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

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

Research Interests

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

Publications

16. Kang Lu, *On Bethe eigenvectors and higher transfer matrices for supersymmetric spin chains*, J. High Energ. Phys. **04** (2023), Article number: 120.

15. Kang Lu, *Schur-Weyl duality for quantum toroidal superalgebras*, J. Pure Appl. Algebra **227** (2023), no. 9, 107382.

14. Kang Lu, *Completeness of Bethe ansatz for Gaudin models with* $\mathfrak{gl}(1|1)$ *symmetry and diagonal twists*, Symmetry **15** (2023), no. 1, 9.

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.

Preprint

1. Kang Lu, *Isomorphism between twisted q-Yangians and affine ıquantum groups: type AI*, arXiv:2308.12484.

2. Kang Lu, Weiqiang Wang, and Weinan Zhang, *A Drinfeld type presentation of twisted Yangians*, arXiv:2308.12254.

3. Kang Lu, Weiqiang Wang, and Weinan Zhang, *Affine ıquantum groups and twisted Yangians in Drinfeld presentations*, arXiv:2406.05067.

4. Kang Lu and Weinan Zhang, *A Drinfeld type presentation of twisted Yangians of quasi-split type*, arXiv:2408.06981.

5. Kang Lu, *Twisted super Yangians of type AIII and their representations*, arXiv:2311.16373.

6. Kang Lu, *Twisted super Yangians of quasi-split type A*, submitted.

Teaching

University of Virginia

2024 Fall	MATH 8710: Lie Algebras
2024 Summer	MATH 7305: Problems in Analysis (for Qualifying Exams)
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.

Sept 2024–Present **Undergraduate directed reading**, *Spectral theory of graphs and Markov chains*, Mentor, University of Virginia.
Mentee: Giovanni Romanello Mazzeo

Jan 2024–Sept 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

Services

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.

Referee Services

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

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

Presentations

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 $\mathfrak{so}_{2r+1}$

Participation in Conferences and Workshops

May 27-31, 2024 **Representation Theory and Related Geometry: Progress and Prospects**, *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.

References

Jonathan Brundan, *University of Oregon*, Department of Mathematics, Brundan@uoregon.edu.

Andrew Linshaw, *University of Denver*, Department of Mathematics, Andrew.Linshaw@du.edu.

Evgeny Mukhin, *Indiana University Purdue University Indianapolis*, Department of Mathematical Science, emukhin@iupui.edu.

Vitaly Tarasov, *Indiana University Purdue University Indianapolis*, Department of Mathematical Science, vtarasov@iupui.edu.

Alexander Varchenko, *University of North Carolina at Chapel Hill*, Department of Mathematics, anv@email.unc.edu.

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