Alexandra Pevzner

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Employment

Zelevinsky Postdoctoral Fellow, Northeastern University　　　　　　　*2024-2027*

Education

University of Minnesota, Twin Cities

Ph.D. in Mathematics
Advisor: Victor Reiner　　　　　　　　　　　　　　　　　　　　*2019-2024*
Thesis: *Symmetric quotients of polynomial rings and Stanley–Reisner rings*

M.S. in Mathematics
Masters/oral exam topic: *Invariant theory of finite groups*　　　　*2019-2021*

B.S. in Mathematics
with High Distinction　　　　　　　　　　　　　　　　　　　　*2013-2017*

Research Interests

Commutative algebra, with an emphasis on invariant theory and free resolutions.

Papers

Symmetric group fixed quotients of polynomial rings ⚭
Journal of Pure and Applied Algebra, Volume 228, Issue 4 (2024)

Equivariant resolutions over Veronese rings ⚭
with Ayah Almousa, Michael Perlman, Victor Reiner, and Keller VandeBogert
Journal of the London Mathematical Society, Volume 109, Issue 1 (2024)

Preprints under review

Alexander duals of of symmetric simplicial complexes and Stanley–Reisner ideals ⚭
with Ayah Almousa, Kaitlin Bruegge, Martina Juhnke-Kubitzke, and Uwe Nagel

Invited Research Talks

Special Session on Group Actions in Commutative Algebra
JMM San Francisco　　　　　　　　　　　　　　　　　　　　*Jan 2024*

Gender Equity in the Mathematical Study (GEMS) of Commutative Algebra workshop
University of Minnesota, Twin Cities　　　　　　　　　　　　　*Nov 2023*

Algebra Seminar
University of Nebraska, Lincoln　　　　　　　　　　　　　　　*Nov 2023*

Special Session on Commutative Algebra, Differential Operators, and Singularities
AMS Fall Central Sectional, Creighton University　　　　　　　　*Oct 2023*

Special Session on Combinatorial and Homological Methods in Commutative Algebra
AWM Research Symposium, Clark Atlanta University　　　　　　　*Sept 2023*

Upcoming Researchers in Commutative Algerba (URiCA) conference
University of Nebraska, Lincoln   *May 2023*

Combinatorics Seminar
KTH (virtual)   *Feb 2023*

Combinatorial Algebra meets Algebraic Combinatorics (CAAC) conference
University of Waterloo   *Jan 2023*

Special Session on Topological and Combinatorial Methods in Commutative Algebra
JMM Boston   *Jan 2023*

Algebra and Geometry Seminar
Queen's University   *Nov 2022*

Commutative Algebra Seminar
University of Michigan, Ann Arbor (virtual)   *Nov 2022*

Commutative Algebra and Algebraic Geometry Seminar
University of Minnesota, Twin Cities   *Oct 2022*

Expository talks

When are invariant rings . . . ?
Commutative Algebra Reading Seminar, University of Nebraska   *Nov 2023*

Introduction to FI modules
Student Summer Representation Theory Seminar, University of Minnesota   *Aug 2023*

Stabilization properties of chains of symmetric ideals
Student Combinatorics and Algebra seminar, University of Minnesota   *Mar 2022*

Invariant theory and fixed quotients of polynomial rings
Oral/candidacy exam presentation   *Oct 2021*

Gorenstein rings in the context of Stanley–Reisner theory ∞
Topics in Combinatorics course, University of Minnesota   *Apr 2021*

Invariant rings, Hilbert series, and reflection groups ∞
Graduate Online Combinatorics Colloquium (GOCC)   *Nov 2020*

The exchange property of Coxeter groups
Reading group on the combinatorics of Coxeter groups   *Jul 2020*

Workshops and Summer Schools Attended

`Macaulay2` **Workshop**
University of Minnesota, Twin Cities   *Jun 2023*

SLMath/CMND Summer School on Commutative Algebra and Algebraic Geometry
University of Notre Dame   *May 2023*

Workshop on Syzygies and Regularity
University of Illinois, Chicago   *Apr 2023*

WARTHOG: Infinite Dimensional Methods in Commutative Algebra
University of Oregon   *Jun 2022*

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

Research Encounters in Algebraic and Combinatorial Topics (REACT)
Virtual research workshop *Feb 2021*

Organizing

Minnesota Research Workshop in Algebra and Combinatorics ⚭
A weeklong workshop for research and network building among University of Minnesota *2023-24*
graduate students, alumni, and current/former postdocs in algebra and combinatorics.

Directed Reading Program ⚭
A semesterly program which pairs undergraduate students with graduate student mentors *2022-23*
to explore a mathematical reading together.

Student Combinatorics and Algebra Seminar
A weekly seminar showcasing graduate student talks, along with invited pre-talks for the *2021-22*
University of Minnesota Combinatorics Seminar.

Service and Mentoring

Mathematics Project at Minnesota ⚭
A weeklong workshop for underrepresented students interested in pursuing mathematics *2020-23*

    2023: Organized sessions on imposter syndrome, math puzzles, and future career opportunities
    2021: Guided small group of participants through reading and presenting a mathematical article
    2020: One-on-one mentor for participant; still maintain relationship

Directed Reading Program
Reading project mentor *2021-23*

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

Graduate Student Combinatorics Conference
University of Minnesota, Twin Cities (virtual) *2021*

    Session chair for *Combinatorics inspired by neural codes*

Software

`MatrixFactorizations` **package for** `Macaulay2`
In-progress, current code available on Github ⚭
Co-authored with David Favero, Timothy Tribone, and Keller VandeBogert

Supplemental functions for `InvariantRing` **package in** `Macaulay2`
Publicly available on Github ⚭

Teaching

University of Minnesota School of Mathematics

MATH 1271: Calculus I
    Lecturer/Instructor of Record: Fall 2018, Spring 2024 (online)
    Teaching Assistant: Fall 2019, Spring 2023

MATH 2263: Multivariable Calculus
    Lecturer/Instructor of Record: Spring 2022
    Teaching Assistant: Spring 2020, Fall 2021

MATH 3283W: Sequences, Series, and Foundations (Introduction to Proofs)
> **Teaching Assistant:** Fall 2020, Spring 2021, Fall 2022, Fall 2023

University of Minnesota Talented Youth Mathematics Program (UMTYMP) 🔗

Calculus III: Multivariable Calculus
> **Teaching Assistant:** Fall 2022

University of Minnesota REU in Combinatorics and Algebra

Virtual resolutions of points in $\mathbb{P}^n \times \mathbb{P}^m$ (mentored by Christine Berkesch)
> **Teaching Assistant:** Summer 2023
> **Students:** Isidora Bailly-Hall, Karina Dovgodko, Sean Guan, Sai Sivakumar, Jishi Sun

Invariant theory of cyclic groups (mentored by Victor Reiner)
> **Teaching Assistant:** Summer 2021
> **Students:** Swapnil Garg, Frank Lu, Kevin Ren, Brian Sun

Topology of augmented Bergman complexes (mentored by Victor Reiner)
> **Teaching Assistant:** Summer 2021
> **Students:** Elisabeth Bullock, Aidan Kelley, Kevin Ren, Gahl Shemy, Dawei Shen, Brian Sun, Amy Tao, Joy Zhang

University of Minnesota Office of Undergraduate Education

PHYS 1301W: Mechanics
> **Peer-Assisted Learning (PAL)/ Supplemental Instruction (SI) Facilitator 🔗:** Fall 2016

PHYS 1302W: Electricity and Magnetism
> **PAL/SI Facilitator:** Spring 2016, Spring 2017

Awards

Jean Roberts Fellowship ($5000 award for research outcomes and service to the department)	2024
JMM Travel Grant	2023
AWM Travel Grant	2023
Nomination for SLMath Summer School	2022
University of Minnesota First Year Summer Fellowship	2019
University of Minnesota Professional Development Funding	2019
University of Minnesota Outstanding Graduate in Mathematics	2017

Industry Experience

PeopleNet Communications, Inc.
Technical Operations Engineer, Level 2   *2017-19*
Conducted long-term technical investigation for problems with on-board computers for commercial vehicles. Searched device logs, data pathways, and source code to diagnose issues with cell, Wi-Fi, messages, and engine data processing. Communicated to customers with varying levels of technical knowledge.

Skills

Software/programming
> Macaulay2, SageMath, Mathematica, C++, Python, SQL

Languages
> **Fluent:** English, Russian
> **Conversational:** French

References

Victor Reiner (*PhD advisor*)
reiner@umn.edu

Christine Berkesch
cberkesc@umn.edu

Bryan Mosher (*concerns teaching*)
mosher@umn.edu

Uwe Nagel
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David Wehlau
david.wehlau@queensu.ca