

# Kang Lu

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## Employment

- Aug 2022–Present **Mary Ann Pitts Research Associate and Lecturer**, *UNIVERSITY OF VIRGINIA*.  
Mentor: [Weiqiang Wang](#)
- Sep 2020–Jul 2022 **Visiting Assistant Professor**, *UNIVERSITY OF DENVER*.  
Mentor: [Andrew Linshaw](#)

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## Education

- 2014–2020 **Ph.D. in Mathematics**, *Indiana University Purdue University Indianapolis*.  
Advisors: [Evgeny Mukhin](#) & [Vitaly Tarasov](#)
- 2012–2014 **M.S. in Mathematics**, *Zhejiang University*.  
Advisor: Gang Han
- 2006–2010 **B.S. in Mathematics**, *Fudan University*.  
Advisor: Meng Chen

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## Research Interests

- Representation Theory
- Mathematical Physics
- Quantum Groups
- Quantum Integrable Systems

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## Publications

16. [Kang Lu](#), *Isomorphism between twisted  $q$ -Yangians and affine  $q$ quantum groups: type AI*, to appear in [Int. Math. Res. Not. IMRN](#), [arXiv:2308.12484](#).
15. [Kang Lu](#), *On Bethe eigenvectors and higher transfer matrices for supersymmetric spin chains*, [J. High Energ. Phys.](#) **04** (2023), Article number: 120.
14. [Kang Lu](#), *Schur-Weyl duality for quantum toroidal superalgebras*, [J. Pure Appl. Algebra](#) **227** (2023), no. 9, 107382.
13. [Kang Lu](#), *Completeness of Bethe ansatz for Gaudin models associated with  $\mathfrak{gl}(1|1)$* , [Nuclear Phys. B](#) **980** (2022), 115790.
12. [Kang Lu](#), *A note on odd reflections of super Yangian and Bethe ansatz*, [Lett. Math. Phys.](#) **112** (2022), Article no.: 29.
11. [Kang Lu](#), *Gelfand-Tsetlin bases for representations of super Yangian and quantum affine superalgebra*, [Lett. Math. Phys.](#) **111** (2021), Article no.: 145.
10. [Kang Lu](#) and [Evgeny Mukhin](#), *Bethe ansatz equations for orthosymplectic Lie superalgebras and self-dual superspaces*, [Ann. Henri Poincaré](#) **22** (2021), no. 12, 4087–4130.

9. Kang Lu and Evgeny Mukhin, *Jacobi-Trudi identity and Drinfeld functor for super Yangian*, [Int. Math. Res. Not. IMRN](#) **2021** (2021), no. 21, 16749-16808.
8. Kang Lu and Evgeny Mukhin, *On the supersymmetric XXX spin chains associated to  $\mathfrak{gl}_{1|1}$* , [Commun. Math. Phys.](#) **386** (2021), 711-747.
7. Kang Lu, *Perfect integrability and Gaudin models*, [SIGMA](#) **16** (2020), 132, 10 pages.
6. Chenliang Huang, Kang Lu, and Evgeny Mukhin, *Solutions of  $\mathfrak{gl}_{m|n}$  XXX Bethe ansatz equation and rational difference operators*, [J. Phys. A: Math. Theor.](#) **52** (2019), no. 37, 375204, 31 pages.
5. Kang Lu and Evgeny Mukhin, *On the Gaudin model of type  $G_2$* , [Commun. Contemp. Math.](#) **21** (2019), no. 3, 1850012, 31 pages.
4. Gang Han, Yucheng Liu, and Kang Lu, *Multiplicity free gradings on semisimple Lie and Jordan algebras and skew root systems*, [Algebra Colloq.](#) **26** (2019), no. 1, 123-138.
3. Kang Lu, *Lower bounds for numbers of real self-dual spaces in problems of Schubert calculus*, [SIGMA](#) **14** (2018), 046, 15 pages.
2. Kang Lu, Evgeny Mukhin, and Alexander Varchenko, *Self-dual Grassmannian, Wronski map, and representations of  $\mathfrak{gl}_N$ ,  $\mathfrak{sp}_{2r}$ ,  $\mathfrak{so}_{2r+1}$* , [Pure Appl. Math. Q.](#) **13** (2017), no.2, 291-335, special issue in honor of Yuri Manin's 80-th birthday.
1. Kang Lu, Evgeny Mukhin, and Alexander Varchenko, *On the Gaudin model associated to Lie algebras of classical types*, [J. Math. Phys.](#) **57** (2016), no. 10, 101703, 23 pages.

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### Submitted for Publication

1. Kang Lu, Weiqiang Wang, and Weinan Zhang, *A Drinfeld type presentation of twisted Yangians*, [arXiv:2308.12254](#).
2. Kang Lu, Weiqiang Wang, and Weinan Zhang, *Affine  $\imath$ quantum groups and twisted Yangians in Drinfeld presentations*, [arXiv:2406.05067](#).
3. Kang Lu and Weinan Zhang, *A Drinfeld type presentation of twisted Yangians of quasi-split type*, [arXiv:2408.06981](#).
4. Kang Lu, *Twisted super Yangians of type AIII and their representations*, [arXiv:2311.16373](#).
5. Kang Lu, *Twisted super Yangians of quasi-split type A*, [available here](#).

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### In preparation

1. Kang Lu, Lucas Tappeiner, Lewis Topley, Yung-Ning Peng and Weiqiang Wang, *Shifted twisted Yangians and finite  $\mathcal{W}$ -algebras*, in preparation.
2. Kang Lu, Weiqiang Wang, and Alex Weekes, *Shifted twisted Yangians and fixed point loci of affine Grassmannian slices*, in preparation.

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### Teaching

University of Virginia

2025 Spring MATH 3350: Applied Linear Algebra  
 2024 Fall MATH 8710: Lie Algebras  
 2024 Summer MATH 7305: Problems in Analysis  
 2024 Spring MATH 2310: Calculus III  
 2023 Spring MATH 3351: Elementary Linear Algebra  
 2022 Fall MATH 3310: Basic Real Analysis

#### University of Denver

2022 Summer MATH 1952: Calculus II  
 2022 Spring MATH 2070: Introduction to Differential Equations  
 2022 Spring MATH 2080: Calculus of Several Variables  
 2022 Winter MATH 1951: Calculus I  
 2022 Winter MATH 1150: Mathematics for Cryptography  
 2021 Autumn MATH 1951: Calculus I  
 2020 Spring MATH 1952: Calculus II  
 2020 Winter MATH 1150: Introduction to Cryptography  
 2020 Winter MATH 2070: Introduction to Differential Equations  
 2020 Autumn MATH 1951: Calculus I

#### Indiana University Purdue University Indianapolis

2020 Summer MATH 16500: Calculus and Analytic Geometry I  
 2020 Spring MATH 22100: Calculus for Technology I  
 2019 Fall MATH 15400: Trigonometry  
 2019 Summer MATH 26600: Ordinary Differential Equations  
 2019 Spring MATH 22100: Calculus for Technology I  
 2018 Fall MATH 11100: Intermediate algebra  
 2018 Summer MATH 15400: Trigonometry  
 2018 Spring MATH 11000: Fundamentals of Algebra  
 2017 Fall MATH 16500: Calculus and Analytic Geometry I, (Recitation)

#### Mentoring

Sep 2024–Present **Qualifying Exam Study Sessions**, *Analysis*, Mentor, UNIVERSITY OF VIRGINIA.  
 Sep 2024–Present **Undergraduate directed reading**, *Spectra of graphs*, Mentor, UNIVERSITY OF VIRGINIA.  
 Mentee: Giovanni Mazzeo  
 Jan 2024–Sep 2024 **Undergraduate directed reading**, *Representation theory and symmetric polynomials*, Mentor, UNIVERSITY OF VIRGINIA.  
 Mentee: Henghui Li  
 Sep 2023–Jan 2024 **Undergraduate directed reading**, *Convex optimization and machine learning*, Mentor, UNIVERSITY OF VIRGINIA.  
 Mentee: Alex Ning

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## Services

- Apr 2025 **Spring 2025 AMS Eastern Sectional Meeting, Special Session on Recent progress on categorification and quantum groups**, Co-organizer, UNIVERSITY OF CONNECTICUT.
- Sep 2024–Present **Undergraduate directed reading**, *Committee member*, UNIVERSITY OF VIRGINIA.
- Sep 2024–Present **Workshop Series on Technology**, *Organizer*, UNIVERSITY OF VIRGINIA.
- Aug 2023–Present **Algebra Seminar**, *Co-organizer*, UNIVERSITY OF VIRGINIA.
- Oct 2023–Mar 2024 **14th Southeastern Lie Theory Workshop** , *Quantum Structures in Lie Theory*, UNIVERSITY OF VIRGINIA, Co-organizer.

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## Referee Services

- Algebras and Representation Theory ( $\times 2$ )
- Arnold Mathematical Journal
- Communications in Mathematical Physics ( $\times 2$ )
- Compositio Mathematica
- International Mathematics Research Notices
- Journal of Algebra
- Journal of Mathematical Physics ( $\times 2$ )
- Journal de l'École polytechnique - Mathématiques (Quick Opinion)
- Letters in Mathematical Physics
- Pacific Journal of Mathematics
- SciPost Physics
- Symmetry, Integrability and Geometry: Methods and Applications (SIGMA) ( $\times 3$ )
- Transformation Groups ( $\times 2$ )

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## Honors/Awards

- *Yuri Abramovich Memorial Scholarship*, Indiana University Purdue University Indianapolis, Department of Mathematical Sciences (2017, 2019)
- *Outstanding Advanced Graduate Student*, Indiana University Purdue University Indianapolis, Department of Mathematical Sciences (2016)
- *Charalambos D. Aliprantis Prize*, Indiana University Purdue University Indianapolis, Department of Mathematical Sciences (2015)
- *Outstanding Beginning Graduate Student*, Indiana University Purdue University Indianapolis, Department of Mathematical Sciences (2015)
- *First Year Fellowship from School of Science*, Indiana University Purdue University Indianapolis (2014)

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## Invited Talks

- May 4-5, 2024 **2024 Spring Western Sectional Meeting, Special Session on Geometry, Integrability, Symmetry and Physics**, San Francisco State University, CA.  
Talk: A Drinfeld presentation for twisted Yangians of quasi-split type

- Mar 1-3, 2024 **14th Southeastern Lie Theory Workshop**, *University of Virginia*, Charlottesville, VA.  
Talk: A Drinfeld presentation for twisted Yangians via degeneration
- Nov 29, 2023 **Online Talk via TencentMeeting**, *Yunnan University of Finance and Economics*, Kunming, Yunnan, China.  
Talk: Representations of twisted Yangians of type AIII
- May 12-14, 2023 **13th Southeastern Lie Theory Workshop**, *North Carolina State University*, Raleigh, NC.  
Talk: A Drinfeld presentation of twisted Yangians
- Apr 26, 2023 **Algebra Seminar**, *University of Virginia*, Charlottesville, VA.  
Talk: A Drinfeld presentation of twisted Yangians
- Mar 13-14, 2021 **2021 AMS Spring Southeastern Sectional Meeting**, *Special Session on Superalgebras, Quantum Groups, and Related Topics*.  
Talk: Skew representations of super Yangian
- Nov 19, 2021 **NCTS Seminar on Representation Theory**, *Taiwan*, Zoom.  
Talk: Representations of Super Yangian
- Mar 11, 2021 **Rocky Mountain Representation Theory Seminar**, Zoom.  
Talk: Skew representations of super Yangian
- Feb 17, 2021 **Representations and Lie Theory seminar**, *Ohio State University*, Zoom.  
Talk: Skew representations of super Yangian
- Oct 19, 2020 **Algebra and Logic Seminar**, *University of Denver*, Denver, CO.  
Talk: Gaudin model, Feigin-Frenkel center, and Grassmannian
- Nov 15, 2019 **Algebra Seminar**, *University of Virginia*, Charlottesville, VA.  
Talk: Jacobi-Trudi identity, Berezinian, and transfer matrices
- Oct 04, 2019 **Physically inspired mathematics seminar**, *University of North Carolina*, Chapel Hill, NC.  
Talk: Supersymmetric quantum spin chains
- Apr 13-14, 2019 **2019 AMS Spring Eastern Sectional Meeting**, *University of Connecticut*, Hartford, CT.  
Talk: On the supersymmetric XXX spin chain associated to  $\mathfrak{gl}_{1|1}$
- Mar 15-17, 2019 **2019 AMS Spring Southeastern Sectional Meeting**, *Auburn University*, Auburn, AL.  
Talk: Self-dual Grassmannian and Representations of  $\mathfrak{gl}_N$ ,  $\mathfrak{sp}_{2r}$ , and  $\mathfrak{so}_{2r+1}$
- Apr 1-2, 2017 **2017 AMS Spring Central Sectional Meeting**, *Indiana University*, Bloomington, IN.  
Talk: Bethe ansatz method in Gaudin Model

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## Presentations

- Oct 12-15, 2024 **Quantum Groups and Representation Theory**, *On the occasion of Kailash Misra's 70th birthday*, North Carolina State University, NC.  
Contributed Talk: A Drinfeld presentation of twisted Yangians

- Apr 15-16, 2023 **2023 AMS Spring Central Sectional Meeting, Special Session on Representation Theory, Geometry and Mathematical Physics**, University of Cincinnati, OH.  
Talk: Representations of twisted super Yangians of type AIII
- Jan 15-18, 2020 **Joint Mathematics Meetings 2020**, Colorado Convention Center, Denver, CO.  
Talk: On the supersymmetric XXX spin chains
- Aug 12-16, 2019 **Representation Theory and Integrable Systems**, ETHZ, Zurich, Switzerland.  
Contributed Talk: On the supersymmetric XXX spin chain associated to  $\mathfrak{gl}_{1|1}$
- May 29-Jun 2, 2017 **Representation Theory at the Crossroads of Modern Mathematics**, Université de Reims Champagne Ardenne, Reims, France.  
Poster: Self-dual Grassmannian and Representations of  $\mathfrak{gl}_N$ ,  $\mathfrak{sp}_{2r}$ , and  $\mathfrak{so}_{2r+1}$

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## Participation in Conferences and Workshops

- May 27-31, 2024 **Representation Theory and Related Geometry: Progress and Prospects**, On the occasion of Daniel K. Nakano's 60th birthday, University of Georgia, GA.
- May 1-3, 2024 **Advances in Lie Theory, Representation Theory And Combinatorics: Inspired By The Work of Georgia M. Benkart**, MSRI, University of California, Berkeley, CA.
- April 6-7, 2024 **2024 Spring Eastern Sectional Meeting, Special Session on Recent Developments in Noncommutative Algebra and Tensor Categories**, Howard University, Washington, DC.
- Nov 17-19, 2023 **Workshop on Geometric Representation Theory and Moduli spaces**, University of North Carolina at Chapel Hill, NC.
- Jun 4-8, 2018 **Representation Theory, Mathematical Physics and Integrable Systems**, Centre International de Rencontres Mathématiques, Luminy, France.
- Jun 6-9, 2017 **Algebraic Analysis**, IHÉS, Bures-sur-Yvette, France.
- Apr 30, 2016 **Algebra, Geometry and Combinatorics Day**, University of Notre Dame, Notre Dame, IN.
- Aug 14-18, 2015 **Lie Algebras, Vertex Operator Algebras, and Related Topics**, University of Notre Dame, Notre Dame, IN.

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## References

- [Jonathan Brundan](#), University of Oregon, Department of Mathematics, Brundan@uoregon.edu.
- [Nicolas Guay](#), University of Alberta, Mathematics and Statistical Sciences, nguay@ualberta.ca.
- [Andrew Linshaw](#), University of Denver, Department of Mathematics, Andrew.Linshaw@du.edu.
- [Evgeny Mukhin](#), Indiana University Indianapolis, Department of Mathematical Science, emukhin@iu.edu.
- [Alexander Varchenko](#), University of North Carolina at Chapel Hill, Department of Mathematics, anv@email.unc.edu.

**Weiqliang Wang**, *University of Virginia*, Department of Mathematics,  
ww9c@virginia.edu.

**Ben Webster**, *University of Waterloo*, Department of Mathematics,  
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