

## **Mustansir Barma**

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**Personal** Born in Mumbai, December 27, 1950

### **Educational Qualifications**

1970 B.Sc. (Physics and Mathematics)  
St. Xavier's College, University of Bombay  
1974 Ph.D. (Physics)  
State University of New York at Stony Brook

### **Academic Positions**

*Current* Professor Emeritus at Tata Institute of Fundamental Research, Hyderabad

#### *Earlier*

1974 – 1976 Research Associate at Michigan State University  
1976 – 1977 Visiting Fellow at TIFR  
1977 – 2015 Academic Member at TIFR (retired as Distinguished Professor)  
2016 – Professor Emeritus at TIFR, Hyderabad  
2004 – 2007 Chair, Department of Theoretical Physics, TIFR  
2007 – 2014 Director, TIFR

#### *Extended Visits*

1982 – 1984 Cornell University, U.S.A.  
1991 – 1992 Oxford University, U.K.

### **Areas of Specialization**

Statistical Physics  
Dynamics of Nonequilibrium Systems, Phase Transitions, Disordered Systems

## **Honours and Recognitions**

Padma Shri, Civilian honour awarded by the Government of India (2013).

## **Academic Awards**

Young Scientist Award of the Indian National Science Academy (1980).

Associate of the Indian Academy of Sciences (1983 – 1986).

Shanti Swarup Bhatnagar Prize for the Physical Sciences (1995).

S.N. Bose Birth Centenary Award of the Indian Science Congress (2007).

J.C. Bose Fellowship of the Department of Science and Technology (2007 – 2017).

R.S. Goyal Prize for Physics (2006), awarded in 2010.

G. M. Modi Award for Innovative Science and Technology (2015).

R. D. Birla Memorial Award (2018) of the Indian Physics Association, awarded in 2019.

DAE-Homi Bhabha Chair Professorship (2018 - 2023).

INSA Senior Scientist (2024 onwards).

## **Fellowship of Academic Bodies**

Fellow of the Indian Academy of Sciences, Bangalore.

Fellow of the Indian National Science Academy, New Delhi.

Fellow of the National Academy of Sciences, Allahabad.

Fellow of the Academy of Sciences for the Developing World (TWAS), Trieste, Italy.

## **Special Lectures**

DAE Raja Ramanna Prize Lecture in Physics, Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru (2004).

Seventh Abdus Salam Memorial Lecture, Jamia Millia Islamia, New Delhi (2009).

Jawaharlal Nehru Lecture of the Indian National Science Academy, University of Hyderabad (2014).

First B.K. Mahanti Memorial Lecture, Ravenshaw University, Cuttack (2015).

DAE C.V. Raman Lecture of the Indian Physics Association, St. Xavier's College, Mumbai (2015).

Third Father Verstraeten Memorial Lecture, St. Xavier's College, Kolkata (2015).

Fourth S. S. Bhatnagar Anniversary Lecture, Panjab University, Chandigarh (2016).

Horizon Lecture, Tezpur University (2016).

Popli Memorial Lectures, St. Stephen's College, New Delhi (2018)

Dr. A. P. J. Abdul Kalam Memorial Lecture, Indian Institute of Space Science and Technology,

Thiruvananthapuram (2018)

Second Anjan Kundu Memorial Lecture, Acharya Bhaban, Kolkata (2019)

P. S. Narayanan Memorial Lecture, Indian Institute of Science, Bengaluru (2023)

## **Membership of Commissions, Juries and Advisory Bodies**

Member, International Jury for the L'Oreal-UNESCO Award for Women in Science (2002 – 2003).

Member, IUPAP C3 Commission on Statistical Physics (1999 – 2002).

Chairman, IUPAP C3 Commission on Statistical Physics (2002 – 2005).

Vice-President at large, IUPAP (2009 – 2014).

Member, Scientific Advisory Committee to the Cabinet (2008-2012).

Member, Scientific Advisory Council to the Prime Minister (2010 – 2014).

## **Membership of Professional Societies and Editorial Boards**

Member of the Indian Physics Association.

Member of the Indian Complex Systems Society.

Member of the Indian Science Congress.

Editorial Board of Pramana – Journal of Physics (1989 – 1995).

Editorial Working Committee of Physics News (1993 – 1999).

Editorial Board of the Journal of Statistical Physics (1997 – 1999; 2003 – 2009).

Editorial Board of Proceedings of the Royal Society A: Mathematical, Physical & Engineering (2017 - 2022)

Editorial Board of Journal of Physics A: Theoretical and Mathematical (Institute of Physics) (2018 - 2021)

## **Academic Affiliations and Membership of Boards**

Honorary faculty, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore (1998 – 2001).  
Adjunct faculty, Ramakrishna Vivekananda University, Belur (2018 - 2020).  
Member, Board of Research in Nuclear Sciences, Mumbai (2010-2025).  
Member, Board and Executive Council of the Institute of Mathematical Sciences, Chennai (2001 – ).  
Member, Council of the Saha Institute of Nuclear Physics, Kolkata (2008 – 2025).  
Member, Council of the Harish Chandra Research Institute, Allahabad (2021 - ).  
Member, Board of Management, Homi Bhabha National Institute, Mumbai (2018- 2025)

## **Organization of Conferences, Workshops and Schools**

Workshop on Dynamics of Nonequilibrium Systems, ICTP, Trieste, August 1996 (with A. Maritan and R.B. Stinchcombe).  
Workshop on Dynamics of Nonequilibrium Systems, ICTP, Trieste, August 1999 (with A. Maritan and R.B. Stinchcombe).  
SERC School on Statistical Physics, TIFR, Mumbai, February 2004 (with D. Dhar).  
22<sup>nd</sup> IUPAP International Conference on Statistical Physics (STATPHYS 22) Bangalore, July 2004 (Chair, Steering Committee).  
Meeting on Nonequilibrium Dynamics: Diffusion, Populations and Aging, TIFR Hyderabad, June 2017 (with P. Perlekar)  
Academies' Refresher Course on Statistical Physics, RKMVU, Belur, December 2018 (with S. Gupta)  
ASSURE School and Workshop on Magnetism, Osmania University, Hyderabad, December 2024 (with S. R. Shenoy)

## **Ph.D. Students Guided**

V. Subrahmanyam (1991) Faculty at University of Hyderabad.  
Supriya Krishnamurthy (1998) Faculty at Royal Institute of Technology, Stockholm.  
Goutam Tripathy (1999) Faculty at Institute of Physics, Bhubaneswar.  
Dibyendu Das (2001) Faculty at I.I.T. Mumbai.  
Kavita Jain (2004) Faculty at Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.  
Apoorva Nagar (2006) Faculty at Indian Institute of Space Science and Technology, Thiruvananthapuram.  
Sakuntala Chatterjee (2007) Faculty at S.N. Bose Centre for Basic Sciences, Kolkata.  
Shamik Gupta (2008) Faculty at Tata Institute of Fundamental Research, Mumbai.  
Himani Sachdeva (2014) Faculty at University of Vienna.

## **Invited Talks in Conferences, Workshops and Meetings (2007 onwards)**

1. 'Clustering of Sliding Passive Scalars Driven by Fluctuating Surfaces'  
23<sup>rd</sup> IUPAP International Conference on Statistical Physics – Statphys 23 (Genova, Italy, July 2007).
2. 'Driven Dimers'  
Fluctuation and Dissipation Phenomena in Driven Systems Far from Equilibrium (Dresden, July 2007).
3. 'Coupled Nonequilibrium Systems'  
The 10<sup>th</sup> Asia Pacific Physics Conference (APPC10), (Pohang, Korea, August 2007).
4. 'Periodic Forcing of a Brownian Particle in Classical and Quantum Mechanics' Nonequilibrium Phenomena in Condensed Matter (New Delhi, February 2008).
5. 'Coupled Nonequilibrium Systems'  
Current Trends in Physics (IIT Madras, Chennai, February 2008).
6. 'Diffusing Reconstituting k-mers'  
TIFR-Weizmann Institute Interaction Meeting (Rehovot, Israel, June 2008).
7. 'Particles in Fluctuating Potentials'  
Nonlinear Dynamics and Turbulence (IISc, Bangalore, July 2008).
8. 'Simple Models of Complex Behaviour'  
Indian Academy of Sciences (IIT Delhi, New Delhi, October 2008).
9. 'Statistical Physics and Everyday Life'

- Andhra Akademi of Sciences (Osmania University, November 2008)
10. 'Statistical Physics: Historical Developments and Current Trends'  
52<sup>nd</sup> DAE Solid State Physics Symposium (Mumbai, December 2008).
  11. 'Driven Dimers'  
Disorder, Complexity and Biology II (Banaras Hindu University, January, 2009).
  12. 'Interacting Random Walkers with Fluctuating Bias'  
Non-Hermitian Hamiltonians in Quantum Physics (BARC-TIFR, Mumbai, January 2009).
  13. 'Drift and Diffusion in Random Media'  
Indo-French Discussion Meeting on Diffusion in Nanoporous and Dense Media (Bangalore, April 2009).
  14. 'Fluctuation-driven phase ordering'  
Frontiers in Physics (Indian Institute of Science, Bangalore, May 2009).
  15. 'Entropy-induced ordering'  
ICTS Workshop on Non-equilibrium Statistical Physics, Meghnad Saha Lecture, (IIT Kanpur, February 2010).
  16. 'Transport in a Multispecies Model with Interconversion'  
105<sup>th</sup> Statistical Mechanics Meeting, (Rutgers University, New Brunswick, May 2011).
  17. 'Entropy and Order'  
Mid-year meeting of the Indian Academy of Sciences (Bangalore, July 2011).
  18. 'Phase Transition in a Multispecies Model'  
5<sup>th</sup> Indo-Israeli Meeting on Condensed Matter Physics (Kochi, October 2011).
  19. 'Phase Transition on an Open Aggregation-Fragmentation System'  
International Workshop on Statistical Mechanics and Dynamical Systems (ITAP, Turunc, Turkey, September 2012).
  20. 'Phase Transitions and Intermittency in Open Aggregation-Fragmentation systems'  
Complex Systems: From Physics to Biology (JNU, New Delhi, October 2013).
  21. 'Aggregation-Fragmentation Dynamics'  
Nonequilibrium Statistical Physics and Nonlinear Dynamics (IACS, Kolkata, January 2014).
  22. 'Condensation and Intermittency in an Aggregation-Fragmentation Model'  
Advances in Nonequilibrium Statistical Mechanics (Galileo Galilei Institute, Florence, July 2014).
  23. 'Order parameter scaling in fluctuation-dominated Phase Ordering'  
Growing Length Scale Phenomena in Condensed Matter Physics (JNCASR, Bengaluru, October 2015)
  24. 'Fluctuation-dominated Phase Ordering'  
Workshop on Nonequilibrium Statistical Physics (ICTS-TIFR, Bengaluru, October 2015).
  25. 'Aggregation, Fragmentation and Phase Transitions in 1D Systems'  
Driven Stochastic Transport in Low-dimensional Systems (Institute for Research in Fundamental Sciences, Tehran, Iran, September 2016).
  26. 'Degrees of Order in Coupled Driven Systems',  
Statphys-Kolkata IX (Saha Institute of Nuclear Physics, Kolkata, December 2016)
  27. 'Interfaces in Random Media: Extremal Dynamics and Passive Scalars'  
Discussion Meeting on Percolation Phenomena (SNBCBS, Kolkata, January 2017).
  28. 'Time Evolution of Intermittency in the Passive Slider Problem'  
International Conference on Recent Advances in Condensed Matter Physics and Complex Systems (Savitribai Phule Pune University, October 2017).
  29. 'Away from the Average: The Physics of Fluctuations'  
Workshop on Theoretical Physics (RKMVU, Belur, December 2017).
  30. 'Clustering and Intermittency in the Passive Scalar Problem'  
SRITP Workshop on Correlations, Fluctuations and Anomalous Transport in Systems far from Equilibrium (Weizmann Institute, Rehovot, January 2018).
  31. 'Phase Transitions in two-component Nonequilibrium Systems'  
UGC Workshop on Soft and Active Matter (University of Hyderabad, February 2018)
  32. 'Fluctuations and Order'  
Conference on Frontiers of Statistical Physics (ISI Kolkata, February 2018)
  33. 'Time Evolution of Intermittency in the Passive Slider Problem'  
Workshop on Emergent Phenomena in Classical and Quantum Systems (SNBCBS, Kolkata, February 2018)

34. 'Stochastic Evolution of Interacting Particle Systems'  
Workshop on Long-range Interactions and Synchronization (ICTP-SAIFR, Sao Paulo, May 2018)
35. 'Fluctuation-dominated order in an Ising model with long-range interactions'  
Workshop on Quantum and Classical Systems with Long-range interactions (International Institute of Physics, Natal-Brazil, July 2019)
36. 'Interface Growth driven by a single Active Particle'  
National conference on Recent topics in Statistical Mechanics, (NISER, Bhubaneswar, December 2019)
37. 'Dynamics of Extremes'  
87th Annual Meeting of the Indian Academy of Sciences, Bengaluru (Virtual meeting, November 2021)
38. 'Coarsening and Extremes'  
Symposium on Current trends in non-equilibrium physics, Jawaharlal Nehru University, New Delhi (Virtual meeting, November 2021)
39. 'Coarsening in Aggregation-Fragmentation Systems: Condensates and Extremes'  
Discussion meeting on Statistical Physics: recent developments and future directions, ICTS-TIFR, Bengaluru (Virtual meeting, February 2022)
40. 'Coarsening, Condensates and Extremes in Aggregation-Fragmentation Models'  
Workshop on Large Deviations, Extremes and Anomalous Transport in Non-equilibrium Systems Erwin Schrodinger Institute, Vienna (September 2022)
41. 'Biased Random Walks in Random Media: Drift and Trapping Effects'  
Statistical Physics of Complex Systems (ICTS-TIFR, Bengaluru, December 2022)
42. 'Coarsening in Fluctuation-dominated Phase Ordering'  
Discussion meeting on Frontiers in Active and Soft Matter (University of Hyderabad and TIFR, Hyderabad, February 2023)
43. 'Approaching the Steady State: A Focus on Extremes'  
Conference on Steady State Phenomena in Soft Matter, Active and Biological Systems (S. N. Bose Centre, Kolkata, March 2023)
44. 'Michael E. Fisher' (Memorial Lecture)  
28<sup>th</sup> IUPAP International Conference on Statistical Physics - Statphys 28 (Tokyo, Japan, August 2023)
45. 'Aggregation and fragmentation: Coarsening, condensation and extremes'  
International Conference on Nonlinear Science and Applications, (IIT Bhubaneswar, October 2023)
46. 'Fluctuation-dominated order'  
Meeting on the State of Theoretical Physics (Harish Chandra Research Institute, Prayagraj, October 2023)
47. 'Stretched exponential to power law relaxation in kinetically constrained models'  
Frontiers in Theoretical Physics (Raman Research Institute, Bengaluru, December 2023)
48. 'Condensates in stochastic aggregation processes'  
International Workshop on Fundamentals and Frontiers in Complex System Dynamics (Hainan University, Haikou, China, August 2024)
49. 'Fluctuation-dominated ordering'  
Summer School on Fundamentals and Frontiers in Complex System Dynamics, (Hainan University, Haikou, August 2024)
50. 'Fluctuation dominated Ordering'  
Condensed Matter Days (Dibrugarh University, November 2024)
51. 'The Origin of Magnetism in Solids' (Three lectures)  
ASSURE School and Workshop on Magnetism, (Osmania University, Hyderabad, December 2024)
52. 'Condensate-induced organization and Emergent power laws in the Takayasu model'  
Indo-French Workshop on Classical and Quantum Dynamics in Out of Equilibrium Systems (ICTS, Bengaluru, December 2024)
53. 'Condensate-induced organization and emergent power laws in the Takayasu model'  
29<sup>th</sup> IUPAP International Conference on Statistical Physics - Statphys 29 (Florence, Italy, July 2025)
54. 'Biased diffusion of particles with Bose-Hubbard interactions on a 1D lattice'  
Statphys Kolkata XIII (SNBCBS, Kolkata, January 2026)

