Alexandra (Sasha) Pevzner

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Education

University of Minnesota, Twin Cities
Ph.D. candidate in Mathematics, Advisor: Professor Victor Reiner — *Fall 2019 start*
M.S. in Mathematics — *Fall 2021*
B.S. in Mathematics, with High Distinction — *Spring 2017*

Research Interests

I am interested in commutative algebra, specifically the topics of invariant theory, graded free resolutions, and asymptotic algebra. I often find myself studying free resolutions of modules enjoying nice symmetry properties, such as a module over a ring of invariants. Such a situation allows one to use tools from both representation theory and commutative algebra to understand the module. I am also fascinated by large, overarching structures which unify many related modules over different rings, such as in the case of FI modules and GL varieties.

Papers

Symmetric Group Fixed Quotients of Polynomial Rings (Submitted.) — *2023*

Equivariant Resolutions of Veronese Rings (Submitted.) — *2022*
with Ayah Almousa, Michael Perlman, Victor Reiner, Keller Vandebogert

Alexander Duals of Symmetric Simplicial Complexes and Stanley–Reisner Ideals (Submitted.) — *2022*
with Ayah Almousa, Kaitlin Bruegge, Martina Juhnke-Kubitzke, Uwe Nagel

Invited Research Talks

Symmetric Group Fixed Quotients of Polynomial Rings — *May 2023*
KUMUNUjr, University of Nebraska, Lincoln

Facets of Simplicial Complexes with Symmetric Stanley–Reisner Ideals — *February 2023*
Combinatorics Seminar, KTH (virtual)

Alexander Duals of Symmetric Simplicial Complexes and Stanley-Reisner Ideals — *January 2023*
Combinatorial Algebra Meets Algebraic Combinatorics, University of Waterloo

Alexander Duals of Symmetric Simplicial Complexes and Stanley-Reisner Ideals — *January 2023*
Special Session on Topological and Combinatorial Methods in Commutative Algebra, JMM, Boston

Symmetric Group Fixed Quotients of Polynomial Rings — *November 2022*
Algebra and Geometry Seminar, Queen's University

Symmetric Group Fixed Quotients of Polynomial Rings — *November 2022*
Commutative Algebra Seminar, University of Michigan (virtual)

Symmetric Group Fixed Quotients of Polynomial Rings — *October 2022*
Commutative Algebra Seminar, University of Minnesota

Expository Talks

Stabilization Properties of Chains of Symmetric Ideals — *March 2022*
Student Combinatorics and Algebra Seminar

Invariant Theory and Fixed Quotients of Polynomial Rings — *October 2021*
Oral/candidacy exam presentation

Gorenstein Rings in the Context of Stanley–Reisner Theory — *April 2021*
Topics in Combinatorics course, University of Minnesota

Invariant Theory of Finite Groups *November 2020*
Graduate Online Combinatorics Colloquium

The Exchange Property of Coxeter Groups *July 2020*
Reading group on the combinatorics of Coxeter groups

Workshops and Summer Schools Attended

Syzygies and Regularity *April 2023*
University of Illinois, Chicago

WARTHOG (Topic: Infinite dimensional methods in commutative algebra) *June 2022*
University of Oregon

D-Modules, Group Actions and Frobenius: Computing on Singularities *August 2021*
ICERM (virtual)

REACT: Research Encounters in Algebraic and Combinatorial Topics *February 2021*
virtual workshop

Organizing

Minnesota Research Workshop in Algebra and Combinatorics *2023*
A weeklong workshop for University of Minnesota graduate students, alumni, and current/former postdocs in algebra and algebraic combinatorics.

Directed Reading Program *2022-2023*
A semesterly program which pairs undergraduate students with graduate student mentors to go through a mathematical reading.

Student Combinatorics & Algebra Seminar *2021-2022*
A weekly seminar featuring graduate student talks and pre-talks for the University of Minnesota Combinatorics Seminar

Graduate Student Combinatorics Conference *2021*
Session chair

Mentoring and Service

University of Minnesota Directed Reading Program (DRP) *Spring 2023, Fall 2021*
Reading project mentor

- Spring 2023: *Ideals, Varieties, and Algorithms* by Cox, Little, and O'Shea
- Fall 2021: *The Finite Simple Groups* by Wilson

Minnesota Research Workshop in Algebraic Combinatorics *Summer 2022*
Problem Proposer

- P-partition rings and linear extensions of posets

Mathematics Project at Minnesota *Winter 2020, 2021, 2023*
Workshop for underrepresented students interested in mathematics

- *Mentor (2023)*: Organized workshops for MPM participants on imposter syndrome and math puzzles; organized panel on future career opportunities
- *Counselor (2021)*: Guided participants through reading a mathematical paper and giving a presentation
- *Pal (2020)*: One-on-one mentor for workshop participants during and beyond the workshop duration

University of Minnesota Combinatorics & Algebra REU *Summer 2021*
Teaching Assistant

- TA for two research problems: (1) cyclic group invariants and (2) shellability of the augmented Bergman complex
- Presented introductory material on free resolutions; created and demonstrated Macaulay2 code
- Organized a workshop on Impostor Syndrome for all REU students
- Panelist for the industry careers panel

Teaching

University of Minnesota School of Mathematics
Lecturer

- Math 2263: Multivariable Calculus (Spring 2022)
- Math 1271: Calculus I (Fall 2018)

Teaching Assistant

- Math 2263: Multivariable Calculus (Fall 2021, Spring 2020)
- Math 3283W: Introduction to Proofs (Spring 2022, Spring 2021, Fall 2020)
- Math 1271: Calculus I (Spring 2023, Fall 2019)

UMTYMP (program for gifted high school students) Workshop Leader

- Calculus III (Fall 2022)

University of Minnesota Office of Undergraduate Education
Peer-Assisted Learning Facilitator

- Phys 1302W: Physics II, Electricity and Magnetism (Spring 2017, Spring 2016)
- Phys 1301W: Physics I, Mechanics (Fall 2016)

Awards

University of Minnesota First Year Summer Fellowship *2019*
University of Minnesota Professional Development Funding *2019*
University of Minnesota Outstanding Graduate in Mathematics *2017*

Work Experience

PeopleNet Communications, Inc. *2017-2019*
Technical Operations Engineer, Level 2 *Minnetonka, MN*

Investigated long-term technical issues with on-board computers for commercial vehicles. Searched device logs and data pathways to locate errors and identify root cause of problems. Synthesized information to communicate to customers with varying levels of technical knowledge.

Skills

Software	Macaulay2, SageMath, Mathematica
Programming	C++, Python, SQL
Languages	English (fluent), Russian (fluent), French (conversational)