

Name: Satya Narayan Majumdar

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Date of Birth: 01-01-1966

Education:

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| 8/87 – 9/92 | Tata Institute of Fundamental Research
Ph.D. in Physics, September 1992.
Thesis: Self-organized Criticality in Sandpiles and Driven Diffusive Lattice Gases.
<i>Advisor:</i> Prof. Deepak Dhar, Tata Institute, Bombay, India. | Bombay, India |
| 9/85 – 7/87 | University of Calcutta
M.Sc in Physics, 1987 (ranked 1st among approx. 200) | Calcutta, India |
| 9/81 – 8/85 | Presidency College
B.Sc in Physics, University of Calcutta, 1985 (ranked 1st among approx. 2500) | Calcutta, India |

Employment:

- 10/11 – present: Directeur de Recherche (DR1) at **Laboratoire de Physique Théorique et Modèles Statistiques, Université Paris-Sud, Orsay, France.**
- 09/03 – 09/11: Directeur de Recherche (DR2) at **Laboratoire de Physique Théorique et Modèles Statistiques, Université Paris-Sud, Orsay, France.**
- 01/00 – 09/03: Chargé de Recherche (CR1) at **UMR 5626 du CNRS, IRSAMC, Université Paul Sabatier, Toulouse, France.**

- 11/96 – 12/99 Reader at **Tata Institute of Fundamental Research, Bombay, India.**
- 10/94 – 10/96 Post Doctoral Associate at **Yale University, USA.**
- 10/92 – 09/94 Post Doctoral fellow at **AT&T Bell Labs, USA.**
- 08/87 – 09/92 Thesis student and Research Assistant at **Tata Institute of Fundamental Research, Bombay, India.**

Honors and Awards:

1. **Plenary** speaker at STATPHYS-25 (Seoul, South Korea, 2013).
2. **Plenary** speaker at ‘Extreme Value Analysis’ (EVA 2011) (Lyon, France, 2011).
3. ‘Prime d’excellence Scientifique’ (PES) (2009-2012, 2013-) awarded by CNRS.
4. ‘Excellence Award’ (2009) for outstanding contributions to statistical physics, awarded by the Tata Institute Alumni Association.
5. Paul Langevin Medal for theoretical physics (2005) awarded by the French physical society.
6. Young Scientist Medal awarded by the Indian National Science Academy, 1998.
7. Geeta Udgaonkar Award, 1992 for outstanding thesis in the school of Physics (Tata Institute, Bombay, India).
8. Calcutta University Gold Medal for securing first position in M.Sc (Calcutta University, India, 1987).
9. Jubilee Merit Prize for securing first position in B.Sc (Calcutta University, 1985).
10. Best Graduating Student in Physics Award (Presidency College, Calcutta, India, 1985).

Editor of Journals:

- Divisional Associate Editor (DAE) of Phys. Rev. Lett. (2011-2013).
- Associate editor of Journal of Statistical Physics (since 2011). Previously, member of the editorial board of Journal of Statistical Physics (2008-2010).
- Member of the editorial board of Journal of Physics A: Math. Theor. (2010-2016). Current member in the panel 'Fast track communications' in J. Phys. A: Math. Theor. (2016–).
- Member of the editorial board of Journal of Statistical Mechanics: Theory and Experiment (since 2003).

Honorary Positions:

- Adjunct professor at Tata Institute, Bombay, India (since 2005).
- Adjunct Weston professor at the Weizmann Institute, Rehovot, Israel (since 2011).
- Adjunct professor at the International Center for Theoretical Sciences (ICTS), Bangalore, India (since 2011).
- Associate at the Higgs Centre, University of Edinburgh, UK (since 2012).
- Adjunct professor at the Raman Research Institute, Bangalore, India (since 2015).

Publications and Invited Talks:

- 241 publications in reviewed journals (**including 60 PRL's, 1 Science, 1 PNAS, 1 Adv. in Phys.**), 4 conference proceedings and 9 invited reviews/book chapters.

Total number of citations: 10158/6897 (source: Google Scholar (GS)/ISI web of Science (ISI), dated 18/08/2017) with an h-index: 53/43 (GS/ISI).

- 121 invited talks in international conferences/workshops/summer schools since (1996).

Named Lectures:

(i) M. L. Mehta memorial lecture (February, 2011) at the Tata Institute of Fundamental Research, Bombay, India.

(ii) Subhramanyam Chandrasekhar lectures (January, 2012) at the International Center for Theoretical Sciences (ICTS), Bangalore, India.

(iii) Higgs colloquium at the Higgs Center, the University of Edinburgh (UK) (May, 2013 and October, 2016).

(iv) K. Lakshmanan Memorial distinguished lecture at CMI (Chennai mathematical Institute, Chennai) (India) (January, 2017).

Supervision of students and postdocs:

13+1(ongoing) Ph.D students (supervision and co-supervision), 4 M.Sc students and 7 postdocs.

Referee of Journals and Grants:

Since 1992, papers were regularly reviewed for several international journals including Physical Review Letters, Physical Review, Nature Physics, Europhys. Lett., Journal of Physics-A, Journal of Statistical Physics, Journal of Statistical Mechanics, Physica-A, IEEE transactions in Information Theory etc. The grant proposals for the Agence National de Recherche (ANR, France), National Science Foundation (NSF, USA) and the Israel Science Foundation (ISF, Israel) were also reviewed.

Recognized as a 'distinguished referee' by the EPL (Europhysics Letters) (2010).

Administrative Responsibilities:

I have been a member of various scientific commissions in and outside France. These include the following:

- Member of the commission de spécialistes (section 29) at the Université Paul Sabatier, Toulouse, France (2004-2009).
- Member of the 'Comité d'évaluation' of the Laboratoire de Physique Théorique (LPTENS) at Ecole Normale Supérieure, January (2005).
- Member of the 'Conseil de laboratoire LPTMS' since November, 2005.
- Member of the 'Comité d'évaluation' (AERES) of the Laboratoire de Physique Théorique (LPTENS) at Ecole Normale Supérieure, January (2009).
- Member of the 'Management Board' of the International Center for Theoretical Studies (ICTS) at Bangalore, India, since 2014.

- Member of the comite de selection (section 29) (concours de recrutement MCF) at the Universite' Aix Marseille, April, 2012.
- Member of the comite de selection (section 29) (concours de recruitment Prof.) at the Universite' de Cergy-Pontoise, April, 2014.

Research Topics :

My research interests cover various problems in equilibrium and nonequilibrium statistical physics with applications in physics, computer science and biology. Some of the past and present projects are listed below.

- *Extreme Value Statistics of Strongly Correlated Variables*: two particularly interesting strongly correlated systems where we made much progress in recent years: (i) Brownian Motion and various related stochastic processes (ii) Eigenvalues in random matrices. Other questions related to extremes have also been studied, such as the statistics of the fluctuations in the positions of fermions confined in an external potential (trapped cold atoms), number of extrema in a random landscape, integer partition problem, level density of Bose gas and its relation to extreme statistics, zeroes of random polynomials and longest excursions in stochastic processes in nonequilibrium systems etc.
- *Order, Gap & Record Statistics for Stochastic Time Series*: Various other questions related to extreme statistics have also been studied, such as the order and the gap statistics, record statistics, density of near-extreme events etc. in random walks and related stochastic processes.
- *Diverse applications of Random Matrix Theory*: My current/ongoing research involves various applications of the random matrix theory such as the study of (i) fluctuations of the number of eigenvalues in a given spectral interval—the so called Index problem (ii) transport in mesoscopic cavities (iii) distribution of entanglement entropy in random pure states of bipartite systems (iv) nonintersecting Brownian motions and its connection to Yang-Mills gauge theory (v) matrix integrals and the associated fluid dynamics. Also, I have studied various integrable models related to random matrices, such as random growth models, biological sequence matching problems, random permutations etc.
- *Applications of Statistical Physics in Computer Science: Sorting and Search Algorithms*.
- *Persistence and first-passage properties in Nonequilibrium Systems*: Spin Models, Diffusion and Random Walks, Random Search problems, Non-Markov Processes etc.
- *Stress Propagation and Compaction in Granular Medium*.
- *Real-space Condensation in Nonequilibrium Steady-States*: Aggregation and fragmentation processes, Zero-range processes, Random Average processes etc.
- *Quantum Phase Transitions in Disordered Spin Chains*.
- *Coarsening and Phase Ordering Dynamics in Spin Systems*.

- *Transport Properties of Vortices in High- T_c Superconductors.*
- *Interacting Particle Systems: Symmetric and Asymmetric Exclusion Processes, vicious random walkers etc.*
- *Polymers and Self-Avoiding Walks.*
- *Self-organized Criticality in Sandpile Models* (Ph.D Thesis, 1992).

List of 10 most cited papers:

Citation source: Google Scholar (GS) /ISI web of science (ISI) (dated 18/08/2017)

- (1) C.-h. Liu, S.R. Nagel, D.A. Schecter, S.N. Coppersmith, S. Majumdar, O. Narayan and T.A. Witten, “Force Fluctuations in Bead Packs”, **Science**, v-269, 513 (1995). [**citations: 799/550 (GS/ISI)**]
- (2) S.N. Coppersmith, C.-h. Liu, S. Majumdar, O. Narayan and T.A. Witten, “Force Fluctuations in Bead Packs-II”, **Phys. Rev. E**, v-53, 4673 (1996). [**citations: 534/314 (GS/ISI)**]
- (3) S.N. Majumdar, “Persistence in Nonequilibrium Systems”, **Current Science**, v-77, 370 (1999); cond-mat/9907407. [**citations: 245/209 (GS/ISI)**]
- (4) S.N. Majumdar and D. Dhar, “Equivalence of the Abelian Sandpile Model and the $q \rightarrow 0$ Limit of the Potts Model”, **Physica A**, v-185, 129 (1992). [**citations: 285/182 (GS/ISI)**]
- (5) S.N. Majumdar, C. Sire, A.J. Bray and S.J. Cornell, “Nontrivial Exponent in Simple Diffusion”, **Phys. Rev. Lett.**, v-77, 2867 (1996). [**citations: 213/163 (GS/ISI)**]
- (6) D. Dhar and S.N. Majumdar, “Abelian Sandpile Model on the Bethe Lattice”, **J. Phys. A: Math. Gen.**, v-23, 4333 (1990). [**citations: 178/111 (GS/ISI)**]
- (7) H. Safar, P.L. Gammel, D.A. Huse, S.N. Majumdar, L.F. Schneemeyer, D.J. Bishop, D. Lopez, G. Nieva and F. de la Cruz, “Observation of a Nonlocal Conductivity in the Mixed State of $YBa_2Cu_3O_{7-\delta}$: Experimental Evidence for a Vortex Line Liquid”, **Phys. Rev. Lett.**, v-72, 1272 (1994). [**citations: 161/141 (GS/ISI)**]
- (8) S.N. Majumdar, A.J. Bray, S.J. Cornell and C. Sire, “Global Persistence Exponent for Critical Dynamics”, **Phys. Rev. Lett.**, v-77, 3704 (1996). [**citations: 173/134 (GS/ISI)**]
- (9) J. Krug, H. Kallabis, S.N. Majumdar, S.J. Cornell, A.J. Bray and C. Sire, “Persistence Exponents for Fluctuating Interfaces”, **Phys. Rev. E**, v-56, 2702 (1997). [**citations: 172/140 (GS/ISI)**]
- (10) S.N. Majumdar and D. Dhar, “Height Correlations in the Abelian Sandpile Model”, **J. Phys. A: Math. Gen.**, v-24, L357 (1991). [**citations: 159/109 (GS/ISI)**]