

CURRICULUM VITAE

AMIT PATEL

Assistant Professor
Department of Mathematics
Colorado State University

Born in Chicago, IL

EDUCATION

Doctor of Philosophy May 2010
Computer Science, Duke University
Advisor: Herbert Edelsbrunner

Master of Science May 2003
Computer Science, University of Illinois at Urbana-Champaign
Advisor: Jeff Erickson

Bachelor of Science May 2001
Computer Science, University of Illinois at Urbana-Champaign

ACADEMIC POSITIONS

Member September 2014 - June 2016
School of Mathematics
Institute for Advanced Study
Under supervision of Robert MacPherson

Postdoctoral Fellow September 2013 - August 2014
Institute for Mathematics and its Applications
University of Minnesota
Theme: Scientific and Engineering Applications of Algebraic Topology

Postdoc and Coadjunct Professor September 2011 - June 2013
Rutgers University
Department of Mathematics
Under supervision of Konstantin Mischaikow

Postdoctoral Researcher September 2010 - August 2011
GEOMETRICA
INRIA-Saclay
Under supervision of Frédéric Chazal

Date: January 28, 2020.

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| Postdoctoral Researcher Institute of Science and Technology Austria Under supervision of Herbert Edelsbrunner | May 2010 - August 2010 |
| Visiting Grad Student Institute of Science and Technology Austria Under supervision of Herbert Edelsbrunner | August 2009 - January 2010 |
| Visiting Grad Student Berlin Mathematical School Under supervision of Herbert Edelsbrunner | August 2007 - July 2008 |
| Intern Lawrence Livermore National Laboratories Under supervision of Valerio Pascucci | May 2006 - August 2006 |

PUBLICATIONS AND PREPRINTS

16. Amit Patel and Dustin Sauriol. *Leray Spectral Sequence for Simplicial Maps*. arXiv:1912.08288, 2019.
15. Alex McCleary and Amit Patel. *Multiparameter Persistence Diagrams*. arXiv:1905.13220, 2019.
14. Vidit Nanda and Amit Patel. *Canonical stratifications along bisheaves*. arXiv:1812.05593, 2018. Accepted to the Proceedings of the Abel Symposium 2018. To appear.
13. Alex McCleary and Amit Patel. *Bottleneck Stability for Generalized Persistence Diagrams*. arXiv:1806.00170, 2018. Accepted to the journal Proceedings of the American Mathematical Society. To appear.
12. Robert MacPherson and Amit Patel. *Persistent Local Systems*. arXiv:1805.02539, 2018.
11. Justin Curry, Amit Patel. *Classification of Constructible Cosheaves*. arXiv:1603.01587, 2016.
10. Amit Patel. *Generalized Persistence Diagrams*. Journal of Applied and Computational Topology, June 2018, Volume 1, Issue 3–4.
9. Vin de Silva, Elizabeth Munch, Amit Patel. *Categorified Reeb Graphs*. In the journal Discrete & Computational Geometry, June 2016, Volume 55, Issue 4, pp 854-906.
8. Paul Bendich, Herbert Edelsbrunner, Dmitriy Morozov, Amit Patel. *Homology and Robustness of Level and Interlevel Sets*. In the journal Homology Homotopy Appl., Volume 15, Number 1, 2013, Pages 51 - 72.
7. Frédéric Chazal, Amit Patel, Primoz Skraba. *Computing well diagrams for vector fields on \mathbb{R}^n* . In the journal Applied Mathematics Letters, Volume 25, Issue 11, November 2012, Pages 1725 - 1728.

6. Herbert Edelsbrunner, Dmitriy Morozov, Amit Patel. *Quantifying Transversality by Measuring the Robustness of Intersections*. In the journal Foundations of Computational Mathematics, Volume 11, Issue 3, June 2011.
5. Herbert Edelsbrunner, Dmitriy Morozov, Amit Patel. *The Stability of the Apparent Contour of an Orientable 2-Manifold*. In Topological Methods in Data Analysis and Visualization: Theory, Algorithms, and Applications, eds. V. Pascucci, X. Tricoche, H. Hagen, and J. Tierny. Springer-Verlag, Heidelberg, Germany, 2011.
4. Amit Patel. *Reeb Spaces and the Robustness of Preimages*, PhD thesis, Duke University, May 2010.
3. Paul Bendich, Herbert Edelsbrunner, Micheal Kerber, Amit Patel. *Persistent Homology Under Non-Uniform Error*. In Proceedings of the 35th International Symposium on Mathematical Foundations of Computer Science, 2010, pp. 12-23.
2. Paul Bendich, Herbert Edelsbrunner, Dmitriy Morozov, Amit Patel. *Robustness of Level Sets*. In Proceedings of the 18th Annual European Symposium on Algorithms, 2010, 1-10.
1. Herbert Edelsbrunner, John Harer, Amit Patel. *Reeb Spaces of Piecewise Linear Mappings*. In Proceedings of the 24th Annual Symposium on Computational Geometry, 2008, 242-250.

CONTRACTS AND GRANTS

Externally-Funded Projects as PI:

2017–2020 Reeb Spaces and Parameterized Hierarchical Clustering, NSF, \$291,284.

INVITED TALKS

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| <p><i>Persistent Homology of Level Sets</i> Summer School on Persistent Homology and Barcodes JLU Giessen - Schloss Rauischholzhausen, Germany</p> | <p>August 5–9, 2019</p> |
| <p><i>Multiparameter Persistent Homology: A New Algebraic Framework</i> Workshop on Topological Data Analysis UNESP - Rio Claro, Brazil</p> | <p>June 17–19, 2019</p> |
| <p><i>Tensors in Multiparameter Persistent Homology</i> Tensors: Algebra, Computation, and Applications University of Colorado at Boulder</p> | <p>June 3–7, 2019</p> |
| <p><i>Persistent Local Systems</i> <i>Persistence Diagrams</i> (pre-talk) Algebraic Topology Seminar University of Colorado at Boulder</p> | <p>February 26, 2019</p> |

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| Mini-Course | |
| <i>Persistence Beyond Vector Spaces</i> | February 4, 2019 |
| <i>Persistent Local Systems</i> | February 6, 2019 |
| <i>Smoothing Operator</i> | February 7, 2019 |
| Topological and Geometric Data Analysis Seminar The Ohio State University | |
| <i>My Time with Herbert Edelsbrunner</i> | June 20–21, 2018 |
| Herbert Edelsbrunner’s 60th Birthday Conference Institute for Science and Technology Austria Klosterneuburg, Austria | |
| <i>Persistent Local Systems</i> | June 4–8, 2018 |
| Abel Symposium: Topological Data Analysis Geiranger, Norway | |
| <i>Persistent Local Systems</i> | May 21–25, 2018 |
| Bridging Statistics and Sheaves Institute for Mathematics and its Applications | |
| <i>Generalized Persistence Diagrams</i> | August 1, 2017 |
| Topological Data Analysis: Developing Abstract Foundations Banff International Research Station | |
| <i>Generalized Persistence Diagrams</i> | July 10, 2017 |
| Foundations of Computational Mathematics Barcelona, Spain | |
| <i>Generalized Persistence Diagrams</i> | January 31, 2017 |
| Applied Algebraic Topology Network (webinar) Sponsored by the Institute for Mathematics and its Applications | |
| <i>Classification of Constructible Cosheaves</i> | January 4–5, 2017 |
| AMS Special Session on Sheaves in Topological Data Analysis Joint Mathematics Meetings | |
| <i>Semicontinuity of Persistence Diagrams</i> | October 2, 2016 |
| SIAM Central States Section Little Rock, Arkansas | |
| <i>Semicontinuity of Persistence Diagrams</i> | May 16 - 20, 2016 |
| Topology, Geometry, and Data Analysis @ OSU Columbus, Ohio | |
| <i>Persistence for Maps</i> | June 15 - 20, 2015 |
| Dynamics, Topology, and Computations Bedlewo, Poland | |

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| <i>Persistent Objects</i> Foundations of Computational Mathematics Conference Universidad de la República in Montevideo | December 15 - 17, 2014 |
| <i>The Persistent Homology Group</i> Topology Seminar Princeton University | December 4, 2014 |
| <i>Persistence for Maps to Manifolds</i> Workshop: Generalized Persistence and Applications American Institute of Mathematics | September 15 - 19, 2014 |
| <i>The Quillen 2-Construction for Persistence</i> Algebraic Topology - Methods, Computation and Science 6 Pacific Institute for the Mathematical Sciences | May 26 - 30, 2014 |
| <i>Persistent Sheaves for Stratified Maps</i> Topology Seminar University of Minnesota | April 14, 2014 |
| <i>Computing Well Diagrams for the Fixed Points of a Vector Field</i> Geometry and Topology Seminar Tulane University | April 3, 2014 |
| <i>Persistent Sheaves</i> Topology, Geometry and Data Seminar Ohio State University | February 28, 2014 |
| <i>Connecting Persistent Homology Groups</i> Workshop on Topological Data Analysis Institute for Mathematics and its Applications | October 7 - 11, 2013 |
| <i>Multidimensional Persistence and Sheaves</i> (series of lectures) MacPherson Seminar Institute for Advanced Study | April - May, 2013 |
| <i>Measuring the Stability of Intersections to C^0 Perturbations</i> Applied and Computational Topology 2013 SIAM Conference on Applied Algebraic Geometry | August 1 - 4, 2013 |
| <i>The Étalage of a Map</i> Topological Data Analysis and Machine Learning Theory Bannf International Research Station | October 14 - 19, 2012 |
| <i>Sheaves and Persistence</i> Applied Algebraic Topology – The Next Generation SIAM Financial Mathematics and Engineering | July 9 - 11, 2012 |

Well Groups
 Workshop on Computational Topology
 Symposium of Computational Geometry

June 17 - 20, 2012

Well Groups for Mappings to Euclidean Spaces
 Workshop on Computational Topology
 Fields Institute

November 7 - 11, 2011

Algebraic Well Groups
 SIAM Conference on Applied Algebraic Geometry

October 6 - 9, 2011

TEACHING

| Year | Semester | Course | Credit Hours | Enrollment |
|------|----------|--------------------------------------|--------------|------------|
| 2019 | Fall | Math 261: Calculus III | 4 | 91 |
| 2019 | Fall | Math 261: Calculus III | 4 | 94 |
| 2019 | Spring | Math 498: Independent Study | 4 | 1 |
| 2019 | Spring | Math 567: Abstract Algebra II | 3 | 8 |
| 2018 | Fall | Math 566: Abstract Algebra I | 3 | 16 |
| 2018 | Fall | Math 466: Abstract Algebra I | 3 | 17 |
| 2018 | Spring | Math 235: Intro to Math Reasoning | 2 | 30 |
| 2017 | Fall | Math 419: Intro to Complex Variables | 3 | 24 |
| 2017 | Spring | Math 567: Abstract Algebra II | 3 | 11 |
| 2016 | Fall | Math 566: Abstract Algebra I | 3 | 9 |

ADVISING

Undergraduate Students:

0 #Current Undergraduate Advisees: None

1 #Previous Undergraduate Advisees: Amethyst Price (PhD student at UC Santa Clara)

Current Graduate Advisees:

Alex McCleary (PhD) Prelim Nov 22, 2019 and PhD expected May 2021.

Alex Williams (PhD) expected May 2023.

Past Graduate Advisees:

Dustin Sauriol (MS Fall 2018) Engineer at ANSYS, Inc.