Avery Wilson

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UNC Chapel Hill

Education

Ph.D. Mathematics, University of North Carolina at Chapel Hill, expected 2022
   Title: Geometric invariant theory and moduli of principal bundles
   Advisor: P. Belkale

B.A. Mathematics, University of Colorado at Boulder, 2015

Research Interests

- algebraic geometry, moduli problems, and representation theory, especially conformal blocks, moduli of G-bundles, and Schubert calculus of flag varieties.

Research Experience

- generalized work of P. Belkale and A. Gibney to prove finite generation of the conformal blocks algebra on $\overline{\mathcal{M}}_g$ and studied the relation of conformal blocks to compactifications of moduli of G-bundles;

- gave an explicit description of unstable loci in flag varieties $(G/B)^n$ via Schubert calculus and showed that in the case $G = \mathrm{SL}(r)$ codimension one components can always be "removed" for the purposes of moduli problems;

- continued work of P. Belkale and C. Sherman to explore scaling functions of Littlewood-Richardson coefficients and their quiver generalizations;

- (undergraduate) with N. Thiem, studied supercharacter theories of finite unipotent groups and the combinatorial properties of associated Hopf algebras

Preprints & Publications

- A. Wilson, *Compactifications of moduli of G-bundles and conformal blocks,* [arXiv:2104.07549](https://arxiv.org/abs/2104.07549) (submitted to Transformation Groups).

- A. Wilson, *Unstable divisors in flag varieties* (in preparation).

Invited Talks

- *Compactifications of moduli of G-bundles and conformal blocks,* Rutgers Algebra Seminar, May 2021.

Mentoring

- *Mentor, Directed Reading Program at UNC Chapel Hill.* Led an undergraduate in a reading course on character theory of finite groups and helped her prepare for a presentation to her peers at the end of the program. Text: *Character Theory of Finite Groups* by M. Isaacs.

Seminar Involvement

- A. Beauville's *Complex Algebraic Surfaces*, Fall 2018, directed by P. Belkale. Weekly meetings where myself and the other attendees alternated presenting a portion of Beauville's book each week.

Teaching Experience

Instructor of record at UNC Chapel Hill:

- Introduction to Mathematical Modeling (MATH 119), Summer 2018

- Precalculus: Functions and Graphs (MATH 130), Summer 2019, Summer 2020, Fall 2020, Spring 2021, Summer 2021

- Intuitive Calculus (MATH 116), Fall 2021

Recitations led:

- Calculus I (MATH 231), Fall 2017, Spring 2018

- Calculus II (MATH 232), Fall 2018

- Calculus III (MATH 233), Spring 2019, Fall 2019, Spring 2020, Summer 2021

- Calculus III Honors (MATH 233H), Fall 2019

Grading and assisting duties:

- Discrete Mathematics (MATH 381), Fall 2015, Spring 2018

- Number Theory (MATH 533), Summer 2017

- Advanced Calculus I (MATH 521), Summer 2017, Fall 2018

- Elementary Differential Equations (MATH 524), Fall 2021

- Linear Algebra for applications (MATH 547), Spring 2020, Fall 2020

- Combinatorics (MATH 548), Fall 2019