

Hargun Preet Singh Bhatia

GRADUATE STUDENT, DEPARTMENT OF MATHEMATICS, UC SAN DIEGO

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EDUCATION	University of California San Diego (UCSD), La Jolla, CA Ph.D. Mathematics Advisor: Claus Sorensen M.A. Mathematics GPA: 4.0/4.0 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	Sep '21 - Jun '27 (<i>expected</i>) Sep '21 - Mar '23 Jul '17 - May '21																														
RESEARCH INTERESTS	Number Theory and Representation Theory: mod- p representations of p -adic groups and their connections to the mod- p and p -adic local Langlands program																															
PUBLICATIONS, PREPRINTS AND PAPERS IN PREPARATION	• <i>Higher mod-p Satake transforms: Explicit formulas and images for GL_2</i> with Yashi Jain, Casey Perdue, Ben Savoie (preprint: arXiv:2610.13203) • <i>Cohomology of complex supertori</i> with Soumya Ganguly, Zhiyuan Jiang, Jeffrey Rabin, Steven Sam (preprint: arXiv:2606.02903)																															
TALKS	• <i>Representations of p-adic groups</i>, The San Marcos Informal Mathematics In-Person Colloquium, CSU San Marcos, October 6, 2026. • <i>Explicit generalized mod p Satake transforms</i>, Department Seminar, IIT Kanpur, October 17, 2025. • <i>Some problems on the derived category of smooth mod-p representations</i>, Advancement to PhD Candidacy, UC San Diego, April 23, 2025. • <i>Explicit generalized mod p Satake transforms</i>, Number Theory Seminar, UC San Diego, April 16, 2025.																															
GRADUATE LEARNING SEMINARS	These are the Learning Seminars (mostly organized by graduate students at UCSD) that I have participated in: <table><tr><td>Cohomology of p-adic Chevalley groups (Co-organized with Casey Perdue)</td><td>Fall '25</td></tr><tr><td>Katz-Mazur Arithmetic moduli of elliptic curves</td><td>Winter '25</td></tr><tr><td>Representations of p-adic groups (Co-organized with Casey Perdue)</td><td>Fall '24 & Winter '25</td></tr><tr><td>Coleman's 'p-adic Banach Spaces' paper (Online)</td><td>Fall '24</td></tr><tr><td>Infinity Categories</td><td>Winter '24</td></tr><tr><td>Mazur's torsion theorem</td><td>Fall '23</td></tr><tr><td>Étale cohomology</td><td>Summer '23</td></tr><tr><td>Fargues-Fontaine Curve</td><td>Spring '23</td></tr><tr><td>Condensed Math</td><td>Spring '23</td></tr><tr><td>Bruhat-Tits Theory</td><td>Winter '23</td></tr><tr><td>Faltings' proof of Mordell Conjecture</td><td>Winter '23</td></tr><tr><td>Automorphic Representations (Co-organized with Chris Xu, Online)</td><td>Fall '22 & Winter '23</td></tr><tr><td>Deligne's Weil-II Theorem</td><td>Fall '22</td></tr><tr><td>Abelian Varieties</td><td>Summer '22</td></tr><tr><td>Weil cohomology in practice</td><td>Summer '22</td></tr></table>		Cohomology of p -adic Chevalley groups (Co-organized with Casey Perdue)	Fall '25	Katz-Mazur Arithmetic moduli of elliptic curves	Winter '25	Representations of p -adic groups (Co-organized with Casey Perdue)	Fall '24 & Winter '25	Coleman's ' p -adic Banach Spaces' paper (Online)	Fall '24	Infinity Categories	Winter '24	Mazur's torsion theorem	Fall '23	Étale cohomology	Summer '23	Fargues-Fontaine Curve	Spring '23	Condensed Math	Spring '23	Bruhat-Tits Theory	Winter '23	Faltings' proof of Mordell Conjecture	Winter '23	Automorphic Representations (Co-organized with Chris Xu, Online)	Fall '22 & Winter '23	Deligne's Weil-II Theorem	Fall '22	Abelian Varieties	Summer '22	Weil cohomology in practice	Summer '22
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Global class field theory	<i>Spring '22</i>
Arithmetic of Elliptic Curves	<i>Winter '22</i>

CONFERENCES AND WORKSHOPS ATTENDED	The Australian Direction , University of Utah, Salt Lake City	<i>Aug '26</i>
	Arithmetic cycles, Modular forms, and L-functions , CRM, Montréal	<i>Aug '25</i>
	Mathematical Congress of the Americas (MCA) 2025 , Miami	<i>Jul '25</i>
	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>

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)	Fall 2026
	- Math 20D (Introduction to Differential Equations)	Spring 2026
	- Math 180A (Introduction to Probability)	Winter 2026
	- Math 187A (Introduction to Cryptography)	Fall 2025
	- Math 103A (Modern Algebra I)	Summer 2025
	- Math 100C (Abstract Algebra III)	Spring 2025
	- Math 187A (Introduction to Cryptography)	Winter 2025
	- Math 100A (Abstract Algebra I)	Fall 2024
	- Math 103B (Modern Algebra II)	Summer 2024
	- Math 100C (Abstract Algebra III)	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	<i>Jul '21</i>
	- 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	<i>Apr '21 - Jul '21</i>
	- Co-mentored a group of 5 first year undergraduate students on reading the book <i>Topics in Algebra</i> by <i>I.N. Herstein</i> , gave assignments and conducted weekly problem solving sessions.	

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>
	National Talent Search Scholarship (NTSE) , National Council of Educational Research and Training, Govt. of India	<i>2015</i>

LANGUAGES AND SKILLS	Hindi (Native), English, French (Beginner)
	C, C++, Python (NumPy, Pandas, PyTorch), MATLAB, SageMath, $\text{\LaTeX}$

REFERENCES	• Dr. Claus Sorensen	csorensen@ucsd.edu
	• Dr. Aaron Pollack	apollack@ucsd.edu
	• Dr. Florian Herzig	herzig@math.toronto.edu
	• Dr. Leesa B. Anzaldo (teaching)	lbanzaldo@ucsd.edu
