

Anton Dochtermann

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EDUCATION

- **Ph.D. in mathematics**, University of Washington (2007). Thesis: *The topology of graph homomorphisms*.

RESEARCH INTERESTS: Topological and algebraic combinatorics, combinatorial commutative algebra, discrete geometry.

ADVISORS: Professors Eric Babson and Isabella Novik.

- **B.A. in mathematics**, minor in art practice, UC Berkeley (2001).

EMPLOYMENT

- August 2016 - : Assistant Professor, Dept. of Mathematics, Texas State University.
- August 2014 - August 2016: Lecturer, Dept. of Mathematics, University of Texas.
- August 2012 - July 2014: Visiting Assistant Professor, University of Miami.
- August 2010 - June 2011: NSF funded MSRI postdoc position at Stanford University.
- October 2007 - June 2010: Postdoc at Technische Universität Berlin (under Günter M. Ziegler), supported by DAAD research grant and Alexander von Humboldt post-doctoral research fellowship.

TEACHING

- Spring 2017, Math 3377 (Linear algebra), Texas State University.
- Fall 2016, Math 2472 (Calculus II), Texas State University.
- Spring 2016, M 343K (Intro to Algebraic Structures), U Texas.
- Fall 2015, M 408K (Calculus) and M 343K (Intro to Algebraic Structures), U Texas.
- Spring 2015, M 340L (Linear Algebra), U Texas.
- Fall 2014, M 408K (Differential Calculus) and M 427L (Vector Calculus), U Texas.
- 2011 - 2014 (at U Miami) Abstract Algebra, Intro to Linear Algebra, Calculus I, Calculus II, Intro to Differential Equations, Applied Calculus.

PUBLICATIONS AND PREPRINTS

- (1) *Monomial ideals from restricted set chip-firing*, work in progress.
- (2) *Commutative algebra of generalized permutohedra*, with Alex Fink and Raman Sanyal, work in progress.
- (3) *Warmth and homology of graphs*, with Ragnar Freij, [arxiv.org/1511.07866](https://arxiv.org/abs/1511.07866), submitted, 20 pages.
- (4) *Face rings of cycles, associahedra, and standard Young tableaux*, Electron. J. Combin., Volume 23, Issue 3, 2016.
- (5) *Cellular resolutions via mapping cones*, with Fatemeh Mohammadi, J. Combin. Theory Ser. A 128: 180–206, 2014.
- (6) *Laplacian ideals, arrangements, and resolutions*, with Raman Sanyal, J. Algebraic Combin. 40(3):805 – 822, 2014.
- (7) *Coarse tropical type decompositions and associated cellular resolutions*, with Michael Joswig and Raman Sanyal, J. Algebra, 356: 304–324, 2012.
- (8) *Cellular resolutions of cointerval ideals*, with Alexander Engström, Math. Z. 270(1): 145–163, 2012.
- (9) *Topology of Hom complexes and test graphs for bounding chromatic number*, with Carsten Schultz, Israel J. Math 187(1): 371–417, 2012.
- (10) *Algebraic properties of edge ideals via combinatorial topology*, with Alexander Engström, Electron. J. Combin., 6(2) (Björner Festschrift Volume), 23 pages, 2009.
- (11) *Homotopy groups of Hom complexes of graphs*, J. Combin. Theory Ser. A, 116(1): 180–19, 2009.
- (12) *The universality of Hom complexes of graphs*, Combinatorica, 29 (4): 433–448, 2009.
- (13) *Hom complexes and homotopy in the category of graphs*, European J. Combin., 30(2): 490–509, 2009.
Extended abstract in Electron. Notes Discrete Math., Volume 31, 20 August 2008, 131-136, The International Conference on Topological and Geometric Graph Theory.
- (14) *Graphs with disjoint links in every spatial embedding*, with Stephen Chan, et al., J. Knot Theory Ramifications, 13(6), 737–748, 2004.
- (15) *Graphical groups and related constructions*, work in progress, 15 pages.

CONFERENCE, SEMINAR, AND COLLOQUIUM TALKS (selected)

2017 NotSoMath Austin, ‘The mathematics of gerrymandering’ (April 5, 2017)

UC Davis Combinatorics seminar (April 10, 2017)

Texas State Discrete Math Seminar (March 24, 2017)

Texas State Topology Seminar (March 3, 2017)

Texas State Math Education Seminar (March 3, 2017)

2016

AMS Special Session on ‘Chip-firing and Divisors on Graphs and Complexes’, Minneapolis (10/29/16)

FU Berlin Discrete Geometry seminar (July 7, 2016)

Eighth Conference on Discrete Geometry and Algebraic Combinatorics, UT Rio Grande Valley (May 4, 2016)

AMS Special Session on ‘Commutative algebra’, Salt Lake City (4/10/16)

Texas A&M Algebra Seminar (March 25, 2016)

AMS Special Session on ‘Combinatorial/computational commutative algebra’, Athens (3/5/16)

Sam Houston State University Colloquium (February 24, 2016).

Joint Math Meeting AMS Special Session on ‘Algebraic and Topological Methods in Combinatorics’, Seattle (1/8/16).

2015

CMO-BIRS workshop on Sandpile Groups, Oaxaca, Mexico (November 15-19, 2015)

Texas Algebraic Geometry Symposium, Texas A & M (October 24, 2015).

AMS Special Session on ‘Topological Combinatorics’, Memphis (10/17/15)

FU Berlin Discrete Math seminar (June 11, 2015)

U Texas Algebra Seminar (May 7, 2015)

AMS Special Session on ‘Algebro-geometric Methods in Graph Theory’, Las Vegas (4/18/15)

U Texas Random Structures seminar (April 10, 2015)

Texas State Discrete Math Seminar (April 3, 2015)

2014

AMS Special Session on ‘Combinatorics and Algebraic Geometry’, San Francisco (10/24/14)

U Miami Combinatorics Seminar (4/22/14)

2013

AMS Special Session on ‘Combinatorial Commutative Algebra’, Louisville (October 5, 2013)

U Miami Combinatorics Seminar (10/2/13; 1/29/13).

AIM workshop on ‘Generalizations of chip-firing and the critical group’ (July 10, 2013).

Algebra and Combinatorics Seminar, Université Montpellier 2 (June 27, 2013).

11th Nordic Combinatorial Conference (NORCOM) at KTH Stockholm (June 17, 2013).

Aalto University conference on Algebra, Combinatorics, and Number Theory, Helsinki (6/13/13).

University of Kentucky Algebra Seminar (March 22, 2013).

Ohio State University Combinatorics Seminar (March 1, 2013).

Joint Math Meeting AMS Special Session on 'Topological Combinatorics', San Diego (1/12/13).

2012

U Miami Graduate Student Seminar (February 3, 2012; October 19, 2012).

AMS Special Session on 'Algebraic and Topological Combinatorics', New Orleans (10/13/12).

U Miami Combinatorics Seminar (9/11/12; 4/3/12)

2011

CIEM Workshop on Monomial Ideals (MONICA), Castro Urdiales, Spain (July 12, 2011).

Bay Area Discrete (BAD) Math Day, SF State University (April 30, 2011).

UC Davis Combinatorics Seminar (February 4, 2011).

2010

CMS Winter Meeting, Special Session on 'Commutative Algebra and Combinatorics' (12/4/10).

UC Berkeley Student Discrete Math Seminar (November 10, 2010).

U Washington Combinatorics Seminar (Oct 13, 2010).

U Miami Combinatorics Seminar (10/4/10).

TU Berlin Discrete Geometry Seminar (6/17/10; 5/11/10)

New Mexico State U Math Department Colloquium (February 4, 2010).

New Mexico State University Algebra Seminar (February 3, 2010).

New Mexico State U Topology Seminar (February 3, 2010).

pre 2010

Dartmouth College Combinatorics Seminar (November 9, 2009, October 5, 2009)

U Washington Combinatorics Seminar (4/29/09; 1/17/07).

AMS Special Session on 'Matroids in Algebra and Geometry', San Francisco (April 25, 2009).

TU Berlin Discrete Geometry Seminar (4/9/09; 3/18/09; 10/9/08; 2/6/08).

Graph limits, Homomorphisms, and Structures Workshop held at Hranicni Zamecek, Czech Republic (January 27, 2009).

Midsummer Combinatorial Workshop, Charles University, Prague (July 29, 2008).

Topological and Geometric Graph Theory Conference, Paris (May 21, 2008).

MDS Graduiertenkolleg colloquium, Berlin (May 5, 2008).

SFSU Algebra-Geometry-Combinatorics seminar (October 27, 2006).

UC Berkeley Combinatorics Seminar (October 23, 2006).

Workshop on topological methods in combinatorics, MSRI (October 6, 2006).

GRANTS AND AWARDS

- Texas State University Library New Faculty Startup (\$900), 2017.
- Alexander von Humboldt Foundation Renewed Research stay, FU Berlin, June 20 - July 20, 2016.
- National Science Foundation Institutes Postdoc, 2010-11
- Alexander von Humboldt Foundation postdoctoral fellowship, 2008-9.
- National Science Foundation VIGRE fellowship, 2003 and 2006.
- University of Washington *Carl B. Allendoerfer Academic Excellence Award* (for outstanding performance in core courses and preliminary exams), 2002.
- Mentor for first-year instructors at the U Washington (duties included organizing a week long training session as well as mentorship of incoming grad students), Fall 2002.

OTHER ACTIVITIES

Research visits

- June 20 - July 20, 2016 - One month visit to FU Berlin Discrete Geometry group, funded as 'renewed research stay' by Alexander von Humboldt Foundation.
- June 2015 - Three week visit to FU Berlin Discrete Geometry group (Berlin, Germany)
- June 2013 - One month research visit to A. Engström's group at U Aalto (Helsinki, Finland)
- September 2009 - May 2010: Research Scholar, Department of Math, Dartmouth College (Hanover, NH).

Professional development, curriculum development

- Participant in Texas State 'Program for Excellence in Teaching and Learning', (strengthening teaching and learning, creating an awareness of various University resources, and addressing the tenure and promotion process), Fall 2016-Spring 2017.
- Participant in Flipped Calculus Instruction Training at U Texas, August 19-20, 2015.
- Participant in TIDES workshop at U Texas, April 30, 2015.
- Part of U Texas Flipped Calculus semester long workshop (duties included workshoping ideas for flipped instruction, developing official training documents), Fall 2014.

Graduate level Advising

- Member of Board of Examiners for PhD thesis of Samir Shukla (supervised by Prof. Nandini Nilakantan), IIT Kanpur, 2017.

- Committee Member for Master's Thesis of Ellen Robinson (advised by Prof. Lucas Rusnak), Texas State University, 2017-current.
- Member of Graduate Faculty, Texas State University, 2017 - current.

Undergraduate research supervised

- Mentor for U Texas Directed Reading Program (DRP) with undergrad student Jason Lin, 'Matrix Tree Theorem and Algebraic Methods in Graph Theory' (Fall 2015).
- U Texas DRP with Sergey Sambros, 'Fundamental Groups and Algebraic Topology' (Spring 2016).

Refereeing (selected)

Journal of Combinatorial Theory, Series A; European Journal of Combinatorics; Electronic Journal of Combinatorics; Topology and Its Applications; Discrete Mathematics; Journal of Algebraic Combinatorics; Israel Journal of Mathematics; Mathematica Scandinavica; Pacific Journal of Math; Journal of Combinatorics; Journal of Combinatorial Theory, Series B; Combinatorica; Nagoya Math Journal; Arkiv foer Matematik; Discrete and Computational Geometry; Communications in Algebra; Advances in Geometry.

Reviewer for Mathematical Reviews

Conference/seminar organizing

- Co-organizer (with Suho Oh) of special session on *Geometric combinatorics and combinatorial commutative algebra* at the AMS sectional meeting at U North Texas, September 9-10, 2017.
- Co-organizer (with Suho Oh) of *Algebraic Combinatorics Reading Seminar*, Fall 2016, Texas State University.
- Co-organizer (with Alex Engström and Tina O'Keefe) of special session on *Topological combinatorics and combinatorial commutative algebra* at the AMS sectional meeting at SFSU, October 25-26, 2014.
- Co-organizer (with Alex Engström) of *Topological Combinatorics Seminar*, Fall 2010 and Spring 2011, UC Berkeley.
- Organizer of weekly *Algebraic Combinatorics Seminar*, TU Berlin, Summer 2008.
- Co-organizer (with Brant Jones, Matt Kahle, and Beth Morris) of the 2007 *Graduate Student Combinatorics Conference* (GSCC), held at the University of Washington, April 21-22, 2007.
- Co-organizer of the U Washington *Student Combinatorics Seminar*, 2004 - 2007.
- Chair of the VIGRE website committee (duties include maintaining the University of Washington's VIGRE website), 2003 and 2006.

Other Service

- Member of Colloquium Committee, Department of Math, Texas State University.
- Speaker at Texas State 7th Annual Math Department Symposium and Recruitment Fair, November 18, 2016.
- Member of American Mathematical Society
- Contributor to NotSoMath, Austin (series of math-related talks/events aimed at the general public, organized by Pedro Morales from UT Austin).

January 2017