# Prerna

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## EDUCATION

**University of Kentucky**    Lexington, KY
*Doctor of Philosophy*    *Expected May 2028*
- Current GPA: 4.0/4.0

**Indian Institute of Technology**    Bombay,India
*Masters in Science*    *May 2022*
- Msc in Mathematics
- CPI: 8.38/10.0

**Maharishi Dayanand University**    Haryana,India
*Bachelors in Science*    *Aug 2020*
- Mathematics Honors
- Percentage: 84.44%

## RESEARCH

**Graduate Researcher**    2023–Present
*University of Kentucky, Advisor: Prof. Bert Guillou*    *Lexington, Kentucky*
- Computing Integral homology, Effective Algebraic $K$-theory, and Very Effective Hermitian $K$-theory of geometric classifying spaces $BC_{2^n}$ ($n > 1$) using motivic Adams and Atiyah–Hirzebruch spectral sequences over $\mathbb{C}$ and $\mathbb{R}$ (manuscript in preparation).
- Extending these calculations to finite fields $\mathbb{F}_q$ for $q \equiv 1, 3 \pmod 4$.
- Analysing multiplicative structures, hidden extensions, and higher operations arising in these spectral sequences, with emphasis on comparisons between classical and motivic settings.
- Explored the $C_2$-equivariant Adams spectral sequence converging to $RO(C_2)$-graded homotopy groups of $ko^{C_2}$, and its connection with $\mathbb{R}$-motivic homotopy theory, with plans to extend these computations in the $C_2$-equivariant setting.

**Summer Collaborative Workshop**    Summer 2025
*Workshop in Virginia, with J.D. Quigley, Rebecca Field, et al.*    *Virginia, USA*
- Collaborated on extending classical computations to the motivic setting for $BC_2$, including integral motivic homology, effective algebraic K-theory, and very effective Hermitian K-theory.
- Gained hands-on experience with differentials, higher operations, and hidden extensions in the motivic Adams spectral sequence.
- Explored interactions between classical and motivic cohomology operations in a collaborative problem-solving environment.

**Algebraic Topology Project (with Prof. Saurav Bhaumik)**    Jan 2022 – Apr 2022
*Indian Institute of Technology - IIT*    *Bombay, India*
- Reviewed literature on algebraic topology, focusing on fundamental groups.
- Computed fundamental groups using covering spaces and deck transformations.
- Explored compact Riemann surfaces of genus $g$ and projective spaces of dimension $n$.

**Borsuk-Ulam Theorem Project (with Prof. Rekha Santhanam)**    May 2021 – Aug 2021
*Indian Institute of Technology - IIT*    *Bombay, India*
- Studied Borsuk-Ulam Theorem and its implications.
- Investigated connections to Brouwer Fixed Point Theorem and Tucker's Lemma.
- Applied results to prove the Ham Sandwich Theorem.

## Teaching Experience

**Primary Instructor**
*University of Kentucky*

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| **MA 111: Intro to Contemporary Mathematics (Synchronous)** | Summer 2025 |
| **MA 109: College Algebra** | Spring 2025 |

**Recitation Leader**

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| **MA110: Algebra and Trig for Calculus** | Aug 2025 – Dec 2025 |
| **MA114: Calculus II** | Aug 2024 – Dec 2024 |
| **MA113: Calculus I** | Aug 2023 – May 2024 |

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| **Mentor – Summer of Science, Mathematics and Physics Club** | June 2022 – Aug 2022 |
| *Indian Institute of Technology* | *Bombay, India* |

- **Focus areas:** Number Theory, Group Theory
- Mentored students from diverse backgrounds in advanced math.
- Encouraged teamwork through weekly problem-solving sessions.

## Publications

***Very effective algebraic and Hermitian $K$-theory of the cyclic group of order two***, with R. Field, A. Nigam, J. D. Quigley, and A. J. Yang. Preprint available, arXiv:2509.25006, 2025.

## Conference Attended

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| **Equivariant, Motivic, and Physical Topology, Midwest Conference** | October 24-26, 2025 |
| *School of Mathematics* | *University of Minnesota* |
| **Mid Atlantic Topology Conference** | March 22-23, 2025 |
| *Mathematics Department* | *University of Virginia* |
| **Graduate Student Topology and Geometry Conference** | April 12-14, 2024 |
| *Mathematics Department* | *Indiana University, Bloomington.* |
| **Midwest Topology Seminar** | Nov. 2-3, 2024 |
| *Mathematics Department* | *University of Chicago* |
| **Graduate Student Topology and Geometry Conference** | April 12-14, 2024 |
| *Mathematics Department* | *Michigan State University, Michigan.* |
| **Midwest Topology Seminar** | March 16-17, 2024 |
| *Mathematics Department* | *Loyola University Chicago* |

## Position of Responsibility

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| **Pre- qualified Chair** | Aug 2025 - Present |
| *Graduate Student Council* | *Department of Mathematics, UKY* |
| **Secretary** | Aug 2025 - Present |
| *Association of Women in Math* | *University of Kentucky, Lexington* |
| **Treasurer** | Aug 2025 - Present |
| *Spectra* | *Department of Mathematics, UKY* |
| **President** | Aug 2024 - July 2025 |
| *Indian Wildcats Association* | *University of Kentucky, Lexington* |
| **Department Coordinator** | Aug 2021 - May 2022 |
| *Mathematics Department* | *IIT, Bombay* |