

Joseph A. Compton

DOCTORAL CANDIDATE

University of North Carolina at Chapel Hill

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EDUCATION

University of North Carolina at Chapel Hill, Chapel Hill, NC

Ph.D. Mathematics

Expected May 2024

Dissertation advisor: Shrawan Kumar

Dissertation: Equivariant K-theory of partial flag varieties associated to Kac-Moody groups

Wake Forest University, Winston-Salem, NC

M.A. Mathematics

May 2018

Averett University, Danville, VA

B.S. Secondary Education (Mathematics)

May 2013

RESEARCH INTERESTS

Semisimple Lie algebras, Kac-Moody algebras, geometric methods in representation theory

PUBLICATIONS PREPRINTS

Compton, J., Kumar, S. Positivity in T-Equivariant K-Theory of Partial Flag Varieties Associated to Kac-Moody Groups. Submitted to Journal of Algebra, April 2023.

<https://arxiv.org/abs/2304.03353>

TEACHING

UNC CHAPEL HILL

Courses Taught

- Math 920: Teaching Seminar *Fall 2023*
- Math 381: Discrete Mathematics *Spring 2022, Fall 2022, Spring 2023*
- Math 233: Calculus of functions of several variables *Summer 2022, Summer 2023*
- Math 231: Calculus of functions of one variable *Summer 2021, Summer 2022*
- Math 110: College Algebra *Fall 2019, Spring 2020, Summer 2020, Fall 2020*

Recitation Leader

- Math 233: Calculus of functions of several variables *Spring 2021, Spring 2022, Summer 2023*
- Math 232: Calculus of functions of one variable II *Spring 2022, Fall 2022*
- Math 231: Calculus of functions of one variable *Fall 2021*

Assistant: Grading, holding office hours, etc.

- Math 578: Algebraic Structures *Spring 2020*
- Math 528: Mathematical Methods for the Physical Sciences *Summer 2019*
- Math 381: Discrete mathematics *Summer 2019, Summer 2020*
- Math 347: Linear Algebra *Fall 2018, Spring 2019, Summer 2021, Fall 2021*

WAKE FOREST UNIVERSITY

Graduate Teaching Assistant: Grading, holding office hours, etc. *August 2016–May 2018*

- MST 611: Introductory Real Analysis
- MST 113: Multivariable Calculus

Tutoring

- *Provided one-on-one tutoring for students in all undergraduate math courses in the Wake Forest University Math Center. Lead drop-in recitations for Calculus I, II and Multivariable Calculus.*

BASSETT HIGH SCHOOL BASSETT, VA	Mathematics Teacher <ul style="list-style-type: none"> • Lead teacher for Algebra I Honors, Algebra II, and Algebra I Inclusion 	<i>August 2014–May 2016</i>
PROFESSIONAL DEVELOPMENT IN TEACHING	Getting Started with Universal Design for Learning Center for the Integration of Research, Teaching, and Learning	<i>November 2022</i>
	Teaching Assistant Seminar UNC Chapel Hill Mathematics Department	<i>Fall 2018</i>
	National Council of Teachers of Mathematics Conference & Expo Henry County Public Schools	<i>November 2014</i>
RESEARCH ACTIVITIES CONTRIBUTED TALKS	junior Geometric Methods in Representation Theory Seminar UNC Chapel Hill “Restating Fulton’s conjecture for Kac-Moody groups”	<i>October 2023</i>
	Triangle Area Graduate Mathematics Conference North Carolina State University “Generalizing Fulton’s conjecture”	<i>September 2023</i>
	Graduate Mathematics Visions Seminar UNC Chapel Hill “Equivariant K-theory of Generalized Flag Varieties”	<i>March 2023</i>
	Graduate Mathematics Association Visions Seminar UNC Chapel Hill “An introduction to cohomology of flag varieties”	<i>January 2022</i>
CONFERENCES ATTENDED	Triangle Area Graduate Mathematics Conference North Carolina State University	<i>September 2023</i>
	Workshop on Algebra and Representation Theory, Held on Oregonian Grounds (WARTHOG) University of Oregon	<i>July 2023</i>
	Triangle Area Graduate Mathematics Conference Duke University	<i>February 2023</i>
	Joint Mathematics Meeting Boston, MA	<i>January 2023</i>
	Quantum Groups, Categorification, Knot invariants, and Soergel bimodules II (QUACKS II) University of Oregon	<i>August 2022</i>
MENTORING, OUTREACH, & SERVICE	AMS Student Chapter President UNC Chapel Hill	<i>August 2023–Present</i>
	Graduate and Professional Student Government Senator UNC Chapel Hill	<i>August 2022–May 2023</i>

Directed Reading Program Mentor

Spring 2021, Spring 2022

UNC Chapel Hill

- *Mentor for an undergraduate mathematics student in an independent learning project introducing algebraic geometry.*
- *Mentor for an undergraduate mathematics student in an independent learning project on quantum calculus.*

Paisley IB Magnet School Outreach

August 2016–May 2017

Wake Forest University

Mathematics Department volunteer for serving local middle school students working on critical thinking skills and introduction to proofs.

AWARDS &
HONORS

Senior Teaching Fellow

August 2023 - present

Fellowship awarded yearly to one graduate student in the UNC Math Department to co-teach a seminar with a faculty member with the purpose of preparing first-year math graduate students to be effective TAs and instructors.

J. Burton Linker Teaching Award Nominee

Spring 2021, Spring 2022

UNC Chapel Hill Mathematics Department

Annual award to recognize outstanding graduate student teaching in mathematics.

Graduate Teaching Assistantship

August 2016–May 2018

Wake Forest University, Department of Mathematics and Statistics

Outstanding Mathematics Student

April 2013

Averett University

Annual award to recognize outstanding achievement in mathematics.