

Curriculum Vitae

PALLAV GOYAL

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Education/Employment

- 2023 – Visiting Assistant Professor, University of California, Riverside
- 2023 Ph.D. University of Chicago, Mathematics (Advisor: Victor Ginzburg)
Thesis - Almost commuting scheme of symplectic matrices and quantum Hamiltonian reduction
Committee members - Victor Ginzburg, Alexander Beilinson
- 2019 M.S. University of Chicago, Mathematics
- 2017 B.S. Indian Institute of Technology Kanpur, Mathematics and Scientific Computing with a Minor in Algorithms

Research interests

Representation Theory, Symplectic Geometry, Algebraic Geometry, Combinatorics

Academic honors and awards

- 2017 – 2019 McCormick Fellowship, University of Chicago (2 years, \$6,000)
- 2017 Fellow, Visiting Scholars Research Program, Tata Institute of Fundamental Research, Mumbai
- 2017 Director's Gold Medal, Indian Institute of Technology Kanpur
- 2017 General Proficiency Medal, Indian Institute of Technology Kanpur
- 2016 Fellow, S.N. Bose Scholars Program, Science and Engineering Research Board, Government of India
- 2015 J N Kapur Prize, Indian Institute of Technology Kanpur
- 2014 – 2016 Academic Excellence Award, Indian Institute of Technology Kanpur
- 2013 Infosys Award 2013, Infosys Foundation (1 year, ₹15,000)
- 2013 Bronze medal, 54th International Mathematical Olympiad, Santa Marta, Colombia
- 2012 Scholar, Kishore Vaigyanik Protsayan Yojana, Department of Science and Technology, Government of India (5 years, ₹300,000)
- 2009 Scholar, National Talent Search Examination, National Council of Education, Research and Training (4 years, ₹24,000)

Publications

5. (with Peter Samuelson) (In preparation) *Hall algebra of restricted representations and Shifted quantum loop algebras*
4. (In preparation) *Chevalley Restriction Theorem in Type C and Cherednik algebras over algebraic curves*
3. *Almost commuting scheme of symplectic matrices and quantum Hamiltonian reduction*, Algebras and Representation Theory (2024), **27** (2024), 1645-1669
2. *Invariant Theory of finite general linear groups modulo Frobenius powers*, Communications in Algebra, **46** (2018), no. 10, 4511-4529
1. (with Santosha Pattanayak) *Projective Normality of G.I.T. quotient varieties modulo Finite Groups*, Communications in Algebra **45** (2016), no. 7, 2996-3004

Talks and presentations

- 2025 Mar. UC Riverside Representation theory seminar: Bridgeland's theorem on the Hall algebra construction of the full quantum group
- Mar. Washington University at St. Louis (Gone Fishing): Shifted quantum loop algebras and Hall algebras
- Feb. UCLA Algebra seminar: Hall algebras of $\mathfrak{sl}_2$ -modules over positive characteristic and shifted quantum loop algebras

- 2024 Oct. UC Riverside Representation theory seminar: Representations of $\mathfrak{sl}_2$ over positive characteristic and Hall algebras
- Jul. IIT Kanpur Collouquium: Classical Mechanics and Hamiltonian reduction
- May University of Georgia (Representation Theory and Related Geometry: Progress and Prospects): Chevalley restriction theorem for algebraic curves
- Apr. UW Milwaukee (AMS Spring Sectional): Chevalley restriction theorem for algebraic curves
- Apr. Northwestern University (Gone Fishing): Chevalley restriction theorem for algebraic varieties and Cherednik algebras
- 2023 Nov. UC Riverside Algebraic Geometry seminar: Mechanics and Hamiltonian reduction
- Aug. IIT Bombay Colloquium: Almost commuting variety and quantum Hamiltonian reduction
- Aug. TIFR Mumbai Colloquium: Almost commuting variety and quantum Hamiltonian reduction
- May University of Chicago 3-minute thesis: Classical mechanics and almost commuting variety
- Apr. University of Notre Dame Algebraic Geometry and Commutative Algebra seminar: Almost commuting variety and quantum Hamiltonian reduction
- 2022 Sep. UChicago WOMP: Classical Mechanics and Hamiltonian reduction
- Apr. UChicago Student Representation Theory seminar: Generalizations of the Chevalley Restriction Theorem
- Feb. UChicago Pizza seminar: Mathematics of Shoelacing
- 2021 Nov. UChicago Student Representation Theory seminar: An introduction to rational Cherednik algebras
- Feb. UChicago Student Algebraic Geometry seminar: An introduction to fibred categories
- 2020 Oct. UChicago Student Representation Theory seminar: Deformation theory of associative algebras and Hochschild cohomology
- Mar. UChicago Student Representation Theory seminar: Category $\mathcal{O}$ in positive characteristic
- 2019 Nov. UChicago Student Representation Theory seminar: Borel-Weil-Bott theorem
- Oct. UChicago Student Representation Theory seminar: An introduction to Category $\mathcal{O}$
- 2018 Jun. UChicago first Year seminar: Harishchandra isomorphism
- 2017 Jul. TIFR Mumbai VSRP presentations: The First Fundamental Theorem on invariants of actions of linear algebraic groups
- Apr. IIT Kanpur Departmental seminar: Invariant Theory of General Linear Groups over Finite Fields
- 2016 Jun. UW Madison S.N. Bose Scholars presentations: Invariant Theory of General Linear Groups over Finite Fields
- 2015 Oct. IIT Kanpur Topology and Algebraic Geometry seminar: Diamond Lemma and its applications

Other achievements

- 2021 , 2024 Finalist, Indian Sudoku Championship
- 2013 - 2014 Finalist, International Collegiate Programming Contest, Amritapuri Regionals

Organizing activities

Conferences and other meetings

- 2024 Oct. Organizer (with Peter Samuelson and Boris Tsvelikhovskiy), Special session on Non-commutative Algebras in Representation Theory and Topology at the AMS Western Sectional at UC Riverside, CA
- 2024 May Volunteer, Mathematical Pathways to an Excellent Future at UC Riverside, CA

Graduate seminars and other activities

- 2020 Fall Organizer (with Ignacio Darago), UChicago Student Representation Theory Seminar on Deformation Theory and Deligne's Conjecture
- 2020 Wint. Organizer (with Ignacio Darago), UChicago Student Representation Theory Seminar on Perverse Sheaves and Kazhdan-Lusztig Conjectures

- 2019 Fall Organizer (with Ignacio Darago), UChicago Student Representation Theory Seminar on $\mathcal{D}$ -modules and Beilinson-Bernstein Localization
- 2019 Sep. Organizer (with Hao Lee), WOMP UChicago, Warmup and Orientation Program for incoming math graduate students

Referee and review activities

- *Transformation Groups* referee
- *zbMATH Open* reviewer
- *Math Reviews* reviewer

Other community outreach

- 2017 – 2019 Lecturer at Knowledge Center for Success (KCS) Bhilai: Gave lectures on several topics including Recurrence relations, Ceva's theorem and Pigeonhole principle geared towards training high school students for mathematical olympiads
- 2014 – 2017 Academic mentor, Academics Core team member and Coordinator at Counselling Service IIT Kanpur: Helped organize and gave lectures as well as provided one-to-one mentoring to students facing difficulties in mathematics classes at IIT Kanpur
- 2013 Volunteer at Help Student India Bhilai: Gave mathematics lectures to students from economically weaker sections of the society and trained them for competitive exams

Teaching activities

Personal development

- 2023 Winter College Teaching Certificate: Program offered by Chicago Center for Teaching to help instructors reflect on their pedagogical style and to learn and implement better teaching practices through seminars, workshops and feedback from professionals
- 2022 Fall Academic and Professional Writing (LRS): Course offered by the Writing Program (UChicago) on tools for making academic research and technical writing more lucid and effective for readers
- 2022 Spring Workshop on Inclusive Teaching, Chicago Center for Teaching
- 2022 Winter Seminar and Workshop on Teaching statement and Portfolio, Chicago Center for Teaching
- 2021 Fall Fundamentals of Teaching in Science: Workshop series offered by Chicago Center for Teaching focused on teaching methodologies for teaching college courses in STEM fields
- 2020 Spring College Teaching and Course Design: Course offered by Chicago Center for Teaching on student-centered pedagogical strategies for designing and implementing an undergraduate course

Courses taught at UC Riverside

- 2025 Spring Introduction to Discrete Structures (Math 11/CS 11)
- 2025 Spring Introduction to Ordinary Differential Equations for Physical Sciences and Engineering (Math 45/EE 20)
- 2025 Winter Precalculus: An Introduction to Functions I (Math 6A)
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- 2024 Fall Introduction to Discrete Structures (Math 11/CS 11)
- 2024 Fall Introduction to Discrete Structures (Math 11/CS 11)
- 2024 Spring First-year Calculus (Math 9A)
- 2024 Spring Calculus for Life Sciences II (Math 7B)
- 2024 Winter Calculus for Life Sciences I (Math 7A)
- 2024 Winter Polynomials and Number Systems (Math 140)
- 2023 Fall First-year Calculus (Math 9A)
- 2023 Fall Calculus: Several variables (Math 10B)

Courses taught at UChicago

2022	Fall	Calculus II (Math 15200)
2022	Winter	Studies in Mathematics II (Math 11300)
2021	Fall	Mathematical Methods for Social Sciences (Math 19520)
2021	Spring	Calculus III (Math 15300)
2021	Winter	Linear Algebra (Math 19620)
2020	Fall	Linear Algebra (Math 19620)
2020	Spring	Elementary Functions and Calculus III (Math 13300)
2020	Winter	Elementary Functions and Calculus II (Math 13200)
2019	Fall	Elementary Functions and Calculus I (Math 13100)

Recitations led at UChicago

2019	Spring	Analysis in $\mathbb{R}^n$ (Math 20300)
2019	Winter	Abstract Linear Algebra (Math 20250)
2018	Fall	Representation theory of finite groups (Math 26700)

Courses graded for at UChicago

2020	Spring	Algebra III (Math 32700)
2019	Fall	Calculus III (Math 15300)

Mentoring activities

Undergraduate students advised (while at UChicago)

2023	Spring	Charles Benello: Polynomial time algorithm for primality testing
2023	Winter	William Hu: Representation theory of finite groups
2022	Fall	Jakob Wellington: Elliptic curves cryptography
2022	Summer	Alex Sheng: Elliptic curves with complex multiplication
2022	Spring	Andrey Shapiro: Spectral graph theory
2022	Winter	Alex Sheng: Invariant theory of finite groups
2021	Fall	Drew Melman-Rogers: Adjoint functor theorem
2021	Summer	Ben Goldman: An overview of Lie Theory and Peter-Weyl Theorem
2021	Summer	Henry Hale: Representations of quivers and Gabriel's theorem
2021	Summer	John Naughton: Schubert calculus and enumerative geometry
2021	Spring	Judson Kuhrman: Representation theory of compact Lie groups
2021	Winter	Yuchen Chen: Linear algebraic groups
2020	Fall	Ruochuan Xu: An introduction to knot theory
2020	Summer	Sayali Gove: Probabilistic methods in combinatorics
2020	Summer	Anushka Murthy: Introduction to matroids
2020	Summer	Yueheng Zhang: Spectral graph theory
2020	Spring	Neil Mauskar: Fourier analysis
2020	Winter	Claudia Yao, Ajay Mitra: Representation theory of complex semisimple Lie algebras
2019	Fall	Thiviya Kumaran: Deep learning
2019	Spring	Elizabeth Ombrellaro: Group theory and ring theory
2019	Winter	Spencer Dembner: Dirichlet's class number formula for imaginary quadratic fields
2018	Fall	Roy McKenzie: An introduction to generating functions