

Nicholas Ovenhouse

Email: `nicholas.ovenhouse@yale.edu`
Website: `gauss.math.yale.edu/~no269/`

School Address:
218 Leet Oliver Memorial Hall
12 Hillhouse Ave
New Haven, CT 06511

Research Interests

I am interested in algebra, combinatorics, and geometry. Specifically, I work on topics related to *cluster algebras*, especially those that also involve

- enumerative combinatorics
- symplectic/Poisson geometry and integrable systems
- Teichmüller spaces and character varieties
- noncommutative algebra & noncommutative geometry
- Grassmannians and flag varieties

Publications & Preprints

Matrix Formulae for Decorated Super Teichmüller Spaces
(with Gregg Musiker and Sylvester Zhang)
Arxiv preprint (2022), arXiv:2208.13664

q-Rationals and Finite Schubert Varieties
Comptes Rendus Mathématique (to appear)
Arxiv preprint (2021), arXiv:2111.07912 [math.CO]

Double Dimer Covers on Snake Graphs from Super Cluster Expansions
(with Gregg Musiker and Sylvester Zhang)
Journal of Algebra, Volume 608 (2022)

Discrete Dynamical Systems from Real Valued Mutation
(with John Machacek)
Experimental Mathematics (2022)

An Expansion Formula for Decorated Super-Teichmüller Spaces
(with Gregg Musiker and Sylvester Zhang)
Symmetry, Integrability, and Geometry: Methods and Applications, Vol 17 (2021)

Noncommutative Networks on a Cylinder
(with Semeon Arthamonov and Michael Shapiro)
Arxiv preprint (2020), arXiv:2008.02889 [math.QA]

Non-Commutative Integrability of the Grassmann Pentagon Map
Advances in Mathematics 373 (2020)

Log-Canonical Coordinates for Poisson Brackets and Rational Changes of Coordinates
(with John Machacek)
Journal of Geometry and Physics 121 (2017)

Education

Ph.D. in Mathematics May 2019
Michigan State University
Advisor: Michael Shapiro
Thesis: *Log-Canonical Poisson Structures and Non-Commutative Integrable Systems*

	B.S. in Computer Science Michigan State University Minor in Mathematics	December 2012
Employment	Postdoctoral Associate Yale University	2022 ~ Present
	RTG Postdoc University of Minnesota	2019 ~ 2022
	Graduate Teaching Assistant Michigan State University	2013 ~ 2019
	Undergraduate Teaching Assistant Michigan State University	2010 ~ 2012
	Undergraduate Research Assistant Michigan State University	2011 ~ 2013
	<ul style="list-style-type: none"> • Worked on software package HOM4PS 3.0, (solves polynomial systems numerically using homotopy continuation) • Supervised by Tianran Chen and Tien-Yien Li 	
Invited Talks	<ul style="list-style-type: none"> • Michigan State University Cluster Algebras Seminar • University of Arizona Algebra Seminar • University of Connecticut Algebra Seminar • Gone Fishing Poisson Geometry Conference, Savannah GA • Workshop on Supergeometry, Fields Institute, Toronto • Paris Algebra Seminar (online) • Quantum Curves, Integrability, and Cluster Algebras, Melbourne • Online Cluster Algebra Seminar • Michigan State Combinatorics and Graph Theory Seminar • Yale Clusters and Geometry Seminar (online) • AMS Sectional, Penn State (online) • University of Arizona Hamiltonian Systems Seminar (online) • University of Wisconsin-Madison Combinatorics Seminar • Michigan State University Cluster Algebras Seminar • Notre Dame Cluster Algebras Seminar • KUMUNU Jr, Student Comm. Alg. Conference, U of Nebraska • York University Combinatorics Seminar • University of Minnesota Combinatorics Seminar • AMS Sectional, University of Michigan • Grad Student Topology/Geometry Conference, Michigan State 	<p>Nov 2022</p> <p>Nov 2022</p> <p>Sep 2022</p> <p>Apr 2022</p> <p>Mar 2022</p> <p>Dec 2021</p> <p>Dec 2021</p> <p>May 2021</p> <p>Feb 2021</p> <p>Oct 2020</p> <p>Oct 2020</p> <p>Oct 2020</p> <p>Mar 2020</p> <p>Feb 2020</p> <p>Oct 2019</p> <p>Mar 2019</p> <p>Jan 2019</p> <p>Nov 2018</p> <p>Oct 2018</p> <p>Apr 2017</p>

**Teaching
Experience**

University of Minnesota

2019 ~ 2022

- Enumerative Combinatorics
- Graph Theory
- Abstract Algebra
- Cryptology and Number Theory
- Multivariable Calculus

Michigan State University

2013 ~ 2019

- Transitions and Proofs
- Calculus I, II, and III
- Survey of Calculus
- College Algebra

**Mentoring
Experience**

Supervised Undergraduate Capstone & Honors Theses
University of Minnesota

2019 ~ 2022

- Student: Grace Ditmar
Project: Representation Theory of Symmetric Groups
- Student: Isaac Martin
Project: q -Analogues of Rational Numbers
- Student: Antonio Turley
Project: Elliptic Curve Cryptology

Mentor for Summer REU

2020

University of Minnesota

Project: Unimodality conjecture for q -rational numbers

Students: Preston Cranford & Eli Fonseca

Center for Instructional Mentoring

2015 ~ 2019

Michigan State University

Lead TA / Mentor for:

- Survey of Calculus
- Calculus II and III
- all courses (during summer semester)

Seminars Organized

Combinatorics Seminar

2020 ~ 2022

University of Minnesota

Student Algebra Seminar

2017 ~ 2019

Michigan State University

Conferences Attended

Open Problems in Algebraic Combinatorics University of Minnesota	May 2022
Gone Fishing Poisson Geometry Conference Georgia Southern University	April 2022
Workshop on Supergeometry and Bracket Structures in Math & Physics Fields Institute, Toronto	March 2022
Interdisciplinary Applications of Cluster Algebras Isaac Newton Institute, Cambridge	November 2021
AMS Sectional Meeting Penn State	October 2020
Dimers in Combinatorics and Cluster Algebras University of Michigan	August 2020
KUMUNU Jr Commutative Algebra Conference University of Nebraska	March 2019
Combinatorics & Beyond: the Many Facets of Sergey Fomin's Mathematics (conference in honor of Sergey Fomin) University of Michigan	November 2018
AMS Sectional Meeting University of Michigan	October 2018
Retakh Fest: Non-commutative Structures, Cluster Algebras, and Applications (conference in honor of Vladimir Retakh) University of Angers, France	June 2018
Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion Steklov Mathematical Institute, Moscow, Russia	June 2018
Cluster Algebras and Math Physics Michigan State University	May 2018
Algebra Extravaganza Temple University	July 2017
Cluster Algebra Spring School University of Connecticut	May 2017
"Gone Fishing" Poisson Geometry Conference Notre Dame	May 2017

Midwest Algebraic Geometry Graduate Conference April 2017
University of Illinois, Chicago

Graduate Student Topology and Geometry Conference April 2017
Michigan State University

AMS Sectional Meeting October 2015
Loyola University, Chicago

AMS Sectional Meeting March 2015
Michigan State University