

ALEX CHANDLER, PHD

University of Vienna
Department of Mathematics
alex.chandler@univie.ac.at
mat.univie.ac.at/~chandler/

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*

PUBLICATIONS

TORSION IN THIN REGIONS OF KHOVANOV HOMOLOGY
Joint with A. Lowrance, R. Sazdanović, and V. Summers. Preprint available at arXiv:1903.05760
To appear in The Canadian Journal of Mathematics

CATEGORICAL DIAGONALIZATION

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

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT

Preprint available at arXiv:1811.08090

To appear in The Journal of Knot Theory and its Ramifications

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

WORKS IN PROGRESS

HOMFLY-PT HOMOLOGY AND THE CATEGORIFIED PLETHYSTIC EXPONENTIAL
 Joint with A. Mellit. In Preparation

FOLIATIONS, OPEN BOOK DECOMPOSITIONS, AND DIGRAPH EMBEDDING HOMOLOGY
 Joint with V. Vertesi and G. Kiss. In Preparation

DAHA MODULES VIA DOUBLY PERIODIC TABLEAUX
 Joint with A. Mellit, L. Bittmann, and C. Novarini. In Preparation

INVITED TALKS AND CONFERENCES

(slides, videos, and posters available at mat.univie.ac.at/~chandler/)

ON THE STRENGTH OF CHROMATIC SYMMETRIC HOMOLOGY *Winter 2021*
JMM 2021: Special Session on Algebraic Structures Related to Knot Theory

TORSION IN THIN REGIONS OF KHOVANOV HOMOLOGY *Fall 2020*
Topology Seminar: George Washington University

TORSION IN KHOVANOV HOMOLOGY OF LOCALLY THIN LINKS *Fall 2020*
Geometry and Topology Seminar: North Carolina State University

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

TORSION IN KHOVANOV HOMOLOGY OF LOCALLY THIN LINKS *Spring 2019*
Knots in Washington XLVII: George Washington University
 Distinguished Graduate Student Speaker

THIN POSETS AND DIAMOND TRANSITIVITY *Spring 2019*
Graduate Student Combinatorics Conference: Drexel University

THIN POSETS, HOMOLOGY THEORIES, AND CATEGORIFICATION *Spring 2019*
JMM 2019: AMS Special Session on Not Knot Theory (A Community for Knot Theory)

TORSION IN KHOVANOV HOMOLOGY OF 3-BRAIDS *Spring 2019*
JMM 2019: Contributed Paper Session on Low Dimensional Manifolds

THIN POSETS AND DIAMOND TRANSITIVITY (won best presentation award) *Fall 2018*
The 14th Annual Regional Mathematics and Statistics Conference: UNCG

THIN POSETS AND HOMOLOGY THEORIES *Fall 2018*
Combinatorics and Topology Seminar: University of Kentucky

TORSION IN KHOVANOV HOMOLOGY OF 3-STRAND TORUS LINKS *Spring 2018*
Knots in Washington XLVI: George Washington University

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT *Spring 2018*
AMS Spring Western Sectional Meeting: Portland State University

A CATEGORIFICATION OF THE VANDERMONDE DETERMINANT *Spring 2018*
Graduate Student Combinatorics Conference: University of Texas in Dallas

A CATEGORIFICATION OF THE LAGUERRE POLYNOMIALS *Fall 2017*
Triangle Area Graduate Mathematics Conference: North Carolina State University

OUT AND ABOUT WITH TOPOLOGICAL QUANTUM FIELD THEORIES *Fall 2017*
NCSU Graduate Student Recruitment: North Carolina State University

FROBENIUS ALGEBRAS AND TOPOLOGICAL QUANTUM FIELD THEORIES *Summer 2017*
Summer School in Modern Knot Theory: 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: George Washington University

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

DE BRUIJN SEQUENCES AND DIACONIS' MAGIC TRICKS *Spring 2016*
Graduate Combinatorics and Algebra Seminar: North Carolina State University

CONTRIBUTED TALKS

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

Monoidal and 2-Categories in Rep. Theory and Categorification: Online *Fall 2020*
QUACKS: Online *Summer 2020*
QFT and Manifold Invariants: Research Program at PCMI *Summer 2019*
Triangle Lectures in Combinatorics: Wake Forest University *Spring 2019*
A Broken Circuit Model for Chromatic Homology: Collaborate@ICERM *Spring 2019*
Categorification in Quantum Topology: Erwin Schrödinger Institute *Spring 2019*
Classical & Quantum 3-Manifold Topology: Monash University *Fall 2018*
Sergey Fomin Birthday Conference: University of Michigan *Fall 2018*
Bob Gompf Birthday Conference: University of Texas, Austin *Summer 2018*
MSRI (Derived Categories in Algebraic Geometry): UC Berkeley *Summer 2018*
ALGECOM: University of Michigan *Spring 2018*
GSTGC: Michigan State University *Fall 2017*

MSRI (Soergel Bimodules): UC Berkeley	<i>Summer 2017</i>
Floer Homotopy Theory Summer School: UC Los Angeles	<i>Summer 2017</i>
Floer Homotopy Theory Conference: UC Los Angeles	<i>Summer 2017</i>
CEU Workshop: Low Dimensional Topology: Budapest, Hungary	<i>Summer 2016</i>
Knots in Hellas: Ancient Olympia, Greece	<i>Summer 2016</i>
Summer School in Algebraic Topology: University of Chicago	<i>Summer 2016</i>
Knots in the Triangle: North Carolina State University	<i>Spring 2016</i>
Knots in Washington XLI: George Washington University	<i>Spring 2015</i>

FORMER EMPLOYMENT

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

As an instructor, my duties included preparation and presentation of lectures, writing and grading tests and quizzes, preparing and grading the final exam for the course. I was instructor of record for the following courses:

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

Additionally, I was teaching assistant for the following courses:

Math 407	Intro to Modern Algebra	Spring 2019
Math 405	Intro to Linear Algebra	Fall 2018
Math 131	Calculus for Life Sciences A	Spring 2015
Math 141	Calculus I	Fall 2014

During Spring 2016, in addition to my teaching assistant duties, I contributed to the writing of exercise sections in the textbook “Calculus for Engineers and Scientists” by Franke, Griggs, and Norris which was used for the calculus sequence at NCSU from 2017 onward.

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

Taught large problems sessions weekly (over 100 students) for the Math Learning Center. Worked as a recitation leader and grader for the following courses:

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

In Summer 2013, assisted a group of 40 mathematics students from Beihang University, China in a summer program including daily lectures, weekend travel and activities. Organized a research group for 5 students, concluding with student research presentations to the department.

SERVICE

Wikipedia Contributor (WikiProject Mathematics)	<i>Fall 2018 to present</i>
Volunteer with Wake County Habitat for Humanity	<i>Fall 2018</i>
Organizer for Summer Algebraic Geometry Seminar at NCSU	<i>Summer 2018</i>
Discovering America Student Leader at MSU	<i>Summer 2013</i>

COMPUTER SKILLS

Sage, Mathematica, Python (Pandas, Numpy, Scikit-learn), Overleaf, Atom, Moodle, Hugo
