

ALEX CHANDLER, PHD

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Department of Mathematics
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RESEARCH INTERESTS

Knot theory, graph theory, low dimensional topology, topological combinatorics, categorification

ACADEMIC APPOINTMENTS

Postdoctoral Researcher University of Vienna, Austria
Supervisor: Anton Mellit *Fall 2019 to present*

EDUCATION

Ph.D. in Mathematics North Carolina State University *May 2019*
Advisor: Radmila Sazdanović
BS in Mathematics Michigan State University *May 2014*
BS in Physics Michigan State University *May 2014*

AWARDS AND HONORS

Austrian Science Fund Researchers Career Grant (€2000) *2019*
14th UNC Greensboro RMSC Best Presentation Award *2018*
National Science Foundation Travel Funding (\$2500) *2017-2019*
Research Engagement for Graduates at NCSU (\$3600) *2016*
Herbert T. Graham Scholarship (\$1000) *2014*
Harold and Helen Tolles Scholarship (3×\$3000) *2011-2013*
MSU Dean's List *2011-2014*

PUBLICATIONS

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT
Preprint available at arXiv:1811.08090
To appear in Journal of Knot Theory and its Ramifications.

CATEGORICAL DIAGONALIZATION

Chapter 23 in *Introduction to Soergel Bimodules*, pp. 461-480. Springer, Cham, 2020.
Joint with N. Karnick and D. Vagner. Based on the work of B. Elias, G. Williamson.

PREPRINTS

THIN POSETS, CW POSETS, AND CATEGORIFICATION

Preprint available at arXiv:1911.05600
Submitted for publication December 2019.

A BROKEN CIRCUIT MODEL FOR CHROMATIC HOMOLOGY THEORIES

Joint with R. Sazdanović. Preprint available at arXiv:1911.13226
Submitted for publication December 2019.

ON THE STRENGTH OF CHROMATIC SYMMETRIC HOMOLOGY FOR GRAPHS

Joint with R. Sazdanović, S. Stella, M. Yip. Preprint available at arXiv:1911.13297
Submitted for publication December 2019.

TORSION IN THIN REGIONS OF KHOVANOV HOMOLOGY

Joint with A. Lowrance, R. Sazdanović, and V. Summers. Preprint available at arXiv:1903.05760

Submitted for publication January 2019.

INVITED TALKS AND CONFERENCES

TORSION IN THIN REGIONS OF KHOVANOV HOMOLOGY

*Fall 2020***George Washington University** Topology Seminar

TORSION IN KHOVANOV HOMOLOGY OF LOCALLY THIN LINKS

*Fall 2020***North Carolina State University** Geometry and Topology Seminar

TORSION IN KHOVANOV HOMOLOGY OF LOCALLY THIN LINKS

*Spring 2019***Knots in Washington XLVII**

Distinguished Graduate Student Speaker

Slides available at: <http://alexchandler.wordpress.ncsu.edu/slides/localKIW/>

THIN POSETS AND DIAMOND TRANSITIVITY

*Spring 2019***Graduate Student Combinatorics Conference** at Drexel University

THIN POSETS, HOMOLOGY THEORIES, AND CATEGORIFICATION

*Spring 2019***JMM 2019 AMS Special Session on Not Knerds: A Community for Knot Theory**Slides available at: <http://alexchandler.wordpress.ncsu.edu/slides/thinhomcat/>

TORSION IN KHOVANOV HOMOLOGY OF 3-BRAIDS

*Spring 2019***JMM 2019 Contributed Paper Session on Low Dimensional Manifolds**Slides available at: <http://alexchandler.wordpress.ncsu.edu/slides/local/>

THIN POSETS AND DIAMOND TRANSITIVITY (won best presentation award)

*Fall 2018***The 14th Annual UNCG Regional Mathematics and Statistics Conference**Slides available at: <http://alexchandler.wordpress.ncsu.edu/slides/dt/>Poster available at: <http://alexchandler.wordpress.ncsu.edu/slides-from-talks/bc/>

THIN POSETS AND HOMOLOGY THEORIES

*Fall 2018***Combinatorics and Topology Seminar** at the University of KentuckySlides available at: <http://alexchandler.wordpress.ncsu.edu/slides/thin/>

TORSION IN KHOVANOV HOMOLOGY OF 3-STRAND TORUS LINKS

*Spring 2018***Knots in Washington XLV** at George Washington UniversitySlides available at: <http://alexchandler.wordpress.ncsu.edu/slides-from-talks/tor3br/>

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT

*Spring 2018***AMS Spring Western Sectional Meeting** at Portland State UniversitySlides available at: <http://alexchandler.wordpress.ncsu.edu/slides-from-talks/vand-2/>

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT

*Spring 2018***Graduate Student Combinatorics Conference** at the University of Texas in Dallas

A CATEGORIFICATION OF THE LAGUERRE POLYNOMIALS

*Fall 2017***Triangle Area Graduate Mathematics Conference** at North Carolina State UniversitySlides available at: <http://alexchandler.wordpress.ncsu.edu/slides-from-talks/lag/>

OUT AND ABOUT WITH TOPOLOGICAL QUANTUM FIELD THEORIES

*Fall 2017***NCSU Graduate Student Recruitment** at North Carolina State UniversitySlides available at: <http://alexchandler.wordpress.ncsu.edu/out-and-about/>

FROBENIUS ALGEBRAS AND TOPOLOGICAL QUANTUM FIELD THEORIES

*Summer 2017***Summer School in Modern Knot Theory** at the University of Freiberg

Gave 4 chalk talks and organized problem sessions on Khovanov homology

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT *Spring 2017*
Knots in Washington XLIV at George Washington University

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT *Spring 2017*
Triangle Area Graduate Mathematics Conference at Duke University

DE BRUIJN SEQUENCES AND DIACONIS' MAGIC TRICKS *Spring 2016*
Graduate Combinatorics and Algebra Seminar at NCSU

CONTRIBUTED TALKS

University of Vienna Representation Theory and Automorphic Forms Seminar:
 THIN POSETS AND CATEGORIFICATION *Fall 2019*

NCSU Geometry and Topology Working Seminar:
 DOWLIN'S SPECTRAL SEQUENCE FROM KHOVANOV TO KNOT FLOER HOMOLOGY *Spring 2019*
 SPECTRAL SEQUENCES ON KHOVANOV HOMOLOGY *Spring 2019*
 APPLICATIONS OF THE BOCKSTEIN SPECTRAL SEQUENCE *Spring 2019*
 THIN POSETS AND HOMOLOGY THEORIES *Fall 2018*
 TRISECTIONS OF 4-MANIFOLDS WITH BOUNDARY *Spring 2018*
 APPLICATIONS OF THE LIPSHITZ-SARKAR KHOVANOV HOMOTOPY TYPE *Fall 2017*
 SYMPLECTIC GEOMETRY AND DARBOUX'S THEOREM *Fall 2017*
 CLUSTER ALGEBRAS AND SHELLABILITY *Spring 2017*
 COMPUTATIONS IN HEEGAARD FLOER HOMOLOGY *Spring 2017*
 MORSE HOMOLOGY AS MOTIVATION FOR FLOER THEORY *Spring 2017*
 3-MANIFOLD TOPOLOGY AND HEEGAARD SPLITTINGS *Summer 2017*
 2D TOPOLOGICAL QUANTUM FIELD THEORIES AND FROBENIUS ALGEBRAS *Fall 2016*

MSU Algebra and Combinatorics Seminar:
 DISCRETE MORSE THEORY AND APPLICATIONS *Spring 2014*
 CYCLIC SIEVING AND YOUNG TABLEAUX *Fall 2013*
 THE CYCLIC SIEVING PHENOMENON *Fall 2013*

FUNDED CONFERENCES, SUMMER SCHOOLS AND WORKSHOPS

QFT and Manifold Invariants Research Program at PCMI *Summer 2019*
Triangle Lectures in Combinatorics at Wake Forest University *Spring 2019*
Collaborate@ICERM A Broken Circuit Model for Chromatic Symmetric Homology *Spring 2019*
Categorification in Quantum Topology at the ESI in Vienna *Spring 2019*
Classical and Quantum 3-Manifold Topology at Monash University in Melbourne *Fall 2018*
Sergey Fomin Birthday Conference at the University of Michigan *Fall 2018*
Bob Gompf Birthday Conference at the University of Texas, Austin *Summer 2018*
MSRI: Derived Categories at the University of California, Berkeley *Summer 2018*
ALGECOM at the University of Michigan *Spring 2018*
GSTGC at Michigan State University *Fall 2017*
MSRI: Soergel Bimodules at the University of California, Berkeley *Summer 2017*
Floer Homotopy Theory Summer School at UCLA *Summer 2017*
Floer Homotopy Theory Conference at UCLA *Summer 2017*
CEU Workshop: Low Dimensional Topology in Budapest, Hungary *Summer 2016*
Knots in Hellas in Ancient Olympia, Greece *Summer 2016*
Summer School in Algebraic Topology at the University of Chicago *Summer 2016*
Knots in the Triangle at North Carolina State University *Spring 2016*
Knots in Washington XLI at George Washington University *Spring 2015*

FORMER EMPLOYMENT

Graduate TA and Instructor at North Carolina State University *Fall 2014 to Spring 2019*

Preparation and presentation of lectures, supervision of group work, writing and grading tests and quizzes, grading projects and papers, preparing and grading the final exam for the course. I was instructor of record for the following courses:

Math 141	Calculus I	Fall 2015, 2016, 2017, Spring 2017
Math 242	Calculus III	Fall 2017, Spring 2016, 2018, Summer 2016, 2018

Undergraduate TA at Michigan State University *Fall 2011 to Spring 2013*

Supervisor of the math department tutoring branch outreach to the neighborhood centers. Work consisted of traveling to all 7 neighborhood centers regularly and coordinating their activities, leading large problem sessions and review sessions for precalculus, calculus I,II,III, differential equations. Additionally I worked as a recitation leader and grader for the following courses:

Math 299	Transition to Formal Mathematics	Fall 2013, Spring 2014
Math 310	Abstract Algebra I	Fall 2012
Math 411	Abstract Algebra II	Spring 2013

Discovering America Student Leader at Michigan State University *Summer 2013*

Assisted a group of 40 mathematics students from Beihang University, China in a summer program including daily lectures, weekend travel and activities, concluding with student research presentations.

SERVICE

Volunteer with Wake County Habitat for Humanity	Fall 2018
Organizer for Summer Algebraic Geometry Seminar at NCSU	Summer 2018

COMPUTER SKILLS

Experience using Excel, Mathematica, Python (Pandas, Numpy, Matplotlib, Sklearn), Sage
