent Homology for Virtual Screening w/ Bryn Keller, Ted Wilke. Submitted, 2018. ChemRxiv:6969260

Interactive Visualization of 2-D Persistence Modules w/ Matthew Wright. In revision, 2015. arXiv:1512.00180. 75 pages.

Publications

Efficient Two-Parameter Persistence Computation via Cohomology w/ Ulrich Bauer, Fabian Lenzen. Accepted to SoCG 2023. arXiv:2303.11193. 23 pages.

An Introduction to Multiparameter Persistent Homology w/ Magnus Botnan. Proceedings of the 2020 International Conference on Representations of Algebras, in press. 65 pages.

Universality of the Homotopy Interleaving Distance w/ Andrew Blumberg. Transactions of the American Mathematical Society, in press. arXiv:1705.01690. 40 pages.

Stability of 2-Parameter Persistent Homology w/ Andrew Blumberg. Foundations of Computational Mathematics, 2022. 43 pages.

The Universal ℓ^p -Metric on Merge Trees w/ Robert Cardona, Justin Curry, and Tung Lam. SoCG 2022. arXiv:2112.12165. 20 pages.

Computing Minimal Presentations and Bigraded Betti Numbers of 2-Parameter Persistent Homology w/ Matthew Wright. SIAM Journal of Applied Algebra and Geometry, Vol. 6., No. 2, 2022. arXiv:1902.05708. 33 pages.

Computing the Multicover Bifiltration w/ René Corbet, Michael Kerber, Georg Osang. SoCG 2021. Invited to Discrete and Computational Geometry, 2023. 30 pages.

Quantifying Genetic Innovation: Mathematical Foundations for the Topological Study of Reticulate Evolution w/ Raul Rabadan and Daniel Rosenbloom. SIAM Journal of Applied Algebra and Geometry, Vol. 4, Issue 1, 2020. 44 pages.

Persistence Diagrams as Diagrams: A Categorification of the Stability Theorem w/ Ulrich Bauer. Proceedings of the 2018 Abel Symposium (Published in 2020). 23 pages.

Exact computation of the matching distance on 2-parameter persistence modules w/ Michael Kerber, Steve Oudot. SoCG 2019. Invited to Journal of Computational Geometry, Vol. 11, No. 2, 2020. 18 pages.

Feasibility of Topological Data Analysis for event-related fMRI w/ Cameron Ellis, Gregory Henselman-Petrusek, Bryn Keller, Jon Cohen. Network Neuroscience, 2019.

Feature Ratings and Dimension-Specific Similarity Explain Distinct Aspects of Semantic Similarity Judgments w/ Marius Cătălin Iordan, Cameron T. Ellis, Daniel N. Osherson, and Jonathan D. Cohen. Proceedings of the 40th Annual Meeting of the Cognitive Science Society, 2018.

Algebraic Stability of Zigzag Persistence Modules w/ Magnus Botnan. Algebraic and Geometric Topology, Vol. 18, No. 6, 2018. 72 pages.

Induced Matchings and the Algebraic Stability of Persistence Barcodes, w/ Ulrich Bauer. SoCG 2014. Invited to

Journal of Computational Geometry, Vol. 6, No. 2, 2015. 30 pages.

The Theory of the Interleaving Distance on Multidimensional Persistence Modules. Foundations of Computational Mathematics, Vo. 15, No. 3, 2015. 36 pages.

Studying the Shape of Data Using Topology. The IAS Letter, Summer 2013.

Topological Methods for Exploring Low-density States in Biomolecular Folding Pathways, w/Y. Yao, J. Sun, X. Huang, G. Bowman, G. Singh, L. Guibas, V. Pande, G. Carlsson. Journal of Chemical Physics, Apr 2009. 23 pages.

Teaching Experience

Instructor, Topics in Topology

SUNY Albany

Spring 2019, Fall 2022, Spring 2023

Designed and taught a graduate topics course on multiparameter persistence.

First iteration was a one-semester course (2019), second iteration was a two-semester course (2022-2023)

Instructor, Algorithms for Data Science

SUNY Albany

Spring 2021 (online), Spring 2022

Designed and taught a graduate level course on algorithms for Data Science MS students

Instructor, Topological Data Analysis III

SUNY Albany

Fall 2020 (online), Spring 2022

Designed and taught a TDA practicum.

Instructor, Topological Data Analysis II

SUNY Albany

Spring 2020 (partly online), Fall 2021, Spring 2023

Designed and taught the sequel to my TDA I course.

Instructor, Topological Data Analysis I

SUNY Albany

Fall 2019, Spring 2021 (online), Fall 2022

Designed and taught a course on topological data analysis.

Instructor, Topology

SUNY Albany

Fall 2019, 2020 (online), 2021

Designed and taught an undergraduate course on topology.

Instructor, Masters Seminar

SUNY Albany

Spring 2020

Led a seminar where students did independent expository research and gave presentations.

Instructor, Honors Calc II

SUNY Albany

Spring 2019

Taught an honors second semester calculus class.

Instructor, Honors Calc I

SUNY Albany

Fall 2018

Designed and taught an honors first semester calculus course.

Instructor, Topology for Biologists

Columbia University

Fall 2015

Held an informal weekly series of eight introductory lectures on topology.

Co-Instructor, Short Course on Topological Data Analysis

CIMAT, Guanajuato, Mexico

Jan. 2015

Gave four hours of lectures on multidimensional persistent homology.

Instructor, Applied Linear Algebra

University of Minnesota

Fall 2014

Designed and taught a linear algebra class.

Teaching Assistant, Multivariable Calculus

Stanford University

Fall 2011

Held problem sessions and Matlab tutorials for a multivariable calculus class of 160 students.

Teaching Assistant, Accelerated Calculus

Brown University

Fall 2003

Held weekly recitations for class of 20 students in second semester calculus course.

Ph.D. Students Advised

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| Tung Lam Ph.D. student in mathematics, SUNY Albany, co-advised by Justin Curry. | <i>Fall 2019-</i> |
| Robert Cardona Ph.D. student in mathematics, SUNY Albany, co-advised by Justin Curry. | <i>Fall 2020-Summer 2023</i> |

Master's Theses Advised

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| Ken McCabe M.S. student in mathematics, SUNY Albany. | <i>Fal 2022-Spring 2024</i> |
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Undergraduate and Postgraduate Research Assistants Supervised

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| Simon Segert Princeton University '14, mathematics major. | <i>Spring-Summer 2018</i> |
| Alexander Yu Princeton University '16, mathematics major. | <i>Summer 2016-Spring 2017</i> |
| William Wang University of Pennsylvania '20, mathematics major. | <i>Summer 2017</i> |
| Roy Zhao Princeton University '17, mathematics major. | <i>Spring 2016-Spring 2017</i> |
| Samuel Harris Princeton University '17, mathematics major. | <i>Spring 2016</i> |

Visiting Graduate Students Advised

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| Fabian Lenzen Ph.D. Student at TU Munich. | <i>Fall 2022</i> |
| René Corbet Ph.D. Student at TU Graz. | <i>Spring 2019</i> |

External Examiner for Ph.D. Theses

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| Luis Scoccola , "Locally Persistent Categories And Metric Properties Of Interleaving Distances" Western University | <i>July 2020</i> |
| Arnur Nigmetov , "Comparison of Topological Summaries" TU Graz | <i>January 2020</i> |

Consulting Work

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| Data Science Consultant Bluelight AI, Inc. | <i>Fall 22 - Winter 2023</i> |
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Service at UAlbany

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| Speaker , 2023 CAS Spotlight Series | <i>Spring 2023</i> |
| Member , Search Committee for three open tenure track positions | <i>Spring 2023</i> |
| Non-member Contributor , Data Science Committee | <i>Fall 2022</i> |
| Member , Counsel on Research, UAlbany | <i>Spring 2022-present</i> |
| (Co-)Chair , Colloquium Committee, Department of Mathematics and Statistics | <i>Fall 2022-present</i> |
| Member , Colloquium Committee, Department of Mathematics and Statistics | <i>Fall 2021-Spring 2022</i> |
| Member , Graduate Committee, Department of Mathematics and Statistics. | <i>Fall 2021-Fall 2022</i> |
| Undergraduate Advisor , Actuarial Program, Department of Mathematics and Statistics. | <i>Spring 2020-Present</i> |
| Co-organizer , Applied Topology in Albany seminar | <i>Fall 2019-present</i> |

Other Service

Referee, Discrete and Computational Geometry, SIAM Journal on Imaging Sciences, ACM Symposium on Computational Geometry, ACM-SIAM Symposium on Discrete Algorithms, Foundations of Computational Mathematics, Bulletin of the AMS, Foundations of Data Science, Homology Homotopy and Applications, Journal of Applied and Computational Topology, Algebras and Representation Theory, European Symposium on Algorithms, Proceedings of the AMS (quick opinions), Transactions of the AMS (quick opinion), Advances in Mathematics (quick opinions), Oxford University Press, US Army Research Office, Department of Defense Congressionally Directed Medical Research Programs

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| Application Reviewer , Travel Support for Mathematicians Grant, Simons Foundation | <i>Summer 2023</i> |
| Program Committee Member , Multimedia Workshop, SoCG 2023. | <i>Spring 2023</i> |
| Co-organizer , Workshop on Metrics in Multiparameter Persistence, Lorentz Center, Netherlands. | <i>July 2021</i> |
| Co-organizer , Session on Applied Topology, Union College Mathematics Conference. | <i>September 2019</i> |
| Co-organizer , Tutorial on Multiparameter Persistence, Computation, and Applications, Institute for Mathematics and Its Applications, Minneapolis. | <i>August 2018</i> |
| Co-organizer , BIRS Workshop on Multiparameter Persistent Homology, Oaxaca, Mexico. | <i>August 2018</i> |
| Member , Scientific Committee, ATMCS 8, IST Austria, Vienna. | <i>June 2018</i> |
| Review Panelist , Division of Mathematical Sciences, NSF. | <i>March 2018</i> |
| Co-organizer , Fifth Annual Minisymposium on Applied Topology, SoCG, Boston. | <i>June 2016</i> |
| Co-organizer , Evening Applied Topology Seminar, Institute for Advanced Study. | <i>Spring 2016</i> |
| Co-organizer , Upper West Side Applied Topology Seminar, Columbia University. | <i>Fall 2015</i> |
| Organizer , Multidimensional Persistence Workgroup, Applied Topology Research Network, IMA. | <i>Spring 2015</i> |
| Co-organizer , School on Topological Data Analysis and Stochastic Topology, CIMAT, Guanajuato, Mexico. | <i>January 2015</i> |
| Co-organizer , Workshop on Topological Data Analysis, Kyoto University. | <i>June 2014</i> |
| Co-organizer , Mathematical Conversations Seminar, Institute for Advanced Study. | <i>Fall 2012-Spring 2013</i> |

Presentations

The Tension Between Robustness and Computability in 2-Parameter Persistence

Workshop on Applied Homological Algebra Beyond Persistence Diagrams, American Institute of Mathematics, 6/19/2023

The (Not So) Mysterious Rhomboid Bifiltration

Workshop on Topological Data Analysis and Applications, Schloss Dagstuhl, 5/7/2023

Stability of 2-Parameter Persistent Homology

Data Science and Applied Topology Seminar, CUNY Graduate Center, 4/28/2023.

The (Not So) Mysterious Rhomboid Bifiltration

Special Session on Topological Persistence, AMS Southeastern Sectional Meeting, Atlanta, 3/18/2023.

Robustness and Computation of Density-Sensitive Bifiltrations

Joint Mathematics Meetings, Boston, 1/5/2023.

Stability of 2-Parameter Persistent Homology

Department of Mathematics Colloquium, University of Oklahoma 11/17/2022.

Stability of 2-Parameter Persistent Homology

Union College Math Conference, Special Session on Applied Topology and Geometry, 6/5/2022.

Recent Progress and Current Challenges in Multiparameter Persistence

Panel on Computational Tools, Workshop on Applications of TDA, SIAM Conference on Data Mining, 4/28/2022.

Stability of 2-Parameter Persistent Homology

Applied Algebraic Topology Research Network, 2/23/2022.

ℓ_p -Distances on Multiparameter Persistence Modules

Persistence, Sheaves, and Homotopy (Online Seminar), 1/11/2022

An Introduction to Multiparameter Persistent Homology

Information, Network, and Topological Data Analysis, Pohang University of Science and Technology, 12/9/2021

ℓ_p -Distances on Multiparameter Persistence Modules

Computational Persistence Workshop, Purdue University, 11/4/2021

ℓ_p -Distances on Multiparameter Persistence Modules

Algebra Seminar, University of Iowa, 10/26/2021.

ℓ_p -Distances on Multiparameter Persistence Modules

Topological Data Analysis – Theory and Applications, Western University, 5/3/2021.

Stability of 2-Parameter Persistent Homology (2 talks)

Applied Topology in Albany (ATiA) Seminar, 6/4/2020, 6/13/2020

Computing Minimal Presentations of 2-Parameter Persistent Homology

SIAM Conference on Mathematics of Data Science, Minisymposium on Topological Data Learning, online, 6/26/2020

Studying the Shape of Data Using Topology

Lightning Talks on Artificial Intelligence, UAlbany, 4/7/2020

Computing Minimal Presentations of 2-Parameter Persistent Homology

Data Science and Applied Topology Seminar, Graduate Center, CUNY, 10/11/2019

Computing Minimal Presentations of 2-Parameter Persistent Homology

International Congress on Industrial and Applied Mathematics, Valencia, 7/16/2019

Computing Minimal Presentations of 2-Parameter Persistent Homology

SIAM Conference on Applied Algebraic Geometry, University of Bern, 7/9/2019

Multiparameter Persistent Homology and Interleavings

Bummer and Partners MathDataLab Seminar, KTH, 5/28/2019

Computational Aspects of 2-Parameter Persistent Homology

Workshop on Topology, Computation and Data Analysis, Schloss Dagstuhl, 5/20/2019

Computing Minimal Presentations and Bigraded Betti Numbers of 2-Parameter Persistent Homology

Computational Applications of Quiver Representations: TDA and QPA, Bielefeld University, 5/4/2019

Computational Aspects of 2-Parameter Persistence (Three Talks)

Algebra and Topology Seminar, SUNY Albany, 10/25/2018, 11/1/2018, 11/29/2018

Computing Minimal Presentations of Bipersistence Modules in Cubic Time

Tutorial on Multiparameter Persistence, Computation, and Applications, Institute for Mathematics and Its Applications, Minneapolis, 8/14/2018.

An Introduction to Multiparameter Persistent Homology

Tutorial on Multiparameter Persistence, Computation, and Applications, Institute for Mathematics and Its Applications, Minneapolis, 8/13/2018.

Multiparameter Persistent Homology: Future Promises

Workshop on Persistence, Representations, and Computation, Burghausen, 2/26/2018.

Quantifying Genetic Innovation: Mathematical Foundations for the Topological Study of Reticulate Evolution

TAGS: Linking Topology, Algebraic Geometry, and Statistics, Max Plank Institute, Leipzig, 2/23/2018.

Multiparameter Persistent Homology

Theoretical Biology Seminar, Department of Mathematics, Penn State, 11/28/2017.

Universality of the Homotopy Interleaving Distance

Institute for Advanced Study, Evening Applied Topology Seminar, 10/12/2017.

Universality of the Homotopy Interleaving Distance

Topological Data Analysis: Developing Abstract Foundations, Banff International Research Station, 8/1/2017.

An Introduction to Multidimensional Persistent Homology

Topology, Computation and Data Analysis, Schloss Dagstuhl, 7/17/2017.

Universality of the Homotopy Interleaving Distance

Foundations of Computational Mathematics, Universitat de Barcelona, 7/10/2017.

Universality of the Homotopy Interleaving Distance

New York Applied Topology Seminar, Columbia University, 3/31/2017

Multiparameter Persistent Homology and Interleavings

New York Applied Topology Seminar, Columbia University, 3/1/2017

Universality of the Homotopy Interleaving Distance

Applied Topology Seminar, École Polytechnique Fédérale de Lausanne, 2/21/2017

Multiparameter Persistent Homology and Interleavings

Department of Mathematics Colloquium, SUNY Albany, 2/7/2017.

Multiparameter Persistent Homology and Interleavings

Department of Mathematics, UC Davis, 2/1/2017.

Universality of the Homotopy Interleaving Distance

Union Math Conference, Union College, 12/3/2016

Introduction to Multidimensional Persistent Homology

Applied Topology Seminar, Brown University, 12/1/2016

Interactive Visualization of 2-D Persistence Modules: Mathematical Foundations

SIAM Central States Meeting, 10/1/2016.

Interactive Visualization of 2-D Persistence Modules

Algebraic Topology: Methods Computation, and Science, ISI, Torino, 7/25/2016.

Algebraic Stability of Zigzag Persistence Modules

Topology, Geometry, and Data Analysis Conference, OSU, 5/17/2016.

Interactive Visualization of 2-D Persistence Modules

Mathematics Colloquium, Rutgers-Newark, 3/9/2016.

Induced Matchings and Algebraic Stability

Evening Applied Topology Seminar, Institute for Advanced Study, 3/3/2016.

Algebraic Stability of Zigzag Persistence Modules

Algebra and Topology Seminar, SUNY Albany, 2/18/2016.

Interactive Visualization of 2-D Persistence Modules

Applied and Computational Topology Session, Joint Mathematics Meetings, Seattle, 12/9/2016.

Interactive Visualization of 2-D Persistence Modules

Workshop on Topology: Identifying Order in Complex Systems, Institute for Advanced Study, 11/7/2015.

Interactive Visualization of 2-D Persistence Modules

Seminar in Topology, University of Florida, 11/3/2015.

Algebraic Stability of Zigzag Persistence Modules

Applied Algebraic Topology Research Network, 10/6/2015.

The Stability of Persistent Homology

Applied Topology and High Dimensional Data Analysis, University of Victoria, 8/19/2015.

Interactive Visualization of 2-D Persistent Homology

Colloquium in Discretization in Geometry and Dynamics, TU Munich, 7/14/2015.

Interactive Visualization of 2-D Persistent Homology

ACAT Meeting IST Austria, 7/7/2015.

Multidimensional Persistent Homology

PNI/Intel Joint Meeting, Princeton Neuroscience Institute, Princeton University, 5/29/2015.

An Introduction to Topological Data Analysis

Intel Joint Meeting, Princeton Neuroscience Institute, Princeton University, 4/10/2015.

The (Algebraic) Stability of Persistent Homology

Algebraic Topology: Computation, Data Analysis, and Applications, University of Oxford, 2/24/2015.

Interleavings and Stability in Topological Data Analysis

Mathematics Colloquium, University of Rochester, 2/20/2015.

Universality of the Homotopy Interleaving Distance
53rd Cascade Topology Seminar, Banff Centre, Canada, 11/8/2014.

Visualizing Rank Invariants of 2-D Persistence Modules
Applied Topology Seminar, Ohio State University, 6/19/2014.

Studying the Shape of Data Using Topology
Seminario Internacional: Big Data, INFOTEC, Mexico, 6/17/2014.

Induced Matchings and the Algebraic Stability of Persistence Barcodes
2014 Symposium on Computational Geometry, Kyoto University, 6/10/2014.

The Algebraic Stability of Persistence Barcodes
TOPONETS14, University of California–Berkeley, 6/2/2014.

Universality of the Homotopy Interleaving Distance
Postdoc Seminar, Institute for Mathematics and its Applications (IMA), 3/5/2014.

Induced Matchings of Barcodes and the Algebraic Stability of Persistence
Postdoc Seminar, IMA, 11/12/2013.

Interleavings in the Theory of Persistent Homology
Postdoc Orientation Seminar, IMA, 9/17/2013.

Generalized Interleavings and Universal Distances on Filtrations
SIAM Conference on Applied Algebraic Geometry, Colorado State University, 8/2/2013.

An Introduction to Topological Data Analysis
Neuroimaging Analysis Methods Seminar, Princeton Neuroscience Institute, Princeton University, 7/26/2013.

Generalized Interleavings, Universality, and Topological Inference
Symposium on Computational Geometry, Rio de Janeiro, 6/19/2013.

Generalized Interleavings and Applications to Topological Inference (Two Talks),
Workshop on Dynamics and Applied Topology, Kyoto University, 6/10/2013, 6/11/2013.

An Introduction to Topological Data Analysis,
Rabadian Lab Meeting, Department of Bioinformatics, Columbia University, 6/4/2013.

The Optimality of the Interleaving Distance on Multidimensional Persistence Modules,
Workshop on Topology: Identifying Order in Complex Systems, Institute for Advanced Study, 3/6/2013.

Topological Data Analysis and Persistent Homology,
Thursday Morning Seminar, Simons Center for Systems Biology, Institute for Advanced Study, 2/7/2013.

Multidimensional Interleavings and Applications to Topological Inference (Three Talks),
Macpherson Evening Seminar, Institute for Advanced Study, 11/12/2012, 11/19/2012, 11/26/2012.

The Shape of Data,
After Hours Conversations, Institute for Advanced Study, 11/8/2012.

Multidimensional Interleavings and Applications to Topological Inference,
Ghrist Group Applied Topology Meeting, University of Pennsylvania, 10/4/2012.

Topological Data Analysis and Persistent Homology,
Postdoctoral Member Talk, Institute for Advanced Study, 9/28/2012.

Multidimensional Interleavings and Applications to Topological Inference,
Dissertation Defense, Stanford University, 5/25/2012.

Weak Interleavings and the Inferential Interpretation of Random Bifiltrations,
Geometrica Group Meeting, INRIA-Saclay, 2/14/2012.

Optimality of the Interleaving Distance on Multidimensional Persistence Modules,
SIAM Conference on Applied Algebraic Geometry, NC State University, 10/6/2011.

Optimality of the Interleaving Distance on Multidimensional Persistence Modules,
Seminar on Current Research in Engineering and Applied Mathematics, Stanford, 5/26/2011.

Optimality of the Interleaving Distance on Multidimensional Persistence Modules,
Computational Topology Reading Group Meeting, Stanford, 5/18/2011.

Gromov-Hausdorff Stable Signatures for Shapes Using Persistence,

Computational Toplogy Reading Group Meeting, Stanford, 3/16/2011.

Computing Multidimensional Persistence,

Computational Toplogy Reading Group Meeting, Stanford, 11/14/2010.

The Theory of Multidimensional Persistence,

Computational Toplogy Reading Group Meeting, Stanford, 3/8/2010.

Weak Witnesses for Delaunay Triangulations of Submanifolds,

Carlsson Group Applied Topology Meeting, Stanford 5/17/2007.

Hierarchical Representation of Ensembles of Dynamic Pathways,

Guibas Group Computational Geometry and Topology Meeting, Stanford, 5/1/2007.

Hierarchical Representation of Ensembles of Dynamic Pathways (Two Talks),

Carlsson Group Applied Topology Meeting, Stanford, 2/15/2007, 2/22/2007.

Applied Algebraic Topology,

CME 300 Seminar, Stanford University, 1/13/2006.