

## CURRICULUM VITAE

### DR ANITA MEHTA

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### EDUCATION

1986            DPhil (Theoretical Physics), University of Oxford  
 1980            MA (Physics), University of Oxford  
 1977            BSc (Physics), University of Calcutta

### ACADEMIC EMPLOYMENT

Oct 2018 – Leverhulme Visiting Professor, Oxford University  
 Jan 2018 – Oct 2018 Visiting Professor at Max Planck Institute for Mathematics in the Sciences, (Biomath Group), Leipzig  
 May 2017 -- Visiting Professor at the Institut für Informatik, University of Leipzig  
 March - April 2017 Visiting Professor of Physics, University of Roma La Sapienza, Rome  
 2013-2016 Senior Professor at S. N. Bose National Centre for Basic Sciences, Calcutta  
 2008-2013 Professor at S. N. Bose National Centre for Basic Sciences, Calcutta  
 1995-2008 Reader & Associate Professor at S. N. Bose Nat'l Centre for Basic Sciences, Calcutta  
 1991-1995 Senior Research Fellow, IRC in Advanced Materials, University of Birmingham  
 1987-1991 Research Associate, Cavendish Laboratory, University of Cambridge  
 1986-1987 Postdoctoral Consultant, IBM, New York  
 1980-1982 Teaching Assistant, Department of Physics, Cornell University

### AWARDS AND FELLOWSHIPS

2018 -- Visiting Professor at Max Planck Institute for Mathematics in the Sciences, (Biomath Group), Leipzig  
 2014 - 2017 Annual position as Visiting Professor at Dept of Bioinformatics, University of Leipzig  
 2011-12        **Science Ambassador, Indo-US Science and Technology Forum**  
 1990- 2017 Annual position at Institut de Physique Theorique, CEA, Saclay, France  
 2009-2012 Recipient of Cognitive Science Research Initiative grant  
 2008            **Fellowship of the American Physical Society**  
 2007            **Eshbach Professor, McCormick School of Engineering and Applied Sciences, Northwestern University**  
 2006-2007     **Radcliffe Fellow, Harvard University**  
 2004            Stree Shakti Samman Award, Indian Woman Scientist of the Year  
 2003            Visiting Professor, Centre for Complex Systems, University of Rome  
 2002            Visiting Professor, École Normale Supérieure, Paris  
 2001            Visiting Professor, Centro de Investigación en Energía, Cuernavaca, Mexico  
 2000-2001     Visiting Professor, École Supérieure de Physique et Chimie Industrielles, Paris  
 1999            Visiting Professor, Centro de Investigación en Energía, Cuernavaca, Mexico  
 1998-1999     **Engineering and Physical Sciences Research Council Visiting Fellow, Oxford**

- 1998 Visiting Professor, University of New Mexico, Albuquerque  
 1993 Discretionary pay award from the Science and Engineering Research Council for outstanding achievements in research, Birmingham  
 1990 Special Gordon Research Fellowship  
 1990 **Visiting Scientist Grant from the United States Office of Naval Research, to finance a seminar trip to US academic institutions**  
 1978 **Rhodes Scholarship, University of Oxford**

## RESEARCH OVERVIEW

My work as a scientist has been extremely interdisciplinary and strongly collaborative: in my work on granular physics, I drew heavily on the literature of civil and chemical engineering. More recently, I've used the methods of theoretical physics to work on problems in neuroscience (long- and short-term memory), biology (the role of gap junctions in the onset of diabetes, and stochasticity in the visual system of the fruitfly) and computer science (the use of landscapes in optimisation problems).

## RELEVANT EXPERIENCE

I've studied, lived and worked in the UK, the US and India. I've also travelled widely through Asia, North and South America and Europe for professional as well as personal reasons. These travels, as well as my being part of the Rhodes and Radcliffe Fellowships, have brought with them wide professional and personal networks.

I've reviewed grant applications for organisations such as the National Science Foundation (US), Office of Naval Research (US), Department of Energy (US), the European Research Council, and the US-Israel Binational Foundation. I've organized international conferences such as 'Challenges in Granular Physics' (Trieste 2001) and 'The Anatomy of Laughter' (Oxford 2001), and successfully found funding for them.

## PUBLICATIONS

### Books

1. Anita Mehta (2007). *Granular physics*. Cambridge: Cambridge University Press.
2. Thomas C Halsey and Anita Mehta eds. (2002). *Challenges in Granular Physics*. Singapore: World Scientific.
3. Anita Mehta, ed. (1994). *Granular Matter: An Interdisciplinary Approach*. New York: Springer.

### In refereed scientific journals

1. 'Renormalisation group approaches to interacting walk models', Anita Mehta and R B Stinchcombe, *J. Phys. A* 19, 2155 (1986)
2. 'Statistical mechanics of powder mixtures', Anita Mehta and S F Edwards, *Physica A* 157, 1091 (1989)

3. 'Dislocations in amorphous materials', S F Edwards and Anita Mehta, *Journal de Physique* 50, 2489 (1989)
4. 'Novel temporal behaviour of a nonlinear dynamical system - the completely inelastic bouncing ball', Anita Mehta and J M Luck, *Physical Review Letters* 65, 393 (1990)
5. 'A phenomenological approach to relaxation in powders', Anita Mehta and S F Edwards, *Physica A* 168, 714 (1990)
6. 'A Monte Carlo study of granular relaxation', T A J Duke, G C Barker and Anita Mehta, *Europhysics Letters* 13, 19 (1990)
7. 'The bouncing ball revisited', Anita Mehta and J M Luck, *Modern Physics Letters B*, 1245 (1990)
8. 'A statistical theory of entangled lattice polymers', Anita Mehta, R J Needs and D J Thouless, *Europhysics Letters* 15, 113 (1991)
9. 'Vibrated powders - a microscopic approach', Anita Mehta and G C Barker, *Physical Review Letters* 67, 394 (1991)
10. 'The self-organising sandpile', Anita Mehta and G C Barker, in *New Scientist*, 40 15 June, (1991)
11. 'Vibrated powders - structure, correlations and dynamics', G C Barker and Anita Mehta, *Physical Review A* 45, 3435 (1992)
12. 'The Langevin dynamics of vibrated powders', Anita Mehta, R J Needs and Sushanta Dattagupta, *J. Stat. Phys.* 68, 5/6 1131 (1992)
13. 'Real sandpiles - dilatancy, hysteresis and cooperative dynamics', Anita Mehta, *Physica A* 186, 121 (1992)
14. 'Transient phenomena, self-diffusion and orientational effects in vibrated powders', G C Barker and Anita Mehta, *Physical Review E* 47, 184 (1993)
15. 'Size segregation in vibrated powders', G C Barker and Anita Mehta, *Nature* 361, 308 (1993)
16. 'Friction in vibrated powders - a mechanism for memory', Anita Mehta and R J Needs, *Trans. I. Chem. E.* 71, A3 245 (1993)
17. 'The bouncing ball with finite restitution: chattering, locking and chaos', J M Luck and Anita Mehta, *Physical Review E* 48, 3988 (1993)
18. Comment on 'A three-dimensional model for particle size segregation by shaking', G C Barker, Anita Mehta and M J Grimson, *Physical Review Letters* 70, 2194 (1993)
19. 'Size segregation mechanisms', G C Barker and Anita Mehta, *Nature* 364, 486 (1993)
20. 'The dynamics of sand', (review article) Anita Mehta and G C Barker, *Reports of Progress in Physics*, 57, 4, 383 (1994)
21. 'Disorder, memory and avalanches in sandpiles', Anita Mehta and G C Barker, *Europhysics Letters* 27, 501 (1994)
22. Comment on 'A two-dimensional model for particle size segregation by shaking', G C Barker and Anita Mehta, *Europhysics Letters* 29, 61 (1995)
23. 'Dynamics of sandpiles: physical mechanisms, coupled stochastic equations and alternative universality classes', Anita Mehta, J M Luck and R J Needs, *Physical Review E* 53, 92 (1996)
24. 'Rotated sandpiles: the role of grain reorganisation and inertia', G C Barker and Anita Mehta *Physical Review E*, 53, 5704 (1996)
25. 'The dynamics of sandpiles: the competing roles of grains and clusters', Anita Mehta, G C Barker, J M Luck and R J Needs, *Physica A* 224, 48 (1996)
26. 'Noisy nonlinear coupled equations - some new insights', J K Bhattacharjee, Anita Mehta and J M Luck, *Special Issue on Nonlinearity in the Physical Sciences, Pramana* 48, 749 (1997)

27. 'In search of smooth sandpiles - the Edwards-Wilkinson equation with flow', P. Biswas, A. Majumdar, Anita Mehta, and J K Bhattacharjee, *Physica A* 248, 379 (1997)
28. 'Smoothing of sandpiles surfaces after intermittent and continuous avalanches - three models in search of an experiment', P. Biswas, A. Majumdar, Anita Mehta, and J K Bhattacharjee, *Physical Review E* 58, 1266 (1998)
29. 'Modelling avalanche flows', G C Barker and Anita Mehta, in *IMA Journal of Mathematics applied to Business and Industry* 11, 139-150 (2000).
30. 'A new class of coupled continuum equations for atomic growth on surfaces', B Sanyal, Anita Mehta and Abhijit Mookerjee, *J. Phys -Condensed Matter* 11 4367-4380 (1999)
31. 'Growth and electronic structure of rough overlayers', A. Mookerjee, B Sanyal, and Anita Mehta, *Physica A* 270 143-148 (1999)
32. 'Models of competitive learning: complex dynamics, intermittent conversions and oscillatory coarsening', Anita Mehta and Jean-Marc Luck, *Physical Review E* 60, 5218-5230 (1999)
33. 'A two-species model for aeolian sand ripples' Rebecca Hoyle and Anita Mehta *Physical Review Letters*, 83, 5170 (1999)
34. 'Two types of avalanche behaviour in model granular media', G C Barker and Anita Mehta, *Physica A*, 283 3/4, 328-336, (2000).
35. 'Glassy dynamics of granular compaction', Anita Mehta and G C Barker, *J. Phys - Cond. Mat.*, 12, 6619-6628, (2000).
36. 'Avalanches at rough surfaces', G C Barker and Anita Mehta, *Phys. Rev. E*, 61, 6765-6772, (2000).
37. 'Origins of granular memory in model sandpiles', G C Barker and Anita Mehta, *Advances in Complex Systems*, 2, 339-348, (2000).
38. 'Inhomogeneous relaxation in vibrated granular media: consolidation waves', G C Barker and Anita Mehta, *Phase Transitions*, 75, 519-528 (2002).
39. 'Anomalous aging phenomena caused by drift velocities', J. M. Luck and Anita Mehta, *Europhysics Letters*, 54, 573-580, (2001).
40. 'Bistability and hysteresis in tilted sandpiles', Anita Mehta and G. C. Barker, *Europhysics Letters*, 56, 626-632 (2001).
41. 'On random graphs and the statistical mechanics of granular matter' Johannes Berg and Anita Mehta, *Europhysics Letters*, 56, 784-791, (2001).
42. 'Glassy dynamics in granular compaction: sand on random graphs', Johannes Berg and Anita Mehta, *Physical Review E* 65, 031305 (2002).
43. 'Multi-particle structures in non-sequentially reorganized hard sphere deposits', Luis A. Pugnaloni, G. C. Barker and Anita Mehta, *Advances in Complex Systems*, 4, 4, 289-297, (2001).
44. 'Shaking a box of sand', Peter F. Stadler, Jean-Marc Luck and Anita Mehta *Europhysics Letters*, 57, 46-53 (2002).
45. 'Spin-models of granular compaction: From one-dimensional models to random graphs', Johannes Berg and Anita Mehta, *Advances in Complex Systems*, 4, 4, 309-319, (2001)
46. 'Two effective temperatures in traffic flow models: analogies with granular flow', M. E. Larraga, A. del Rio Portilla and Anita Mehta, *Physica A* 307/3-4 527-547 (2002).
47. 'Glassy states in a shaken sandbox', Peter F. Stadler, Anita Mehta, and Jean-Marc Luck, *Advances in Complex Systems* 4, 4, 429-439, (2001).
48. 'The Effect of Avalanching in a Two-Species Ripple Model', R. B. Hoyle and Anita Mehta, *Advances in Complex Systems* vol. 4, no. 4, 345-352 (2001).
49. 'Epitaxial Growth of Thin Films – a Statistical Mechanical Model', Anita Mehta and R. A. Cowley, *J. Phys. - Cond. Mat.* 14, 17, 4385-4392 (2002) .

50. 'Why shape matters in granular compaction', Anita Mehta and J M Luck, *J. Phys. A - Math. Gen.* 36, L365-L372 (2003)
51. 'A column of grains in the jamming limit: glassy dynamics in the compaction process', J. M. Luck and Anita Mehta, *European Journal of Physics B*, 35, 399-411 (2003).
52. 'Dynamics at the angle of repose: jamming, bistability, and collapse', J. M. Luck and Anita Mehta, *JSTAT* P10015, (2004).
53. 'Cooperativity in sandpiles: statistics of bridge geometries', Anita Mehta, G. C. Barker and J. M. Luck, *JSTAT* P10014, (2004).
54. 'Competition and cooperation: aspects of dynamics in sandpiles' by Anita Mehta, J M Luck, J. M. Berg, and G C Barker, (commissioned review article) *J. Phys. Cond. Mat* 17 S2657-S2687, (2005).
55. 'Interacting black holes on the brane: the seeding of binaries', A. S. Majumdar, A. Mehta and J. M. Luck, *Physics Letters B*, 607, 219-224 (2005)
56. 'A deterministic model of competitive cluster growth: glassy dynamics, metastability and pattern formation', J.M. Luck and A. Mehta, *European Physics Journal B* 44 79-92 (2005).
57. 'Dynamical diversity and metastability in a hindered granular column near jamming' J.M. Luck and A. Mehta, *European Physics Journal B* 57, 429-451 (2007).
58. 'Heterogeneities in granular dynamics', A. Mehta, G. C. Barker and J. M. Luck, *Proceedings of National Academy of Sciences*, 105, 24, 8244-8249 (2008).
59. 'Heterogeneities in granular materials', A. Mehta, G. C. Barker and J. M. Luck, pp 40-45 *Physics Today* (May 2009)
60. 'Spatial, dynamical and spatiotemporal heterogeneities in granular materials', Anita Mehta, *Soft Matter* (Invited review on Emergent Areas in Themed issue on granular and jammed materials, eds S R Nagel and A J Liu), 6, 2875-2883 (2010)
61. 'The effects of grain shape and frustration in a granular column near jamming', J M Luck and Anita Mehta, *European Journal of Physics B*, 77, 505-521 (2010)
62. 'Competing with oneself: introducing self-interaction in a model of competitive learning', Gaurang Mahajan and Anita Mehta, *Theory in Biosciences*, 129, 271-282, (2010)
63. 'Competitive cluster growth on networks: complex dynamics and survival strategies', N Nirmal Thyagu and Anita Mehta, *Physica A* 390, 1458-1473 (2011)
64. 'Searching and fixating: scale-invariance vs. characteristic timescales in attentional processes', D P Shinde, Anita Mehta and R K Mishra, *Europhysics Letters* 94 68001 (2011)
65. 'Competing synapses with two timescales -- a basis for learning and forgetting', Gaurang Mahajan and Anita Mehta, *Europhysics Letters* 95 48008 (2011).
66. 'Learning with a network of competing synapses', Ajaz Ahmad Bhat, Gaurang Mahajan and Anita Mehta, *PLoS ONE* 6(9): e25048 (2011).
67. 'Power-law forgetting in synapses with metaplasticity', Anita Mehta and Jean-Marc Luck, *J. Stat. Mech.* P09025 (2011).
68. 'The dynamics of competitive learning: the role of updates and memory'. Ajaz Ahmed Bhat and Anita Mehta, *Phys. Rev. E* 85, 011134 (2012).
69. 'Spectral properties of zero temperature dynamics in a model of a compacting granular column', L S Schulman, J M Luck and Anita Mehta, *Journal of Statistical Physics* 146:924-954 (2012)
70. 'Landscape encodings enhance optimization', Konstantin Klemm, Anita Mehta and Peter F Stadler, *PLoS ONE* 7(4): e34780 (2012)
71. 'A two-species model of a two-dimensional sandpile surface: a case of asymptotic roughening', Bandan Chakraborty and Anita Mehta, *Granular Matter*, 14(4), 523-529 (2012)

72. 'Predatory Trading and Risk Minimisation -- how to (b)eat the competition', Anita Mehta, pp. 141-156 in *Econophysics of Systemic Risk and Network Dynamics*, eds. F. Abergel et al, Springer-Verlag Italia (2013)
73. 'Bridges in three-dimensional granular packings: Experiments and simulations', Y. X. Cao, B. Chakraborty, G. C. Barker, Anita Mehta and Y.J. Wang *Europhysics Letters* 102 24004 (2013).
74. 'Learning Theories Reveal Loss of Pancreatic Electrical Connectivity in Diabetes as an Adaptive Response', Pranay Goel and Anita Mehta, *PLoS ONE* 8(8): e70366 (2013).
75. 'Synaptic metaplasticity underlies tetanic potentiation in *Lymnaea*: a novel paradigm', Anita Mehta, Jean-Marc Luck, Collin C Luk and Naweed I Syed, *PLoS ONE* 8(10):e78056.
76. 'Shaking-induced crystallization of dense sphere packings', D P Shinde, Anita Mehta and G C Barker, *Physical Review E* 89, 022204 (2014).
77. 'The heterogeneous dynamics of sand', Anita Mehta, *Journal of the Physical Society of Japan Conf. Proc.* 1, 011004 (2014)
78. 'Slow synaptic dynamics in a network: From exponential to power-law forgetting', J M Luck and Anita Mehta, *Physical Review E* 90 032709 (2014)
79. 'The clash of the Titans: how preferential attachment helps the survival of the smallest', S. Aich and Anita Mehta, *Eur. Phys. J. Special Topics* 223, 2745-2758 (2014).
80. 'Universality in survivor distributions: Characterizing the winners of competitive dynamics', J. M. Luck and A. Mehta, *Physical Review E* 92, 052810 (2015)
81. 'How the fittest compete for leadership: A tale of tails', J. M. Luck and Anita Mehta, *Physical Review E* 95, 062306 (2017)
82. 'Storing and retrieving long-term memories; cooperation and competition in synaptic dynamics', Anita Mehta, invited review article, *Advances in Physics: X*, 3:1, 755-789, DOI:10.1080/23746149.2018.1480415 (2018)
83. 'Cover-encodings of fitness landscapes', Konstantin Klemm, Anita Mehta and Peter F Stadler, published online in *Bull. Math. Biol.*, <https://doi.org/10.1007/s11538-018-0451-1> (2018)
84. 'Patterning the insect eye: from stochastic to deterministic mechanisms', Haleh Ebadi, Michael Perry, Keith Short, Konstantin Klemm, Claude Desplan, Peter F. Stadler, and Anita Mehta <https://arxiv.org/abs/1704.02379>, accepted for publication in *PloS Comp Biol* (2018)

### Under review

1. 'A neutron tomography study: probing the spontaneous crystallization of randomly packed granular assemblies'. Indu Dhiman, Simon Kimber, Anita Mehta and Tapan Chatterji, submitted (2018)

### In book chapters

1. 'The physics of powders', Anita Mehta in *Correlations and Connectivity*, 88, eds. H E Stanley and N Ostrowsky, (Kluwer Academic Press, Dordrecht, 1990)
2. 'Statics and dynamics of granular materials', Anita Mehta, in *Scaling in Disordered Materials*, 58, eds. J P Stokes, M O Robbins and T A Witten, (MRS Symposium Proceedings, 1990)

3. 'A new statistical approach to granular mixtures', Anita Mehta and S F Edwards, in *Disorder in Condensed Matter Physics*, 155, eds. J Blackman and J Taguena, (Oxford University Press, Oxford, 1991)
4. 'Dynamics and structural relaxation in vibrated powders', Anita Mehta, G C Barker and R J Needs, in *Powders and Grains '93*, 233, ed. C. Thornton, (Balkema, Rotterdam 1993)
5. 'Avalanches in real sandpiles - the role of disorder', G C Barker and Anita Mehta, in *Powders and Grains '93*, 315, ed. C. Thornton, (Balkema, Rotterdam 1993)
6. 'Segregation phenomena in vibrated powders', G C Barker, M J Grimson and Anita Mehta, in *Powders and Grains '93*, 253, ed. C. Thornton, (Balkema, Rotterdam 1993)
7. 'Relaxational dynamics, avalanches and disorder in real sandpiles', Anita Mehta, in *Granular Matter: An Interdisciplinary Approach*, 1, ed. Anita Mehta, (Springer-Verlag, New York, 1994)
8. 'Sandpile physics', Anita Mehta in *Lectures on Thermodynamics and Statistical Mechanics*, 214, eds. M Lopez de Haro and C Varea, (World Scientific, 1994).
9. 'Smoothing of sandpiles after avalanche propagation', Anita Mehta, in *Structure and Dynamics of Materials in the Mesoscopic Domain*, 340-352, eds. M. Lal, R. A. Mashelkar, B D Kulkarni and V M Naik (Imperial College Press and the Royal Society, London, 1999).
10. 'Modelling the growth of rough surfaces: coupled continuum equations, electronic structure and magnetic properties', by Anita Mehta, Biplab Sanyal and Abhijit Mookerjee, pp. 280-307, in *Electronic Structure of alloys, surfaces and clusters: systems without lattice translational symmetry*, *Advances in Condensed Matter Science*, vol. 4, eds. A. Mookerjee and Dipankar Das Sarma, (Taylor and Francis, 2003)
11. 'Science and Society: The perspective of an Indian woman scientist', Anita Mehta, in *Les scientifiques et les droits de l'Homme* eds. Lydie Koch-Miramond and Gerard Toulouse, Editions de la Maison des sciences de l'homme, Paris, 2003.
12. 'Shaken, not stirred: why gravel packs better than bricks', Anita Mehta and J. M. Luck, pp.109-118 in *Unifying Concepts in Granular Media and Glasses* edited by A. Coniglio, A. Fierro, H.J. Herrmann and M. Nicodemi (Elsevier 2004).
13. 'How the rich get richer', Anita Mehta, A. S. Majumdar, and J. M. Luck, pp. 199-204 in *Econophysics of Wealth Distributions*, Springer- Verlag Italia, Ed. A. Chatterjee, B. K. Chakrabarti and S. Yarlagadda (2005)
14. 'Bridges in vibrated granular media', Anita Mehta, pp 305-317 in 'Vibration Problems ICOVP 2005', edited by Esin Inan and Ahmet Kiris (Springer Proceedings in Physics III, 2006)
15. 'Avalanches and Ripples in Sandpiles', Anita Mehta, pp 387-421 in 'Modelling Critical Catastrophic Phenomena in Geoscience', ed. Pratip Bhattacharya and Bikas K Chakrabarti, *Lecture Notes in Physics 705*, (Springer Berlin, Heidelberg)) (2007)
16. 'Ciencia y sociedad: La perspectiva de una mujer cientifica de la India', Anita Mehta, translated into Spanish by Julia Taguena and Sue Berlanga, in *Ciencia y Desarrollo*, 46-49, May-June 2014

## **SERVICE**

### **Conference Organisation and Direction**

- Member of Scientific Organising Committee for all Powders and Grains meetings to date since 1989

- **Organiser and Chair of Forum of International Physics - sponsored session at APS March Meeting, (2008).**
- Coordination Committee Member for Indo-Israeli workshop on Condensed Matter, Jerusalem (2002)
- **Conference Director for ICTP workshop Challenges in Granular Physics, Trieste, (2001)**
- **Conference Organiser for TRIO conference on The Anatomy of Laughter, Oxford, (2001).**
- Member of Scientific Organising Committee of Excitations in Granular Materials at University of New Mexico, Albuquerque (1998)
- Member of Scientific Organising Committee of Indo-UK meeting on Materials in the Mesoscopic Domain, Pune, (1997)

### **Committee Memberships and Leadership**

- Member of National Network for Mathematical and Computational Biology (<http://www.iiserpune.ac.in/~mbio/?q=nnmcb>), Science and Engineering Research Board, India (2014 -)
- Member of Cognitive Science Network, Department of Science and Technology, India (2010 – 2012)
- Member of Working Group for Women in Physics, Asia-Pacific Physics Conferences (2010-)
- **Leader of the Indian Delegation to the International Conference for Women in Physics 2008, Seoul, Korea (2008).**
- **Elected Member-at-Large of Executive Council, Forum of International Physics, American Physical Society (2005-2008)**
- Member of Selection Committee for Rhodes Scholarships, Calcutta (1996-2004)

### **Advisory Roles**

- Appointed Expert Reviewer at European Research Council Executive Agency (2010-2013)
- Reviewer for the US National Science Foundation, the US Office of Naval Research, the US Department of Energy, the US-Israeli Science Foundation, the Hong Kong Research Council, the Department of Science and Technology (India).
- Book proposal reviewer for Springer Verlag, Cambridge University Press etc.
- Referee for Physical Review Letters, Physical Review E, JSTAT, J Phys A, Europhysics Letters, Physica A and many others
- On Advisory Editorial Board of JSTAT (till 2008), Granular Matter (till date) and CHAOS (till date).
- Consultant for Schlumberger Doll Research (2002)
- Consultant for the Science Museum, Mexico City (2002)

### **Invited talks**

#### **Invited seminars given at:**

1. IBM Yorktown Heights (1987)
2. University of Paris-Sud at Orsay (1989)



3. University of Paris VI at Jussieu (1989)
4. Institut Laue-Langevin at Grenoble (1989)
5. Institut Charles Sadron at Strasbourg (1989)
6. Brookhaven National Laboratory (1990)
7. Naval Research Laboratory, Washington (1990)
8. Schlumberger-Doll Research in Connecticut (1990)
9. University of California at Santa Cruz (1990)
10. University of California at Santa Barbara (1990)
11. University of California at Los Angeles (1990)
12. ATT Bell Laboratories, Murray Hill, New Jersey (1989)
13. The James Franck Institute at the University of Chicago (1990)
14. Cavendish Laboratory, University of Cambridge (1991)
15. Service de Physique Théorique, Saclay (1991)
16. Clarendon Laboratory, University of Oxford (1991)
17. Department of Physics, University of Warwick (1991)
18. University of Manchester (1991)
19. University of Kent at Canterbury (1991)
20. University of Birmingham (1992)
21. Instituto di Física, Mexico City (1993)
22. Instituto di Materiales, Cuernavaca (1993)
23. Department of Mathematics, University of Warwick (1993)
24. Tata Institute of Fundamental Research, Mumbai (1993)
25. Indian Institute of Technology, Powai (1993)
26. Jawaharlal Nehru University, New Delhi (1993)
27. University of Sheffield (1994)
28. University of East Anglia (1994)
29. Saha Institute of Nuclear Physics, Calcutta (1995)
30. Indian Association for the Cultivation of Science, Calcutta (1995)
31. University of Pune, TPSC speaker (1997)
32. Indian Institute of Technology, Chennai, TPSC speaker (1997)
33. Institute of Mathematical Sciences, Chennai, TPSC speaker (1997)
34. Jawaharlal Nehru University, New Delhi (1997)
35. Centro di Investigacion en Energia, Cuernavaca (1997)
36. Joint Microsoft-University of Washington Seminar, Seattle (1997)
37. Institute of Theoretical Physics, Santa Barbara (1997)
38. International Centre of Theoretical Physics, Trieste (1997)
39. University of California at Santa Cruz (1997)
40. University of Texas at Austin (1998)
41. Santa Fe Institute, New Mexico (1998)
42. Los Alamos National Laboratory, New Mexico (1998)
43. Clarendon Laboratory, University of Oxford (1998)
44. Collège de France, Paris (1998)
45. University of New Mexico, Albuquerque (1998)
46. University of Manchester (1998)
47. Oxford Centre for Industrial and Applied Mathematics, Oxford University (1998)
48. Centro di Investigacion en Energia, Cuernavaca (1999)
49. Ecole Normale Supérieure, Paris (1999)
50. University of Vienna, Vienna (1999)
51. International Centre of Theoretical Physics, Trieste (1999)

52. Raman Research Institute, Bangalore (1999)
53. Centre for Mathematical Modelling and Computer Simulations, Bangalore (1999)
54. Indian Institute of Management, Calcutta, (2000)
55. S N Bose National Centre, Calcutta (2000)
56. Max-Planck Institute for Complex Systems, Golm (2000)
57. Department of Theoretical Biology, University of Vienna (2000)
58. University of Padova, (2000)
59. Ecole Supérieure de Physique et Chimie Industrielles, Paris, (2000)
60. Delhi University, Delhi (2000)
61. Jawaharlal Nehru University, New Delhi (2000)
62. FAST, University of Orsay, Paris (2001)
63. University of Fribourg, Switzerland (2001)
64. Ecole Supérieure de Physique et Chimie Industrielles, Paris (2001)
65. University of Dortmund, Germany (2001)
66. LPTMS, University of Orsay, Paris (2001)
67. Joint LPS-LPT seminar at Ecole Normale Supérieure (2002)
68. Service de Physique Théorique, Saclay, France (2002)
69. Focus week talk, workshop on 'Geometry and Mechanics of Structured Materials', Max Planck Institute for the Physics of Complex Systems (MPIPKS), Dresde (2002).
70. Workshop week talk, workshop on 'Geometry and Mechanics of Structured Materials', Max Planck Institute for the Physics of Complex Systems (MPIPKS), Dresde (2002).
71. Chairperson and discussion leader, Working Group on Compaction, workshop on 'Geometry and Mechanics of Structured Materials', Max Planck Institute for the Physics of Complex Systems (MPIPKS), Dresde (2002).
72. Laboratoire de Physique Théorique, Université de Strasbourg (2002).
73. Service de Physique Théorique, CEA Saclay (2003)
74. University of Naples, Physics Dept (2003)
75. Dept. of Physics, University of Rome, 'La Sapienza', (2003)
76. Dept. of Physics, University of Geneva (2003)
77. Dept. of Informatics, University of Indiana, Bloomington, Indiana (2004)
78. Dept. of Physics, University of Fribourg (2004)
79. Dept. of Bioinformatics, Max Planck Institut, Leipzig (2004)
80. Colloquium at the Institut für Theoretische Physik, Universität zu Köln (2005)
81. Colloquium at Department of Physics, University of San Diego, La Jolla (2005)
82. Seminar at Service de Physique Theorique, CEA Saclay, Paris (2005)
83. Colloquium at Institut Laue Langevin, Grenoble (2005)
84. Seminar at LPTL, Jussieu, Paris (2005)
85. Colloquium at Institut Laue Langevin, Grenoble (June 2006).
86. Seminar at Department of Engineering and Applied Sciences, Harvard University (2006)
87. Seminar at Radcliffe, 'Radcliffe Science Fellows series', Harvard University (2006)
88. Seminar at Belfer Center for Science and International Affairs, Kennedy School of Government, Harvard University (2007)
89. Colloquium at Clark University Physics department (2007)
90. Seminar at Harvard University, 'Widely Applied Mathematics' series (2007)
91. Colloquium at the Radcliffe Institute for Advanced Study, Harvard University (2007)
92. Colloquium at Materials Research Science and Engineering Research Center, Northwestern University (2007),
93. Seminar at National Brain Research Centre, New Delhi, (2007)
94. Seminar at Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore (2008)

95. Seminar at University of Groningen, The Netherlands (2008)
96. Seminar at University of Erlangen, Germany (2008)
97. Seminar at Department of Physics, University of Budapest (2008)
98. Seminar at Department of Physics, University of Rome, La Sapienza, (2008)
99. Colloquium at National University of Singapore (2009)
100. Seminar at Cavendish Laboratory, Cambridge University (2009)
101. Seminar at the University of Naples, Naples (2011).
102. Seminar at Calcutta University, Calcutta (2011).
103. Seminar at the Complexity Science Group, University of Calgary (2012)
104. Seminar at the Institute of Physics, Academy of Sciences, Beijing (2012).
105. Seminar at the Physics Department, Beijing University of Technology (2012).
106. Seminar at Department of Mathematics, Queen Mary College London (2012).
107. Seminar at Georgetown University (2012)
108. Seminar at Air Force Office of Scientific Research, Arlington, VA (2012)
109. Seminar at Physics Department, Penn State University (2012)
110. Seminar at Physics Department, Temple University (2012)
111. Seminar at Physics Department, Rutgers University (2012)
112. Joint Mathematics and Biology Seminar at IISER Pune (2012).
113. Seminar at IIT Gandhinagar (2012).
114. Colloquium at Presidency College, Calcutta (2013)
115. Seminar at New York University, New York (2013).
116. Colloquium at New York University, Abu Dhabi (2013).
117. Colloquium at Indian Institute for Science Education and Research, Calcutta (2013).
118. Colloquium at Physics Department, Istanbul Technical University, Istanbul (2014)
119. BCCN/BFNT joint seminar at Max Planck Institute for Dynamics and Self-Organization, Goettingen (2014)
120. Seminar at the Department of Physics, University of Barcelona, Barcelona (2014)
121. Seminar at the Department of Physics, Università di Roma La Sapienza, Rome (2017)
122. Seminar at the Department of Physics, University of Calgary, Calgary (2017)
123. Seminar at the Soft Matter Group, Department of Physics, Shanghai Ji'ao Tong University, Shanghai (2018)

[Invited talks at conferences/workshops/schools:](#)

1. NATO School on Propagation of Correlations in Constrained Systems at Cargese, Corsica (1990)
2. ICI Symposium on Buzzwords in Theoretical Physics at Runcorn, England (1991)
3. International Workshop on Disordered Solids, Polymers and Glasses in Calcutta (1991)
4. CECAM workshop on Applications of the Random Sequential Absorption Process at Orsay (1992)
5. Winter School in Statistical Physics at Cuernavaca, Mexico (1993)
6. 2nd European Gordon Conference on Complex Fluids at Irsee, Germany (1993)
7. International Workshop on Granular Materials at Institute of Mechanics and Materials, University of California at Santa Barbara (1994)
8. APS March Meeting as invited speaker and session chair, San Jose, California (1995)
9. Satellite Meeting for Statphys-95 on Dynamics of Complex Systems Calcutta (1995)
10. Review lecture series on Soft Condensed Matter Calcutta (1996)
11. Workshop on Dynamics of Complex Systems at Isaac Newton Institute, Cambridge, England (1996)

12. Workshop on Complex Systems at Centre for Mathematical Modelling and Computer Simulations, Bangalore (1996)
13. ICTP Workshop on Electronic Structure of Solids at University of Dhaka, Bangladesh (1996)
14. International Workshop on Jamming and Rheology at Institute of Theoretical Physics, Santa Barbara (1997)
15. Workshop on Frustration in glassy systems at International Centre of Theoretical Physics, Trieste (1997)
16. 4th Royal Society Indo-UK Forum on Materials in the Mesoscopic Domain in Pune, India (1997)
17. International Workshop on Excitations in Granular Materials at University of New Mexico, Albuquerque (1998)
18. CECAM Workshop on Granular Geomorphology at Lyon (1998)
19. Miniworkshop on Nonlinearity organised by the Dept of Mathematics, Calcutta University (1999)
20. Workshop on Nonequilibrium systems at International Centre of Theoretical Physics (1999)
21. International Conference on Recent Directions in Nonequilibrium Physics at Indian Institute of Science, Bangalore (1999)
22. Mini-workshop on Growth Models at S N Bose National Centre, Calcutta (2000)
23. Workshop on Slow Dynamics and Freezing in Condensed Matter Systems at Jawaharlal Nehru University, New Delhi (2000)
24. Short course on History, Science and Society in the Indian Context, The Asiatic Society, Calcutta (2000)
25. **UNESCO conference on Science and Human Rights, Paris (2001).**
26. **ICTP workshop Challenges in Granular Physics, Trieste,(2001).**
27. Conference on Slow dynamics and the glass transition, Bangalore (2002)
28. Indo-Israeli Workshop on Condensed Matter, Jerusalem (2002).
29. Workshop on Geometry and Mechanics of Structured Materials, Max Planck Institute for the Physics of Complex Systems (MPIPKS), Dresde (2002).
30. International Workshop on Unifying concepts in granular media and glasses, Anacapri, (2003)
31. Workshop on Pattern Formation in Nonequilibrium Systems, Calcutta Satellite to Statphys-22, (2004)
32. Unifying concepts in glass physics III, Bangalore, (2004)
33. **UNESCO conference on The role of science in the information society, CERN, Geneva, (2003)**
34. Conference on Women in science: is the glass ceiling disappearing?, New Delhi, (2004).
35. Workshop on Complexity at ICTP, Trieste (2004)
36. Winter Discussion Workshop on Dynamical Arrest of Soft Matter and Colloids, Bad Gastein, Austria (2005)
37. International Workshop on Econophysics of Wealth Distributions, Calcutta (2005)
38. **Longstay participant at Granular Physics, Kavli Institute for Theoretical Physics, Santa Barbara, California (2005).**
39. Seventh International Conference on Vibration Problems - ICOVP 2005, Istanbul (2005)
40. Conference on Women and the politics of representation: the case of science, Jadavpur University, Calcutta (2005).
41. Conference Still Centres, Moving Boundaries: Literature as Knowledge system, Centre for Advanced Studies, Department of Comparative Literature, Jadavpur University (2005)
42. International conference on Models of Earthquakes: Physics Approaches, Saha Institute of Nuclear Physics, Calcutta, India (2005)
43. International Meeting on Complex Systems, Istanbul (2006)

44. Dynamics Days, Boston (2007)
45. **Invited speaker and panel discussant at On a new frontier; above and beyond the glass ceiling National Symposium for the Advancement of Women in Science, Harvard University (2007)**
46. Joint Program on Innovation of Harvard Business School and Office of Technology Development, Harvard University (May 2007)
47. Discussion Meeting on Mechanisms of Pattern Formation, Coorg (2007)
48. International Conference on Frontiers of Research on Speech and Music (FRSM- 2008), Calcutta (February 2008).
49. **Session chair and invited talk at FIP session at APS March Meeting (2008)**
50. Contributed talk at Glassy Dynamics session at APS March Meeting (2008)
51. **Invited talk at Satellite Meeting on Granular Physics at DeGennes Days, Paris (2008)**
52. Invited talk at Annual Meeting of Society of Mathematical Psychology, Washington DC (2008)
53. Invited talk at Final Conference of the EU RTN Arrested Matter on Dynamical Arrest of Soft Matter and Colloids, Taormina, Sicily (2008)
54. **Invited speaker and Panel Discussant in Science and Medicine Panel at the 30th Anniversary of Women Rhodes Scholars, Oxford (2008)**
55. Leader of the Indian Delegation to the International Conference for Women in Physics 2008, Seoul, Korea (2008).
56. Invited talk at Conference on 'Energy, Food and Water', 14th Conference on Science, Statistics and Public Policy, Herstmonceux Castle, UK (2009)
57. Invited speaker at Conference on 'Particulate matter: does dimensionality matter?' at Max Planck Institute for Complex Systems (MPIPKS), Dresden, June 2010.
58. Invited speaker and plenary panel discussant at Asia Pacific Physics Conference (APPC11) in Shanghai, November 2010
59. **Plenary speaker at Women in Physics Conference, APPC11, Shanghai, November 2010.**
60. Invited speaker at Statphys 7, Kolkata, November 2010.
61. Invited speaker at 4th Indo-Singapore Joint Physics Symposia, Singapore, February 2011.
62. Invited speaker at 'Econophysics of Systemic Risk and Network Dynamics', Centre for Applied Mathematics and Computational Science, Calcutta, October 2011.
63. Invited speaker at 'Frontiers in statistical physics and complex systems', Catania, June 2012
64. **Invited speaker at 9th Symposium of University Professors, and panel discussant at Italian Ministry of External Affairs Rome, June 2012**
65. Invited speaker at Symposium on 'Pattern Formation and Dynamics of Complex Fluids' at NCNSD, Pune, July 2012.
66. Invited speaker at Goethe Institute Calcutta on 'Sustainable Cities', September 2012
67. Invited speaker at 'Econophysics of agent-based systems', Calcutta, November 2012.
68. Invited plenary speaker at 12th Asia Pacific Physics Conference, Chiba, Japan, July 2013.
69. Invited speaker at Rotary Club, Calcutta, 'Sustainable cities -- the science behind the art', August 2013.
70. Invited speaker at 8th Conference on Nonlinear Systems and Dynamics, Indore, December 2013.
71. **Invited speaker at 'Physics and Neuroscience' at the International Institute of Physics, Natal, Brazil, August 2014.**
72. Invited discussant at 'Stochastic physics in Biology', Gordon Conference, Ventura, California, January 2015
73. Session Chair at 'Soft Matter – Theoretical and Industrial Challenges Workshop', Isaac Newton Institute of Mathematical Sciences, Cambridge (September 2016).

74. Invited speaker and panelist on ‘Science and Sustainability’ in ‘Culture and Urban Economy: Crossed Perspectives’, organized by the Embassy of France in India, Calcutta (November 2016)
75. Panel discussant on 'The Cusps of Creativity' for SynTalk (Mumbai, India), January 14, 2017.

## OTHER SKILLS

### Languages

I speak English, French (I have a Diplôme de Langue Française from the Alliance Française de Paris) Bengali, Hindi and Gujarati with native fluency, can get by in Italian and have some basic Spanish.

### Journalism

I have a portfolio of about a hundred articles in the popular press ranging from book and music reviews, to articles on travel and popular science; the venues include The Indian Express, The Telegraph Calcutta, The Times of India, The Statesman, The Hindustan Times, The Asian Age, The Hindu, The Economic and Political Weekly, Physics Today and The Times Higher Educational Supplement. I attach links to some representative work:

- <https://serenademagazine.com/author/anita-mehta>
- <http://indianexpress.com/article/express-sunday-eye/striking-a-chord-reminiscing-the-spirit-of-mozart-5076446/>
- ([http://www.telegraphindia.com/1160305/jsp/opinion/story\\_72799.jsp](http://www.telegraphindia.com/1160305/jsp/opinion/story_72799.jsp)
- (<https://www.timeshighereducation.com/books/journey-through-the-mind-of-the-scientist/161029.article>
- (<https://www.timeshighereducation.com/books/the-world-in-a-grain-of-sand/156168.article> )

A full list can be provided on request.

### Creative Writing

I have written several short stories, an allegorical play on the world of science, and am working on two novels. The last of these was written at Harvard’s Radcliffe Institute of Advanced Study

as part of my brief there, and I was awarded a book completion grant from the Fondation Ferthé on the basis of its first draft.

## **Music**

An Associate (**ATCL**) and Licentiate (**LTCL**) of the Trinity College of London in pianoforte performance, I also hold a Licentiate diploma of the Royal School of Music (**LRSM**), also in pianoforte performance. I've given public performances, although less and less as my scientific career progressed; a particularly happy association was with the Cambridge University Musical Society when I lived there. I've been the Western classical music critic for The Telegraph, The Statesman, The Hindustan Times and The Asian Age in Calcutta and am currently writing for India's first western classical music portal, <http://serenademagazine.com>. I've also conducted courses of western classical music appreciation at the Goethe Institute, Seagull Arts and Media Centre, Calcutta School of Music, C3 School of Music, and the Satyajit Ray Film and Television Institute, Calcutta. I have also trained in Indian classical music.