Maitreyee Kulkarni

CURRICULUM VITÆ

Personal Information
Citizenship: India
Permanent Resident of the United States
Birthdate: Dec 02, 1988

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EDUCATION

Aug 2023–July 2024 : Postdoctoral fellow at the Max Planck Institute for Mathematics, Bonn.

Feb, Mar 2022: Visiting position at International Centre for Theoretical Sciences, Bangalore, India.

Aug 2021–July 2023 : Wissenschaftliche Mitarbeiterin (Postdoc) at Mathematical Institute of the University of Bonn, Bonn.

2020–2021 : Paul Olum Postdoctoral Scholar at University of Oregon, Eugene.

Sept–Dec 2020 : Postdoctoral fellow at the Hausdorff Research Institute for Mathematics, Bonn.

Aug 2019–Aug 2020 : Postdoctoral fellow at the Max Planck Institute for Mathematics, Bonn.

2018–2019 : Postdoc at the Institute for Advanced Study, Princeton.

2013–2018 : Ph.D. from Louisiana State University under Milen Yakimov.

2012–2013 : Masters in Mathematics from Louisiana State University.

2009–2011 : Masters in Mathematics from University of Pune, India.

2006–2009 : Bachelor of Science in Mathematics from University of Pune, India.

RESEARCH INTERESTS

General - Geometric and Combinatorial Representation Theory.

Specific - Categorification of Cluster Algebras, Dimer Models, Grassmannians, Quivers with Potentials, Perverse Sheaves, Quiver Varieties.

PUBLICATIONS

(with K. Baur, I. Canacki, K. Jacobsen, G. Todorov) Infinite friezes and triangulations of annuli. Accepted in Journal of Algebra and Applications.

(with N. Livesay, J. Matherne, B. Nguyen, and D. Sage) The Deligne-Simpson problem for connections on $\mathbb{G}_m$ with a maximally ramified singularity. Adv. Math., 408, 2022, Paper No.108596.

Dimer models on cylinders over Dynkin diagrams and cluster algebras. Proc. Amer. Math. Soc. 147 (2019), 921-932.

PREPRINTS

(with J. Matherne, K. Mousavand, and J. Rock) A continuous associahedron of type A. preliminary draft available. arXiv:2108.12927 [math.RT] (submitted).

(with P. Achar, J. Matherne) Combinatorics of Fourier transform for quiver representation in type A. arXiv:1807.10217 [math.RT] (submitted).

Rigid potentials for cluster algebras from double Bruhat cells. arXiv:1811.02428 [math.RT] (submitted).

Papers in Preparation

(with N. Livesay, J. Matherne, B. Nguyen, and D. Sage) An example of the ramified Deligne–Simpson problem.

Mentoring and Leadership

Bachelor's thesis student: Linnea Gutekunst. Thesis topic: Total Positivity and networks.

I am on the WINART steering committee; a resource for women (cis and trans) and non-binary mathematicians whose research interests lie in Noncommutative Algebra and Representation Theory.

Conference Organized

(with Eric Bucher, Bach Nguyen)
AMS Fall Central Sectional Meeting 2018
University of Michigan, Ann Arbor, October 20-21, 2018

(with Asilata Bapat, Iordan Ganev, Tamas Hausel, Jacob Matherne)
Summer School in Geometric Representation Theory
IST, Austria, July 9-13, 2018

Awards and Achievements

awarded the Marie Sklodowska-Curie Actions Seal of Excellence (with 91.4 points).

received funding from AIM's research program called SQuaREs (Structured Quartet Research Ensembles) to spend a week in January 2020 at AIM in San Jose, California, with the possibility of returning in following years.

Dissertation year fellowship for Spring and Summer 2017 at Louisiana State University.

First rank in the M.Sc Mathematics programme at the University of Pune.

UGC - CSIR NET Mathematics Exam (June 2010) conducted by the National Educational Testing Bureau of University Grants Commission (UGC), Government of India, to determine eligibility for lectureship in Indian Universities and Institutions.

All India Rank of 202 in Joint Admission Test for M.Sc. (JAM) for the Indian Institutes of Technology (IIT).

T.B.Hardikar award for Second year B.Sc, Third year B.Sc and Second year M.Sc. This is awarded to the student scoring highest mark in Mathematics in each academic year.

Software Developed

(Together with J. Matherne and B. Strasser) SageMath software for producing BFZ quivers on cylinders over Dynkin diagrams (https://trac.sagemath.org/ticket/19408)

INVITED TALKS

Geometric and Combinatorial Methods in Homological Algebra, Aarhus, Denmark, July 2022.

Combinatorial Algebraic Geometry - Tropical and Real, ICTS Bangalore, July 2022.

Algebra & Combinatorics Seminar, IISc Bangalore, March 2022.

Representation Theory and Related Topics seminar, Northeastern University, May 7, 2021.

AMS special session on, "Interactions between Representation Theory, Poisson Geometry, and Noncommutative Algebra", Cincinnati, April 17,18 2021.

Flash talks in representation theory at NTNU, Virtual, January 8, 2021.

Suzhou Workshop on Geometry, Combinatorics and Representation Theory, Suzhou University, July 2020. (postponed to 2021).

Infinite friezes and triangulations of an annulus

- Oberseminar, University of Bielefeld, December 13, 2019.
- Oberseminar, University of Stuttgart, December 3, 2019.
- Oberseminar, Max Planck Institute for Mathematics, Bonn, October 10 2019.
- Workshop on Algebra-Geometry-Combinatorics, KIAS, South Korea, June 24-25, 2019.
- WINART, Women in Noncommutative Algebras and Representation Theory, University of Leeds, May 2019
- AMS special session on Representations of Lie algebras, algebraic groups, and quantum groups, Auburn, March 15-17, 2019.

Mini lecture series (four lectures) on quiver representations and quiver varieties, School on Cluster Algebras, ICTS, Bangalore, December 2018.

Geometric Methods in Representation Theory Conference, University of Iowa, November 17-19, 2018.

Dimer models on Cylinders over Dynkin diagram and cluster algebra from double Bruhat cells

- Algebra and Number Theory seminar, University of Graz, Austria, June 2018.
- Cluster Algebras and Math Physics, Michigan State University, East Lansing, May 7 - 12, 2018
- Noncommutative Algebra and Noncommutative Algebraic Geometry at the AMS Sectional Meeting, Ohio State University in Columbus, Ohio, March 17-18, 2018.
- Geometric Methods in Representation Theory Conference
  University of Iowa, November 18-20, 2017
- GASC seminar
  Northeastern University, Boston, November 6, 2017.
- Special Session on Noncommutative and Homological Algebra at the AMS meeting, Denton, Texas, September 2017.
- Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, MA, April 26 - May 1, 2017.
- Algebra seminar, Temple University, Philadelphia, April 2017.
- Cluster Algebras in Representation Theory and Combinatorics at the AMS Sectional Meeting, Hunter College, New York, March 2017.

- Cluster Algebra Seminar, University of Minnesota, Minneapolis, February 2017.
- Special Session on New Developments in Noncommutative Algebra and Representation Theory, JMM, January 2017.
- Cluster Algebra Seminar, Michigan State University, East Lansing, October 2016.
- Workshop and International Conference on Representation of Algebras, Syracuse University, August 10 - 19, 2016.
- Graduate Student Conference in Algebra, Geometry and Topology, Temple University, May 14 - 15, 2016.

Combinatorial Fourier transform for quiver representation varieties in type A

- Geometric Methods in Representation Theory Conference, University of Iowa, November 17-19, 2018.
- International Conference on Geometric Representation Theory and Symplectic Varieties, Center for Mathematics at Notre Dame, June 25 - 29, 2018.
- Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, MA, April 24 - May 1, 2018.
- AMS Spring Southeastern Sectional Meeting, Charleston, South Carolina, March 2017.

Other Talks and Outreach

Combinatorics of friezes
Invited to give a Math Colloquium at Abeda Inamdar College, Pune, India. September 9, 2019.

Combinatorics of cluster categorification
Invited to give a Math Colloquium at the Indian Institute of Science Education and Research (IISER), Pune, India. January 4, 2019.

Colouring the world map
Two talks on graph theory to ninth graders at the New English School, Pune, India January 7, 9, 2019.

Chern classes and their action on Bott–Samelson varieties
VIR Seminar on Combinatorics and Geometry of Flag Manifolds, Louisiana State University, Fall 2017.

Countability and Uncountability
Gave a talk to 8th, 9th, and 10th graders in India, New English School, Pune, India 2016

Careers in mathematics
Discussed careers with undergraduates in India, Modern College, Pune, India, 2016.

Computing Euler form for the category of representations of quivers
VIR Seminar on Combinatorial Representation Theory, Louisiana State University, Fall 2016.

An introduction to quiver varieties
Student Algebra Seminar, Louisiana State University, April 2016.

Topology of quivers from unipotent cells
Second Annual Graduate Student Conference in Algebra, Geometry, and Topology, Temple University, May 2016.

Scattering diagrams and computing theta functions
Student Cluster Algebra Seminar, Louisiana State University, Spring 2016.

Isomorphism of crystals with highest weight vectors
VIGRE Seminar on Combinatorial Representation Theory, Louisiana State University, Spring 2016.

Tensor product of crystals
VIGRE Seminar on Combinatorial Representation Theory, Louisiana State University, Spring 2016.

Puzzles determine boundary conditions on honeycombs
VIGRE Seminar on Combinatorial Representation Theory, Louisiana State University, Fall 2015.

Matrix ball construction and RSK equivalence
VIGRE Seminar on Combinatorial Representation Theory, Louisiana State University, Fall 2015.

Uniqueness of non-degenerate potentials
Student Cluster Algebra Seminar, Louisiana State University, Fall 2014.

The category $\mathcal{U}$ related to a categorification of quantum $sl(2)$
VIGRE Seminar on Diagrammatic Algebra and Representation Theory, Louisiana State University, Spring 2014.

A Clebsch-Gordan Formula for Representations of $sl_2(\mathbb{C})$
VIGRE Seminar on Diagrammatic Algebra and Representation Theory, Louisiana State University, Fall 2013.

Representations of $sl_2(\mathbb{C})$
VIGRE Seminar on Diagrammatic Algebra, Louisiana State University, Fall 2013.

An introduction to Ring Theory
G.E.A.U.X. Program, Louisiana State University, Summer 2013.

An Introduction to Soergel Bimodules
VIGRE Seminar on Reflection Groups, Louisiana State University, Fall 2012.

Polynomial Invariants and Chevalley's Theorem
VIGRE Seminar on Reflection Groups, Louisiana State University, Fall 2012.

The Classification of Finite-Type Quiver Representations and Gabriel's Theorem
VIGRE Seminar on Reflection Groups, Louisiana State University, Fall 2012.

TEACHING AT BONN

Winter 2022: Advanced topics course on total positivity

Summer 2022: Seminar on representation theory of finite groups

Winter 2021: Seminar on cluster algebras

TEACHING AT UO

Spring 2021: Math 231 - Elements of Discrete Mathematics I

Spring 2021: Math 251 - Calculus I

Winter 2021: Math 231 - Elements of Discrete Mathematics I

EARLIER TEACHING

Grader for Math 2057 (Calculus III) and Math 4005 (Geometry)
Louisiana State University, Spring 2018

Grader for MATH 4181 - Number Theory Louisiana State University, Fall 2017

MATH 1023 - Pre-Calculus Louisiana State University, Fall 2017

MATH 1023 - Pre-Calculus Louisiana State University, Fall 2016

MATH 1552 - Calculus I Lab Louisiana State University, Fall 2016

MATH 1550 - Calculus I Louisiana State University, Summer 2016

MATH 1552 - Calculus I Lab Louisiana State University, Spring 2016

MATH 1021 - College Algebra Louisiana State University, Fall 2015

MATH 1552 - Calculus II Louisiana State University, Spring 2015

MATH 1550 - Calculus I Louisiana State University, Fall 2014

MATH 1552 - Calculus II Lab Louisiana State University, Fall 2013

Pleasant Hall R2R Math Lab Louisiana State University, Spring 2012
Tutored college algebra, trigonometry, and precalculus

Pleasant Hall R2R Math Lab Louisiana State University, Fall 2012
Tutored college algebra, trigonometry, and precalculus

Number Theory Sir Parashurambhau College, India, Spring 2011

Graph Theory Sir Parashurambhau College, India, Spring 2011

Differential Geometry Sir Parashurambhau College, India, Fall 2011

Combinatorics Sir Parashurambhau College, India, Fall 2011

OTHER ACTIVITIES AT LOUISIANA STATE UNIVERSITY

Accountant (Fall 2016 - Spring 2018) *Math Student Colloquium Club* Organizing the departmental algebra seminar, handling finances including the purchasing of refreshments, meals, travel reimbursements for the speakers.

Secretary-Treasurer (Fall 2016 - Spring 2018) *AWM Chapter at Louisiana State University* Organizing AWM departmental events, handling all the finances including the purchasing of refreshments for the events.

Accountant (Fall 2014 - Spring 2016) *Student Colloquium Committee* Organized the departmental algebra seminar, handled all the finances including the purchasing of refreshments, meals, travel reimbursements for the speakers.

Committee Member (Summer 2013, 2016) *G.E.A.U.X. Orientation Program for New Math Graduate Students*

Committee Member, Food Manager (Fall 2014 - Spring 2016) *Indian Students Association, Louisiana State University.*

Proctor, Grader, Photographer (Spring 2013, 2014, 2015, 2016) *High School Math Contest at Louisiana State University.*

Mentor, (Spring 2014) *The Harvard-MIT Mathematics Tournament*
Organized weekly problem seesions in Combinatorics, Number Theory and Graph Theory for High School students participating in The Harvard-MIT Mathematics Tournament

Professional Memberships

American Mathematical Society

Association for Women in Mathematics

References

Milen Yakimov, LSU (Advisor)   yakimov@math.lsu.edu
                                                          m.yakimov@northeastern.edu
Gordana Todorov, Northeastern University   g.todorov@northeastern.edu
Pramod Achar, LSU   pramod@math.lsu.edu
Karin Baur, University of Leeds   k.u.baur@leeds.ac.uk
James Oxley, LSU (Teaching)   oxley@math.lsu.edu