

Hargun Bhatia

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GRADUATE STUDENT, DEPARTMENT OF MATHEMATICS, UC SAN DIEGO

EDUCATION

University of California San Diego (UCSD), La Jolla, CA

Ph.D. Mathematics

Advisor: Claus Sorensen

M.A. Mathematics

GPA: 4.0/4.0

Sep '21 - Jun '27 (expected)

Sep '21 - Mar '23

Indian Institute of Technology Kanpur, Uttar Pradesh, India

Bachelor of Science, Mathematics and Scientific Computing

Mathematics GPA: 9.83/10 Overall GPA: 9.58/10

Jul '17 - May '21

RESEARCH INTERESTS

Number theory and representation theory, particularly mod- p representations of p -adic groups and their connections to the local Langlands program. Specific interests include admissibility and duality in derived categories of smooth representations, differential graded Hecke algebras, and higher mod- p Satake transforms.

PUBLICATIONS AND PREPRINTS

- *Higher mod- p Satake transforms: Explicit formulas and images for GL_2* with Yashi Jain, Casey Perdue, Ben Savoie (preprint: [arXiv:2610.13203](https://arxiv.org/abs/2610.13203))
- *Cohomology of complex supertori* with Soumya Ganguly, Zhiyuan Jiang, Jeffrey Rabin, Steven Sam (preprint: [arXiv:2606.02903](https://arxiv.org/abs/2606.02903))

TALKS

- *Representations of p -adic groups*, The San Marcos Informal Mathematics In-Person Colloquium, CSU San Marcos, October 6, 2026.
- *Explicit generalized mod p Satake transforms*, Department Seminar, IIT Kanpur, October 17, 2025.
- *Some problems on the derived category of smooth mod- p representations*, Advancement to PhD Candidacy, UC San Diego, April 23, 2025.
- *Explicit generalized mod p Satake transforms*, Number Theory Seminar, UC San Diego, April 16, 2025.

TEACHING AND MENTORSHIP

Associate Instructor, UCSD

Summer 2026

- Selected for the Summer Graduate Teaching Scholars (SGTS) program. Independently taught Math 20D (Introduction to Differential Equations), an accelerated five-week course with approximately 25 students. Developed the syllabus and exams, delivered 30 hours of lectures, and coordinated discussion sections with the teaching assistant.

Teaching Assistant, UCSD

- Math 20A (Calculus For Science & Engineering)
- Math 20D (Introduction to Differential Equations)
- Math 180A (Introduction to Probability)
- Math 187A (Introduction to Cryptography)
- Math 103A (Modern Algebra I)
- Math 100C (Abstract Algebra III)
- Math 187A (Introduction to Cryptography)
- Math 100A (Abstract Algebra I)
- Math 103B (Modern Algebra II)
- Math 100C (Abstract Algebra III)

Fall 2026
Spring 2026
Winter 2026
Fall 2025
Summer 2025
Spring 2025
Winter 2025
Fall 2024
Summer 2024
Spring 2024

- Math 103B (Modern Algebra II)	Winter 2024
- Math 103A (Modern Algebra I)	Fall 2023
- Math 103B (Modern Algebra II)	Summer 2023
- Math 187A (Introduction to Cryptography)	Spring 2023, Winter 2023, Fall 2022
- Math 103B (Modern Algebra II)	Summer 2022
- Math 10B (Calculus II)	Spring 2022
- Math 20A (Calculus For Science & Engineering)	Winter 2022, Fall 2021

Instructor, Monsoon Math Camp *Jul '21*

- Co-taught a course on “Proof of Leibniz Formula”, which related algebraic and analytic methods in number theory, to a group of highly motivated high school students of India.

Project Mentor, Stamatics, IIT Kanpur *Apr '21 - Jul '21*

- Co-mentored a group of 5 first year undergraduate students on reading the book *Topics in Algebra* by *I.N. Herstein*, gave assignments and conducted weekly problem solving sessions.

SEMINAR	<i>Cohomology of p-adic Chevalley groups</i> (Co-organized with Casey Perdue)	<i>Fall '25</i>
ORGANIZATION	<i>Representations of p-adic groups</i> (Co-organized with Casey Perdue)	<i>Fall '24 & Winter '25</i>
	<i>Automorphic Representations</i> (Co-organized with Chris Xu, Online)	<i>Fall '22 & Winter '23</i>

CONFERENCES	The Australian Direction , University of Utah, Salt Lake City	<i>Aug '26</i>
AND	Arithmetic cycles, Modular forms, and L-functions , CRM, Montréal	<i>Aug '25</i>
WORKSHOPS	Mathematical Congress of the Americas (MCA) 2025 , Miami	<i>Jul '25</i>
ATTENDED	Western Algebraic Geometry Symposium (WAGS) 2025 , UBC, Vancouver	<i>Apr '25</i>
	Arizona Winter School 2025 , University of Arizona, Tucson	<i>Mar '25</i>
	Modular Forms, L-functions, and Eigenvarieties , ENS, Paris	<i>Jun '24</i>
	2024 Lagenhop Lecture & SIU Conference , SIU, Carbondale	<i>May '24</i>
	Arizona Winter School 2024 , University of Arizona, Tucson	<i>Mar '24</i>
	Introductory Workshop: Algebraic Cycles, L-Values, and Euler Systems , SLMath, Berkeley	<i>Jan '23</i>
	Southern California Number Theory Day 2022 , UC Irvine	<i>Sept '22</i>
	A Pair of Automorphic Workshops (APAW) 2022 , University of Oregon, Eugene	<i>Jul '22</i>
	Special Program on p-adic L-functions and Eigenvarieties , University of Notre Dame, Notre Dame	<i>Jul '22</i>
	Conference on Homotopy Theory with applications to Arithmetic and Geometry , The Fields Institute, Toronto	<i>Jun '22</i>
	ICTS workshop on Elliptic Curves and Special Values of L-functions (Online)	<i>Aug '21</i>
	Visiting Students' Research Programme , TIFR, Mumbai	<i>Jun '19</i>

HONORS & FELLOWSHIPS	James B. Ax Graduate Fellowship , UC San Diego	<i>2021</i>
	General Proficiency Medal , IIT Kanpur	<i>2021</i>
	- For best academic performance in the Department of Mathematics and Statistics	
	Academic Excellence Award , IIT Kanpur	<i>2018, 2019</i>
	- For outstanding academic performance during each of the academic sessions	
	Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship , Department of Science and Technology, Govt. of India	<i>2017</i>

LANGUAGES AND SKILLS	Hindi (Native), English, French (Beginner) C, C++, Python (NumPy, Pandas, PyTorch), MATLAB, SageMath, L ^A T _E X
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