Keshav Dahiya

Curriculum Vitae

Department of Mathematics,
Indiana University - Indianapolis,
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Research Interests

Quantum Algebras, Representation Theory, and Integrable Systems

Education

2021 - 2026*	**Ph.D. in Mathematics,** Purdue School of Science, Indianapolis Advisor: Evgeny Mukhin Thesis: *Intertwiners of representations of quantum affine algebras and superalgebras*
2018 - 2020	**M.S. in Mathematics,** Indian Institute of Technology, Delhi Advisor: Biplab Basak Thesis: *Triangulation of manifolds*
2013 - 2015	**M.Tech. in Information and Communication Technology,** Indian Institute of Technology, Delhi Advisor: Brejesh Lall Thesis: *Signal reconstruction from its noisy sub-band components* (Link)
2010 - 2015	**B.Tech. in Electrical Engineering,** Indian Institute of Technology, Delhi

Publications and Preprints

2026	K. Dahiya and E. Mukhin, *On classification of finite dimensional irreducible representations of the quantum affine superalgebra of type D(2|1;x),* in preparation
2026	E. Bodish and K. Dahiya, *The dynamical Weyl group and the R-matrix for the spin representation of orthogonal quantum algebras;* in preparation
2026	K. Dahiya and E. Mukhin, *Intertwiners of representations of exceptional type quantum affine superalgebras;* in preparation
2025	K. Dahiya and E. Mukhin, *Intertwiners of representations of twisted quantum affine algebras,* J. Math. Phys. **66** (2025), no. 5, Paper No. 051703, 24 pp. (Editor's Pick) | DOI | arXiv
2025	K. Dahiya and E. Mukhin, *Intertwiners of representations of untwisted quantum affine algebras and Yangians revisited,* J. Math. Phys. **66** (2025), no. 5, Paper No. 051701, 40 pp. (Editor's Pick) | DOI | arXiv

Teaching Experience

	Adjunct Visiting Lecturer, Indiana University, Bloomington, IN
Spring 2026	MATH-M-106: Mathematics of Decision and Beauty
	Instructor of Record, Indiana University, Indianapolis, IN
Fall 2025	MATH-I-110: Fundamentals of Algebra
Summer 2025	MATH-I-165: Analytic Geometry and Calculus II
Spring 2025	MATH-I-165: Analytic Geometry and Calculus I
	Instructor of Record, Purdue University, Indianapolis, IN
Fall 2024	MA 16010: Applied Calculus I
	Instructor of Record, Indiana University - Purdue University, Indianapolis, IN
Spring 2024	MATH 166-00: Analytic Geometry and Calculus II
Fall 2023	MATH 166-00: Analytic Geometry and Calculus II
Summer 2023	MATH 110-00: Fundamentals of Algebra
Spring 2023	MATH 171-00: Multidimensional Mathematics
Fall 2022	MATH 165-00: Analytic Geometry and Calculus I
	Recitation Leader, Indiana University - Purdue University, Indianapolis, IN
Spring 2022	MATH 166-00: Analytic Geometry and Calculus II
	Teaching Assistant, Indian Institute of Technology, Delhi
Fall 2014	EEL 205: Signals and Systems

Invited Talks

Oct 2025	**Mathematical Physics Seminar** Purdue University, West Lafayette, IN
Oct 2024	**Quantum Groups and Representation Theory Conference** North Carolina State University, Raleigh, NC
Mar 2024	**14th Southeastern Lie Theory Conference** University of Virginia, Charlottesville, VA

Seminar Talks

	Representation Theory Seminar, Indiana University, Indianapolis, IN
Dec 2025	*Finite W-Algebras*
Nov 2025	*The BRST Cohomology*
Mar 2025	*The quantum determinant for Yangian of* $\mathfrak{gl}_n$
Mar 2025	*Transfer matrices for Yangian of* $\mathfrak{gl}_n$
Feb 2025	*Fusion of R matrices*
Oct/Nov 2024	*MacDonald polynomials*

Sep 2024	*Howe duality and quantum Weyl group*
Dec 2023	*Crystal bases for $U_q\mathfrak{sl}_n$ and Young tableaux*
Jan/Feb 2023	*The $\mathfrak{gl}_m \times \mathfrak{gl}_n$ duality*
Sep 2022	*The Pfaffian using Grassmann variables*
Mar/Apr 2022	*The Gelfand-Tsetlin algebras and representations of symmetric groups*
Dec 2021	*Characters of representations of finite groups*

	***K*-Theory Seminar,** Indiana University, Indianapolis, IN
May/Jun 2024	*Generalized cohomology of complex vector bundles*

	Graduate Student Seminar, Indiana University, Indianapolis, IN
Dec 2025	*Invariant subspaces of nilpotent operators*
Apr 2023	*Quantum computing: Shor's algorithm*
Oct 2022	*Tilings by regular vertices*
Mar 2022	*Geometric group theory: Quasi-isometry, the Svarc-Milnor lemma*
Dec 2021	*Spectral bounds in graph theory*
Mar 2021	*Discrete Fourier transform, the convolution theorem and FFT algorithm*

Scholarships and Awards

2026	**Charalambos D. Aliprantis Prize** Indiana University, Indianapolis
2024	**Outstanding Advanced Mathematics Graduate Student Award** Purdue School of Science, Indianapolis
2022	**Outstanding Beginning Mathematics Graduate Student Award** Purdue School of Science, Indianapolis
2021 - 2022	**Graduate Student Scholarship** Purdue School of Science, Indianapolis

Professional Service

2024	**Journal Reviewer,** *Transformation Groups, Volume 29*
2023	**Journal Reviewer,** *Journal of Mathematical Physics, Volume 64*

Projects

Fall 2025	*Image Caption Generator* (GitHub) The Erdős Institute, Deep Learning Bootcamp
Summer 2025	*Quantum Hamming code* (GitHub) The Erdős Institute, Quantum Computing Bootcamp

Summer 2025	*Quantum state preparation* (GitHub) The Erdős Institute, Quantum Computing Bootcamp
Summer 2025	*Quantum circuit for constrained optimization* (GitHub) The Erdős Institute, Quantum Computing Bootcamp
Spring 2022	*q-characters of quantum affine algebras* (GitHub) Advisor: Evgeny Mukhin, Purdue School of Science, Indianapolis
Fall 2012	*Captcha recognition* Advisor: Sumeet Agarwal, Indian Institute of Technology, Delhi
Fall 2012	*3-D object rendering using ray tracing* Advisor: Subodh Kumar, Indian Institute of Technology, Delhi
Spring 2012	*Guidance system for visually impaired* Advisor: Ranjan Bose, Indian Institute of Technology, Delhi

Professional Experience

2015 - 2018	**Ed-Tech Business Founder,** Delhi, India • Built a web application using PHP and JavaScript on a private domain to deliver virtual lessons to IIT aspirants. • Designed and taught interactive online Mathematics and Physics lessons integrating problem-solving exercises.
Summer 2013	**Computer Vision Intern,** Qualcomm, Hyderabad, India • Developed Android applications for real-time edge, corner and face detection, and contour generation in the mobile camera video using FastCV SDK. • Designed user interfaces in Java and implemented native Android functionality in C++ on top of FastCV SDK.

Referees

Evgeny Mukhin
Professor of Mathematics
Department of Mathematical Sciences,
Indiana University, Indianapolis
Email: emukhin@iu.edu
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Vitaly Tarasov
Professor of Mathematics
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Daniel Ramras
Associate Professor of Mathematics
Department of Mathematical Sciences,
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Roland Roeder
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