

# Spencer Daugherty

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## Education.

**Ph.D. Mathematics** ..... Expected May 2024

North Carolina State University. Advisors: Laura Colmenarejo, Sarah Mason.

**B.A. Mathematics** ..... 2019

Mount Holyoke College. Major Mathematics, Minor Computer Science.

## Research Interests

**Algebraic and Enumerative Combinatorics.** I am primarily interested in problems on the quasisymmetric and noncommutative symmetric functions, specifically those surrounding Schur-like bases. I also work on projects involving chromatic symmetric functions,  $(q, t)$ -Catalan numbers, and generalized parking functions with connections to representation theory and geometric combinatorics.

## Publications and Preprints

**Extended Schur Functions and Bases Related by Involutions** ..... 2023

S. Daugherty. Extended Abstract. Submitted FPSAC 2024.

**Combinatorics of Generalized Parking Function Polytopes** ..... 2023

A. Vindas-Meléndez et al. Extended Abstract. Submitted FPSAC 2024.

**A Generalization of the Dual Immaculate Functions in Partially Commutative Variables.** ..... 2023

S. Daugherty. Preprint. arXiv:2309.08518.

**The Nimbers of Node-Kayles on Certain Families of Graphs** ..... 2020

S. Brown, S. Daugherty, E. Fiorini, B. Maldonao, S. Rainville, R. Waechter, T. Wong.

## In Preparation

**Stembridge Codes and  $e$ -positivity of Chromatic Symmetric Functions** ..... 2024

K. Celano, S. Daugherty, S. Sundaram.

## Current Projects

**Combinatorial Statistics and the  $q, t$ -Catalan Numbers** ..... In Progress

S. Daugherty, J. Lentfer.

**A Bijective Approach to Chromatic Symmetric Functions of Trees** ..... In Progress

S. Daugherty, B. Kagy, I. Klein.

## Experience

**Instructor of Record NCSU** ..... 2020-2024

Applied Differential Equations (2024), Finite Math, Calculus II, Calculus III. 6 semesters total, 60-180 students per class.

**Preparing the Professoriate Fellow NCSU** ..... 2023-2024

Professional development that gives doctoral students mentoring, teaching, and future faculty preparation experience.

<b>Math Instructor</b> NC Governor's School East .....	2022
Graph Theory. Four-week long course for gifted high school students.	
<b>Teaching Assistant</b> NCSU .....	2019-2020
Calculus I, Calculus II, Applied Differential Equations.	
<b>Researcher at the Muhlenberg College</b> REU .....	2018
Research Challenges Identifying Integer Sequences Using the OEIS	
<b>Undergraduate Research Assistant</b> Mount Holyoke College.....	2017
Tipping Points in Dynamical Systems. Supervised by Alanna Hoyer-Leitzel.	

## Talks and Posters

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### Extended Schur Functions and Bases Related By Involutions

Mid-Atlantic Algebra, Geometry, and Combinatorics Workshop Poster .....	Dec 2, 2023
University of Waterloo Seminar Talk .....	Nov 9, 2023

### Schur-like Bases of NSym and QSym: Properties of the Shin Functions

Wake Forest Colloquium Talk .....	Oct 19, 2023
NCSU Algebra and Combinatorics Seminar Talk .....	Oct 18, 2023
CAGE Seminar Talk .....	Sep 19, 2023

### Chromatic Symmetric Functions of Trees

Triangle Area Graduate Math Conference Talk .....	Sep 30, 2023
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### Combinatorial Statistics and $q, t$ -Catalan Numbers

NCSU Pure Graduate Seminar Talk .....	Sept 18, 2023
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### A Partially Commutative Generalization of the Dual Immaculate Functions

UAlbany Women in Algebra and Combinatorics Poster.....	Apr 29, 2023
AlGeCom XIII Poster .....	Apr 15, 2023
NCSU Pure Graduate Seminar Talk .....	Nov 21, 2022