

# Shashank Pratap Singh

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## Profile

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Ph.D. candidate in Mathematics (Expected 2026) specializing in representation theory, Hopf algebras, and tensor categories. Seeking a postdoctoral position that combines advanced research in algebraic structures with meaningful teaching opportunities. Research focuses on generalizing results from classical representation theory like Gabriel's Theorem to tensor categories.

## Research Interests

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- **Primary Areas:** Representation theory, Hopf algebras, Tensor categories
- **Additional Interests:** Quiver representations, Category theory
- **Specific Focus:** Generalizations of Gabriel's theorem, Taft algebras, module categories, algebraic structures in tensor categories

## Education

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**Ph.D. in Mathematics**, University of Iowa Expected 2026  
Advisor: Prof. Ryan Kinser  
Dissertation: "Quivers and Tensor Categories: Toward a Generalization of Gabriel's Theorem"

**B.S & M.S. in Mathematics**,  
Indian Institute of Science Education and Research, Pune, India 2018  
Master's Thesis: "Class Field Theory and Tate's Thesis"

## Publications

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- **Dissertation in preparation:** "Quivers and Tensor Categories: Toward a Generalization of Gabriel's Theorem" (Draft available upon request)

## Presentations

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### Conference Presentations

- **A Quiver-Theoretic Description of Module Categories over Taft Algebras**  
Seattle Noncommutative Algebra Conference 2025, University of Washington December 2025
- **Module categories in the representation category of Taft algebras**  
QuaSy-Con III, Iowa State University November 2025
- **Algebra objects in the representation category of Taft algebras**  
AMS Sectional Meeting, St. Louis, MO October 2025
- **Tensor Algebras in the Representation Category of Taft Algebras**  
Hopf25, ULB Brussels April 2025
- **Understanding Hopf Algebra Representations through Quivers**  
AMCS-MATH Day, University of Iowa September 2024

## Seminar Talks

- **Tensor Algebras in Tensor Categories**  
Algebra Seminar, Saint Louis University November 2024
- **Tensor Algebras in Tensor Categories**  
Algebra Seminar, University of Iowa October 2024
- **Exact Module Categories and Module Algebras**  
Algebra Seminar, University of Iowa February 2024

## Outreach and General Audience Talks

- **Scissors, Shapes, and Tensor Products**  
GAUSS, University of Iowa May 2025
- **The ABCs of Algebraic Geometry**  
GAUSS, University of Iowa October 2023

## Pedagogical Training

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- **Certificate in College Teaching**, University of Iowa In Progress  
Completed coursework in curriculum design, assessment strategies, and inclusive teaching practices

## Teaching Experience

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### Instructor of Record, University of Iowa

- **College Algebra** (Spring 2023, Fall 2023, Fall 2024, Fall 2025)  
Taught in a coordinated multi-section course (typically 15–20 sections) with 35–40 students per section. Collaborated with other instructors to maintain consistent standards and assessments across all sections
- **Elementary Functions** (Fall 2022)  
Taught full course with 35–40 students, responsible for all aspects of instruction

### Teaching Assistant, University of Iowa

- **Introduction to Abstract Algebra** (Spring 2025)  
Led discussion sections and provided individualized student support
- **Engineering Math I: Single Variable Calculus** (Spring 2022)  
Conducted discussion sessions and graded assignments
- **Qualifying Exam Preparation Seminars (Algebra)** (Summer 2023)  
Organized and led intensive review sessions for graduate students

## Tutoring and Academic Support

- **Math Platoon** (Spring 2022, Spring 2025, Fall 2025)  
Provided specialized tutoring support for army veterans enrolled in university mathematics courses
- **Math Tutorial Lab** (Spring 2022, 2023, 2025; Fall 2022, 2023, 2024, 2025)  
Delivered comprehensive tutoring services to students across various mathematics courses

## Technical Skills

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- **Mathematical Software:** SageMath, L<sup>A</sup>T<sub>E</sub>X
- **Programming:** Python, C++
- **Mathematical Typesetting:** Advanced L<sup>A</sup>T<sub>E</sub>X, TikZ, Beamer

## Awards and Fellowships

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- **Erwin and Peggy Kleinfeld Scholar,**  
Department of Mathematics, University of Iowa Fall 2023–Spring 2026
- **Kleinfeld Math Graduate Recruitment Fellowship,**  
Department of Mathematics, University of Iowa Fall 2021–Summer 2022
- **INSPIRE Scholarship,**  
Department of Science & Technology, India Fall 2013–Spring 2018

## Service and Outreach

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- **Directed Reading Program** (Fall 2024)  
Mentored undergraduate student Grant Trentz in Cryptography and Number Theory
- **Graduate Student Reading Group Organizer**  
Selected materials and coordinated weekly discussions for 6–8 graduate students:
  - Hopf Algebras (Spring 2024)
  - Lie Algebras and their Representations (Fall 2023)
  - Tensor Categories (Spring 2023)