

# Rekha Biswal

---

Max Planck Institute for Mathematics, Bonn, Germany.

Website: <https://rekhabiswal.github.io/research.html>

Email: [rekha@mpim-bonn.mpg.de](mailto:rekha@mpim-bonn.mpg.de)

Phone: +49-176-7746-4126

---

## Postdoctoral Affiliation

*Postdoctoral Fellow* (Nov 2018 - present)

Max Planck Institute for Mathematics, Bonn, Germany.

*Postdoctoral Fellow* (Nov 2016 - Oct 2018)

Université Laval, Québec City, Canada.

*Visiting Scholar* (Aug 2016 - Oct 2016)

Tata Institute of Fundamental Research (TIFR), Mumbai, India.

---

## Education

2011-2016 **Integrated PhD in Mathematics**, *The Institute of Mathematical Sciences*, Chennai, Advisor: Sankaran Viswanath.

Thesis: Demazure flags, Chebyshev polynomials and mock theta functions.

2010-2011 **M.Sc in Mathematics**, *Indian Institute of Technology*, Mumbai, India.

2006-2010 **Bachelor of Science and Bachelor of Education**, *Regional Institute of Education*, Bhubaneswar, India.

---

## Research Interests

Representation Theory of affine Lie Algebras , Modular forms, Macdonald polynomials.

---

## Publications

### Published.

1. Rekha Biswal and Ghislain Fourier; *Minuscule Schubert Varieties: Poset Polytopes, PBW-degenerated Demazure Modules, and Kogan Faces*, Algebras and Representation Theory, **18**, (2015), Issue 6, pages 1481-1503. (<https://arxiv.org/abs/1410.1126>)
2. Rekha Biswal, Vyjayanthi Chari, Lisa Schneider and Sankaran Viswanath; *Demazure Flags, Chebyshev Polynomials, Partial and Mock Theta functions*, Journal of Combinatorial Theory, Series A, **140**, (2016), pages 38-75. (<https://arxiv.org/abs/1502.05322>)
3. Rekha Biswal, Vyjayanthi Chari and Deniz Kus; *Demazure Flags, q-Fibonacci Polynomials and Hypergeometric Series*, Res. Math. Sci. 5(2018), no.1, Paper No.12, 34 pp. (<https://arxiv.org/abs/1607.01069>)
4. Rekha Biswal and Deniz Kus; *A combinatorial formula for graded multiplicities in excellent filtrations*.(to appear in Transformation groups).(<https://arxiv.org/pdf/1712.02667.pdf>)
5. Rekha Biswal and Travis Scrimshaw; *Existence of Kirillov-Reshetikhin crystals for multiplicity free nodes* (to appear in Publ. Res.Inst.Math.Sci.)(<https://arxiv.org/pdf/1902.00769.pdf>).

## Submitted/In Preparation.

1. Rekha Biswal, Abdelkarim Chakhar and Xiao He; *Classification of rank two Lie conformal algebras*(submitted, 23 pages)(<https://arxiv.org/pdf/1712.05478.pdf>).
2. Rekha Biswal and Travis Scrimshaw; *Kirillov-Reshetikhin crystals  $B^{7,s}$  for type  $E_7^1$*  (submitted, 12 pages)(<https://arxiv.org/pdf/1901.00182.pdf>).
3. Rekha Biswal, Vyjayanthi Chari, Peri Shereen and Jeffrey Wand; *Macdonald polynomials and level two Demazure modules for affine  $\mathfrak{sl}_{n+1}$*  (preprint, 23 pages)(<https://arxiv.org/pdf/1910.05848.pdf>).
4. Georgia Benkart, Rekha Biswal, Ellen Kirkmann, Van C Nguyen and Jieru Zhu; *McKay matrices for finite dimensional Hopf algebras* (preprint, approx. 40 pages)

---

## Awards and Fellowships

### Postdoctoral Fellowships.

- (In collaboration with CRM) Université Laval (2016), Québec City, Canada.
- Weizmann Institute of Science(2016), Rehovot, Israel (declined).
- Harishchandra Research Institute (HRI) (2016), Allahabad, India (declined).

### Other Awards.

- Selected for UGC-CSIR Junior Research Fellowship, July 2013.
- National Board of Higher Mathematics (NBHM) Ph.D Fellowship, 2011.
- National Board of Higher Mathematics (NBHM) M.Sc Fellowship, 2010.

---

## Teaching Experience

May 25-29, 2016	Taught a short course on Topology to masters students and college teachers in the summer school at the Institute of Mathematical Sciences, Chennai, India
Winter 2013	Teaching assistant for Lie Algebra course at the Institute of Mathematical Sciences, Chennai, India
Summer 2013	Teaching assistant for Algebra course at the Institute of Mathematical Sciences, Chennai, India
Winter 2012	Tutor for Representation Theory course in Annual Foundation School at Chennai Mathematical Institute, Chennai, India
Apr-May, 2009	Worked as a teaching intern at DM School, Bhubaneswar where I taught Physics and Mathematics to students of Std. IX.

---

## Conferences

- *2020 Summer Research in Mathematics program(SWiM)*(June 14-27, 2020), MSRI, Berkely, USA.
- *Categorifications: Hecke algebras, finite groups and quantum groups*(March 23-27,2020), Institut Henri Poincare, Paris, France.
- *Introductory Workshop: Higher Categories and Categorification*(February 10-14, 2020), MSRI, Berkeley, USA.
- *Connections for Women: Higher Categories and Categorification*(February 6-7, 2020), MSRI, Berkeley, USA.
- *Introductory Workshop: Quantum Symmetries*(January 27-31, 2020), MSRI, Berkeley, USA.

- *Connections for Women: Quantum Symmetries*(January 23-24, 2020), MSRI, Berkeley, USA.
- *Conference on representation theory and integrable systems*, ETH, Zurich, Switzerland, August 12-16, 2019.
- *Summer School and workshop on Geometric representation theory and low-dimensional topology*, University of Edinburgh, UK, 3 - 14 June 2019.
- *Women in Noncommutative Algebra and Representation Theory*, University of Leeds, UK, May 20 – 24, 2019.
- *Taipei Conference on representation theory VI 2019*, National Taiwan University, Taiwan, January 7-11, 2019.
- *Nikolaus Conference 2018*, RWTH Aachen University, Germany, December 7-8, 2018.
- *Conference on Algebraic Groups, Lie Algebras and their Representations* , Max Planck Institute for Mathematics, Bonn, Germany, November 22-24, 2018
- *Workshop on representation theory, combinatorics and geometry*, University of Virginia, USA, Oct 19-21, 2018
- *Sage Days* , ICERM, Brown University , USA. July 23–28, 2018
- *Southeastern Lie Theory Workshop X* , University of Georgia, Athens, GA , USA. June 10–12, 2018
- *Conference on Interactions of quantum affine algebras with cluster algebras, current algebras and categorification*, The Catholic University of America , Washington, D.C. , USA June 2-8, 2018
- *School and workshop on Equivariant Combinatorics* , Centre de recherches mathématiques (CRM), Montreal, Canada, June 12-23, 2017
- *The 2017 Midwest Combinatorics Conference*, University of Minnesota, Minneapolis, USA, May 23-25, 2017.
- *Workshop on Mid-Atlantic Algebra, Geometry, and Combinatorics (MAAGC)*, Drexel University, Philadelphia, USA. May 5-6, 2017.
- *Conference on Texas-Oklahoma Representations and Automorphic forms VIII*, Oklahoma State University, Stillwater, Oklahoma, USA. March 31-April 2, 2017.
- *Conference on Combinatorial Algebra meets Algebraic Combinatorics*, Université du Québec à Montréal, Montréal, Québec , Canada, January 27-29, 2017.
- *Conference on Texas-Oklahoma Representations and Automorphic forms VII*, University of North Texas, Denton, TX, USA. April 8-10, 2016.
- *International Conference on Number Theory*, SASTRA University, Thanjavur, TN, India. Dec 21-22, 2015.
- *Workshop on Lie Groups, Lie Algebras and their Representations*, University of California, Riverside, USA. Feb 14-15, 2015.
- *Workshop on Combinatorial Representation Theory*, The Centre de recherches mathématiques (CRM) in Montréal, Canada. April 21-25, 2014.
- *Workshop on Hall and Cluster Algebras*, The Centre de recherches mathématiques (CRM) in Montréal, Canada. May 8-12, 2014.
- *Lecture series on Modular representations of algebraic groups* by Professor Peter Fiebig at The Institute of Mathematical Sciences, Chennai, India. October 6-19, 2013.
- *Advanced Instructional School on Chevalley Groups*, Indian Institute of Science Education and Research (IISER), Pune, India. July 2013.

- Lecture series on *Cohomological finite generation* by Professor Wilberd van der Kallen at The Institute of Mathematical Sciences, Chennai, India. June-Aug, 2013.
- Advanced Instructional School on *Commutative algebra*, Indian Institute of Technology (IIT) Madras, India. May 2013.
- Annual Foundation School III, Harish-Chandra Research Institute (HRI), Allahabad, India. July 2012.
- Lecture series on *Infinite dimensional Lie algebras* by Professor Vyjayanthi Chari at The Institute of Mathematical Sciences, Chennai, India. August 16-30, 2011.
- Annual Foundation School II, Panjab University, Chandigarh, India. July 2011.

## Talks

### Conference Talks

- *Conference on representation theory and integrable systems*(Aug 12-16, 2019), ETH, Zurich, Switzerland.
- *Nikolaus Conference 2018*(December 7-8), RWTH Aachen University, Germany.
- *Texas-Oklahoma Representations and Automorphic forms VII* (April 2016), University of North Texas, Denton, TX, USA.
- *International Conference on Number Theory* (December 2015), SASTRA University, Thanjavur, TN, India.

### Seminar Talks

- *Combinatorics seminar talk*(Feb 5,2020) University of Southern California, Los Angeles, California .
- *Combinatorics seminar talk*(Feb 4,2020) University of California, San Diego.
- *Combinatorics seminar talk*(Feb 3,2020) University of California, Berkeley.
- *seminar talk*(Oct 31,2019) University college Dublin, Ireland.
- *Seminar talk*(Sep 19, 2019), Indian Institute of Technology, Bombay, India.
- *Seminar talk*(Sep 18, 2019), Indian Institute of Science Education and Research, Pune, India.
- *Algebra and combinatorics seminar*(Sep 16, 2019), Indian Institute of Science, Bangalore, India.
- *Colloquium talk*(Sep 12, 2019), Indian Statistical Institute, Bangalore, India.
- *Algebra seminar*(Nov 13, 2018), RWTH Aachen University, Germany
- *Algebra and combinatorics seminar*(Oct 22, 2018), North Carolina State University, USA
- *Algebra seminar*(Oct 12, 2018), Laval University, Canada.
- *Lie Group/Quantum Mathematics Seminar*(Feb 23, 2018), Rutgers University, USA.
- *Algebra seminar*(Nov 29, 2017), University of Ottawa, Canada.
- *CAGE seminar*(Nov 16, 2017), University of Pennsylvania, Philadelphia, USA.
- *Combinatorics/Partitions Seminar*(Nov 14, 2017), Pennsylvania State University, State College, PA, USA.
- *Combinatorics seminar*(Nov 3, 2017), Université du Québec à Montréal, Canada.
- *Algebra seminar*(Oct 11, 2017), University of Waterloo, Canada.
- *Algebra and Combinatorics seminar*(June 5, 2017), North Carolina State University, Raleigh, USA.
- *Algebra seminar* (October 2016), Temple University, Philadelphia, PA, USA.

---

## Other Contributions and Activities

- Participated in the Indian Women and Mathematics Symposium at The Institute of Mathematical Sciences, Chennai, India (Jan 8-10, 2012).
- Participated in the Indian Women and Mathematics Symposium at Indian Institute of Science Education and Research, Pune, India (July 26-28, 2013).
- Participated in Sage Days 60 at The Institute of Mathematical Sciences, Chennai, India (August 14-17, 2014).

---

## Professional activities

- Journal refereed: Communications in Algebra

---

## References

- Sankaran Viswanath  
Department of Mathematics  
The Institute of Mathematical Sciences, Chennai, India  
IV Cross Road, CIT Campus, Taramani, Chennai.  
svis@imsc.res.in  
044-2254 3214
- Georgia Benkart  
Department of Mathematics  
University of Wisconsin, Madison  
480 Lincoln Drive  
Madison, WI 53706  
benkart@math.wisc.edu  
608-263-4283
- Kailash C. Misra  
Department of Mathematics  
North Carolina State University  
Raleigh, North Carolina 27695-8205  
misra@ncsu.edu  
919-515-8784
- Dipendra Prasad  
Department of Mathematics  
Indian Institute of Technology, Bombay  
Powai, Mumbai - 400076  
Maharashtra, India  
prasad.dipendra@gmail.com  
022-2576-7477
- Ellen Kirkman  
Department of Mathematics  
Wake Forest University  
127 Manchester Hall  
Box 7388 , Winston-Salem, NC 27109  
kirkman@wfu.edu  
336-758-5351