

# Curriculum Vitæ

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## Education

2008-present	Postdoctoral Research Scientist	Institut de Physique Theorique, CEA Saclay, France.
2003-2008	Ph.D	Physics, Rutgers University, USA under the joint supervision of Prof. Joel L. Lebowitz and Prof. Doron Zeilberger titled <u>Statistical Mechanics and Combinatorics of Some Discrete Lattice Models.</u>
1998-2003	MS	Physics, Indian Institute of Technology Kanpur, India.

## Publications

1. (with A. Sharan, R. Sharma, S. N. Sandhya, K. K. Sharma) Modeling absorption in saturable absorbers, *Optics Communications*, **199** (2001), no. 1-4, 267–275.

2. (with M. K. Verma, A. V. Chandra, O. Debliquy and S. Kumar) Local Shell-to-Shell Energy Transfer via Nonlocal Interactions in Fluid Turbulence, *Pramana*, **65** (2005), 297–310.
3. (with M. K. Verma and A. V. Chandra) Energy Transfer and Locality in Magnetohydrodynamic Turbulence, *Phys. Plasmas*, **12** (2005), 082307 (7pp).
4. (with T. Amdeberhan) Towards The Moduli Space of Extended Partial Isometries, *Preprint*, <http://arxiv.org/abs/hep-th/0508014>.
5. (with D. Zeilberger) The Number of [Old-Time] Basketball games with Final Score  $n:n$  where the Home Team was never losing but also never ahead by more than  $w$  Points, *Electronic J. of Combinatorics* **14** (2007), no. 1, R19 (8pp).
6. (with D. Zeilberger) Two Dimensional Directed Lattice Walks with Boundaries, *Tapas in Experimental Mathematics*, Contemporary Mathematics **457**, edited by Tewodros Amdeberhan and Victor Moll, 1–19, (2007).
7. (with M. Stenlund) Exponential Decay of Correlations for Randomly Chosen Hyperbolic Toral Automorphisms, *Chaos*, **17** (2007), 043116, 7pp.
8. The Half-Perimeter Generating Function of Gated and Wicketed Ferrers diagrams, *Journal of Integer Sequences*, **10** (2007), no. 10, 07.10.3, 11pp.
9. (with C. Liverani and M. Stenlund) Quenched CLT for Random Toral Automorphisms, *Discrete and Continuous Dynamical Systems, A*, **24** (2009) no. 2, 331–348.
10. Towards a human proof of Gessel’s conjecture, *Journal of Integer Sequences*, **12** (2007), no. 4, 09.4.2, 15pp.
11. (with J. L. Lebowitz and E. R. Speer) On the Asymmetric Exclusion Process with Semi-Permeable Boundaries, *Journal of Statistical Physics*, **135** (2009), no 5–6, 1009–1037.
12. (with E. A. Carlen, J. L. Lebowitz, P. K. Mohanty, D. Mukamel and E. R. Speer) Phase diagram of the ABC model on an interval, *Journal of Statistical Physics*, **137** (2009), no 5–6, 1166–1204.

13. (with K. Mallick) Exact results for an asymmetric annihilation process with open boundaries, *J. Phys. A: Math. Theor.*, **43** (2010), 045003, 22pp.
14. A Natural Bijection between Permutations and a Family of Descending Plane Partitions, *European Journal of Combinatorics*, in press, arXiv:0909.4732.
15. (with D. Zeilberger) A Bijectional Attack on the Razumov-Stroganov Conjecture, *submitted*, arXiv:0902.2329.
16. (with Volker Strehl), The spectrum of an asymmetric annihilation process, *Proceedings of FPSAC, 2010*, to appear.
17. (with R. Cori) 312-avoidance for alternating sign matrices, *in preparation*.
18. (with C. Arita, S. Prolhac and K. Mallick) Transfer matrices for the multispecies ASEP on the ring, *in preparation*.

## Talks and Posters

### Talks

1. Some Combinatorial Identities from Noncommutative Field Theory, *Experimental Mathematics Seminar*, Rutgers University, Jan 26 2006.
2. Experimental Mathematics to the Aid of Theoretical Physics, *Experimental Mathematics Seminar*, Rutgers University, Oct 12 2006.
3. Randomly Chosen Hyperbolic Toral Automorphisms, *97th Statistical Mechanics Conference*, Rutgers University, May 7, 2007.
4. The Razumov-Stroganov Conjecture: A Combinatorial Approach, *Mathematical Physics Seminar*, Institut de Physique Théorique, CEA Saclay, France, February 16, 2009.
5. The Razumov-Stroganov Conjecture: A Combinatorial Approach, *Combinatorics Seminar*, Laboratoire d'Informatique, Ecole Polytechnique, France, March 3, 2009.
6. Gessel's Lattice Path Conjecture and Dyck Paths, *63rd Séminaire Lotharingien de Combinatoire*, Bertinoro, September 29, 2009.

7. Descending Plane Partitions and Permutations, *Two-dimensional lattice models: Statcomb 2009*, Institut Henri Poincaré, October 8, 2009.
8. Exact solution of an asymmetric annihilation process, *Theoretical Physics Seminar*, Institute of Mathematical Sciences, India, November 13, 2009.
9. Exact solution of an asymmetric annihilation process, *Special Theoretical Physics Seminar*, Tata Institute of Fundamental Research, Mumbai, December 16, 2009.
10. A bijection among Gogs and Magogs, *Séminaire de Théorie des Nombres et Combinatoire*, Institut Camille Jordan, Université Claude Bernard Lyon 1, January 19, 2010.
11. Spectrum of an asymmetric annihilation process (with V. Strehl), *64th Séminaire Lotharingien de Combinatoire*, Lyon, March 29, 2010.
12. Pattern avoidance and alternating sign matrices, *From  $A = B$  to  $Z = 60$* , *Conference in Honor of Doron Zeilberger's 60th Birthday*, Rutgers University, May 28, 2010.
13. An exact solution for a simple reaction-diffusion lattice model, *Mathematical Physics & Probability Seminar*, University of California, Davis, June 2, 2010.
14. Pattern avoidance and alternating sign matrices, *Séminaire Combinatoire Énumérative et Algébrique*, Laboratoire Bordelais de Recherche en Informatique, Bordeaux, June 25, 2010.

## Posters

1. Constrained Directed Two Dimensional Walks, presented in *Combinatorial Problems Raised by Statistical Mechanics*, part of the *Recent Advances in Combinatorics* theme semester, Centre de Recherches Mathématiques, Université de Montréal, Canada, Feb 19–23, 2007.
2. Exponential Decay of Correlations for Randomly Chosen Hyperbolic Toral Automorphisms, presented in *Statphys23, XXIII IUPAP International Conference on Statistical Physics*, Genova, Italy, July 9–13, 2007.

## Honors

1. *General Proficiency Medal for Best Academic Performance in Physics* for the Graduating Class of 2003, Indian Institute of Technology Kanpur Convocation, May 30, 2003.
2. *Teaching Assistantship*, Department of Physics and Astronomy, Rutgers University, Fall 2003 to Spring 2006.
3. *Graduate Assistantship*, Department of Physics and Astronomy, Rutgers University, Fall 2006 to Summer 2008.

## Additional Information

1. Date of Birth: July 6, 1980.
2. Citizen of India.
3. Human Languages - English, Hindi, Tamil, Gujarati.
4. Computer Languages - C, C++, L<sup>A</sup>T<sub>E</sub>X, Maple.

## References

1. Prof. Joel L. Lebowitz, Rutgers University.
2. Prof. Doron Zeilberger, Rutgers University.
3. Prof. E. R. Speer, Rutgers University.
4. Prof. Kirone Mallick, CEA Saclay.
5. Prof. Amitabh Lath, Rutgers University (teaching).