CURRICULUM VITAE

SPENCER BACKMAN

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1. EDUCATION AND EMPLOYMENT

• Assistant Professor, Department of Mathematics and Statistics, University of
Vermont (August 2019 - Present)
• Zuckerman STEM Postdoctoral Scholar, Einstein Institute for Mathematics,
Hebrew University of Jerusalem (January 2018 - August 2019)
• Postdoctoral Researcher, Institute for Mathematics, Goethe University of Frankfurt
SFB "Discretization and Geometry in Dynamics" A03 (April 2017 - December 2017)
• Postdoctoral Fellow, Hausdorff Center for Mathematics, University of Bonn,
Germany (January 2016 - April 2017)
• Postdoctoral Researcher, Department of Computer Science, University of Rome "La
Sapienza" (November 2014 - December 2015)
• Visiting Researcher, National Institute for Mathematical Sciences, Republic of
Korea (May 2014 - August 2014)
• Ph.D., Algorithms, Combinatorics, and Optimization from the School of
Mathematics at the Georgia Institute of Technology (Spring 2014)
• Visiting Student Researcher, Mathematics Department, University of California
Berkeley (Fall 2011 - Fall 2012)
• Math in Moscow Program (Fall 2007)
• B.A., Oberlin College, with Honors in Mathematics (2007)
• Budapest Semesters in Mathematics Program (Spring 2006)

2. FELLOWSHIPS AND AWARDS

• OVPR Express Grant UVM (2020-2021)
• Zuckerman STEM Postdoctoral Fellowship hosted by Karim Adiprasito (2017-2019)
• DFG (Die Deutsche Forschungsgemeinschaft) SFB "Discretization and Geometry in
Dynamics" A03 Fellowship hosted by Raman Sanyal (2017)

Date: September 10th, 2020.

- Top Graduate Student Award from the School of Mathematics at the Georgia Institute of Technology (2014)
- Algorithms and Randomness Center Student Fellowship (Spring 2014)
- Georgia Institute of Technology Presidential Fellowship (2008-2012)
- Algorithms, Combinatorics, and Optimization Student Fellowship (2008-2009)

3. Publications

- Geometric Bijections for Regular Matroids, Zonotopes, and Ehrhart Theory, with Matthew Baker and Chi Ho Yuen, Forum of Mathematics, Sigma, Volume 7, 2019, e45.
- Transfinite Ford-Fulkerson on a Finite Network, with Tony Huynh, Computability, Volume 7, Issue 4, January 2018, Pages 341-347.
- Fourientation Activities and the Tutte Polynomial, with Sam Hopkins and Lorenzo Traldi, European Journal of Combinatorics, Volume 67, January 2018, Pages 40-60.
- Fourientations and the Tutte Polynomial, with Sam Hopkins, Research in the Mathematical Sciences, December 2017.
- Partial Graph Orientations and the Tutte Polynomial, Advances in Applied Mathematics, Special Issue on the Tutte Polynomial, June 2017.
- Riemann-Roch Theory for Graph Orientations, Advances in Mathematics, Volume 309, pages 655-691, March 2017.
- Explicit Deformation of Lattice Ideals via Chip Firing Games on Directed Graphs, with Madhusudan Manjunath, Journal of Algebraic Combinatorics, Volume 42, Issue 4, December 2015, pages 1097D1110.
- Infinite Reduction of Divisors on Metric Graphs, European Journal of Combinatorics, Volume 35, January 2014, Pages 67-74.
- Sum-product inequalities with perturbation, with Ernie Croot, Mariah Hamel, and Derrick Hart, INTEGERS Volume 11A (2011) Proceedings of the Integers Conference 2009 in Honor of the Birthdays of Melvyn Nathanson and Carl Pomerance.

4. Preprints

- Matroid Chern-Schwartz-MacPherson Cycles and Tutte Activities, with Ahmed Ashraf.
- Simplicial Generation of Chow Rings of Matroids, with Chris Eur and Connor Simpson.
- Topological Bijections for Oriented Matroids, with Francisco Santos and Chi Ho Yuen.
- Cone Angles, Gram's Relation, and Flag-Angles, with Sebastian Manecke and Raman Sanyal.
- A Convolution Formula for Tutte Polynomials of Arithmetic Matroids and Other Combinatorial Structures, with Matthias Lenz.
- A Bijection Between the Recurrent Configurations of a Hereditary Chip-Firing Model and Spanning Trees.
- Chip-Firing and Riemann-Roch Theory for Directed Graphs, with Arash Asadi.

5. Research Talks

- Summer 2020 FPSAC Lecture (originally scheduled for Bar-Ilan University, Israel and moved online due to Covid19)
- Spring 2020 Invited Lecture at Unimodality, Log-concavity, and Beyond Conference at the Mittag-Leffler Institute in Stockholm, Sweden (canceled due to Covid19)
- Spring 2020 Geometry-Algebra-Singularities-Combinatorics Seminar, Northeastern University
- Fall 2019 Number Theory Seminar, University of Vermont
- Fall 2019 Combinatorics Seminar, University of Vermont
- Summer 2019 Vermont Summer Combo, University of Vermont
- Summer 2019 Discrete Geometry Seminar, University of Frankfurt
- Summer 2019 Arrangements at Western Workshop, University of Western Ontario
- Spring 2019 Discrete Geometry Seminar, Institute Henri Poincaré, Paris, France
- Fall 2018 Combinatorics Seminar, Hebrew University of Jerusalem, Israel
- Fall 2018 Combinatorial Geometries: Matroids, Oriented Matroids and Applications Conference, CIRM, Luminy, France
- Fall 2018 University of Vermont Mathematics Colloquium
- Fall 2018 MIT Combinatorics Seminar
- Summer 2018 FPSAC Lecture, Hanover, New Hampshire
- Fall 2017 MSRI Geometric and Topological Combinatorics Semester, MSRI Berkeley
- Summer 2017 Kombinatorik Seminar, Leipzig University
- Spring 2017 András Frank's Seminar, Eötvös Loránd University, Budapest, Hungary
- Spring 2017 Algebra Seminar, Renyi Institute, Budapest, Hungary
- Winter 2016, Discrete Mathematics, Geometry, and Optimization Seminar, University of Frankfurt
- Winter 2016, Representation Theory Seminar, Hausdorff Center for Mathematics, University of Bonn
- Fall 2016, Chip-firing and Divisors on Graphs and Complexes Special Session, AMS Sectional, Minneapolis, Minnesota
- Summer 2016, Summer Combo in Vermont, St. Michael's College.
- Spring 2016, Discrete Geometry Seminar, Freie Universität Berlin
- Spring 2016, Graph Polynomials: Towards a Comparative Theory, Dagstuhl Seminar, Schloss Dagstuhl – Leibniz Center for Informatics
- Fall 2015, Sandpile Groups Workshop, Casa Mathemática Oaxaca - Banff International Research Station (CMO-BIRS), Oaxaca, Mexico.
- Fall 2015, Le Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier (LIRMM), Montpellier, France.
- Fall 2015, Arrangements: Combinatorics and Topology Seminar, University of Fribourg, Switzerland.
- Fall 2015, Algebraic Geometry Seminar, Roma Tre University.
- Fall 2015, Joint Session of the 75th Sèminaire Lotharingien de Combinatoire and of the XX Incontro Italiano di Combinatoria Algebrica, Bertinoro, Italy.
- Summer 2015, Summer Combo in Vermont, St. Michael's College.

- Summer 2015, Workshop on New Directions for the Tutte Polynomial, Royal Holloway University of London, England.
- Spring 2015, Algebraic Geometry Seminar, Fluminense Federal University, Brazil.
- Spring 2015, Combinatorics Seminar, Georgia Tech.
- Spring 2015, Combinatorics Seminar, UC Berkeley.
- Fall 2014, Special Session on Combinatorics in Algebraic Geometry, AMS Western Sectional, SFSU.
- Fall 2014, Combinatorics Seminar, MIT.
- Summer 2014, Algebraic Geometry Seminar, Korean Institute of Advanced Study (KIAS).
- Summer 2014, Discrete Mathematics Seminar, Korean Advanced Institute of Science and Technology (KAIST).
- Spring 2014, Student Tropical Algebraic Geometry Seminar, Yale University.
- Spring 2014, Graph Theory Seminar, Georgia Tech.
- Spring 2014, Combinatorics Seminar, Georgia Tech.
- Fall 2013, Mathematics Colloquium, Reed College.
- Fall 2013, Algebra Seminar, Georgia Tech.
- Summer 2013, SIAM Conference on Applied Algebraic Geometry; Tropical Geometry and Combinatorics in Dynamical Systems Minisymposium.
- Fall 2012, Combinatorial Commutative Algebra Seminar, MSRI.
- Fall 2012, Combinatorics Seminar, Georgia Tech.
- Spring 2012, Joint University of Kaiserslautern & University of Saarlands Seminar.
- Spring 2012, Tropical Geometry Day, University of Warwick.
- Fall 2011, Chip-Firing Day, UC Berkeley.
- Fall 2011, European Conference on Combinatorics, Budapest, Hungary.
- Fall 2011, Combinatorics Seminar, University of Minnesota.

6. Refereeing Service

- Annals of Combinatorics
- Discrete Mathematics
- Electronic Journal of Combinatorics
- European Journal of Combinatorics
- Journal of Combinatorial Theory Series A
- Journal of Combinatorial Theory Series B
- Journal of Combinatorics
- New York Journal of Mathematics
- Selecta Mathematica

7. Teaching

Lead Instructor
- Fall 2019, Basic Combinatorial Theory, 173, University of Vermont
- Spring 2019, Topics in Combinatorics, 373: Matroids and Polytopes, University of Vermont
- Fall 2019, Combinatorial Graph Theory, 273, University of Vermont

- Spring 2013, Finite Mathematics, 1711, Georgia Tech

Masters Students
- Spring 2020, Patrick Mullins

Emory-Tibet Science Initiative
- Summer 2013, Emory-Tibet Science Initiative Mathematics Lecturer, Sarah College, Dharamsala, India
- Summer 2012, Emory-Tibet Science Initiative Mathematics Lecturer, Sarah College, Dharamsala, India

Substitute Instructor
- Fall 2011 UC Berkeley, Undergraduate Algebraic Geometry

Teaching Assistant
- Fall 2010, Calculus 3, 2401
- Fall 2009, Linear and Discrete Mathematics, 2602
- Summer 2009, Linear and Discrete Mathematics, 2602
- Fall 2008, Calculus 1, 1501