

## Biographical Sketch

Bulbul Chakraborty

**Mailing Address:** Physics Department MS 057    **Date of Birth:** January 21, 1954  
Brandeis University                                    **Place of Birth:** India  
Waltham, MA 02454-9110                            **Citizenship:** United States  
**Phone:** (781) 736-2843

### Professional Preparation

State University of New York, Stony Brook                                    Physics    Ph.D., 1979  
State University of New York, Stony Brook                                    Physics    M.S., 1975  
Indian Institute of Technology, Kharagpur, India,                                    Physics    B.Sc., 1974

### Appointments

Sept 2000–                                    Professor, Brandeis University,  
Sept 1994–Sept 2000                                    Associate Professor, Brandeis University  
Sept 1989–Sept 1994                                    Assistant Professor, Brandeis University  
Sept 1987–Aug 1989                                    Associate Research Physicist and Lecturer,  
Applied Physics, Yale University  
April 1986–July 1987                                    Visiting Assistant Professor, NORDITA, Denmark  
March 1984–March 1986                                    Scientific Officer (equivalent of Assistant Professor)  
Materials Science Laboratory, Indira Gandhi  
Center for Atomic Research  
July 1983–March 1984                                    Research Associate, Indian Institute of Science  
Jan 1983–June 1983                                    Visiting Scientist, NORDITA, Denmark  
Feb 1979–Dec 1982                                    Postdoctoral Fellow, Materials Science Division,  
Argonne National Laboratory

### Service

2006–                                    Chair, Department of Physics, Brandeis University,  
2003-2005                                    Member, GSNP Executive Committee, APS,  
2005                                    Chair, Nominating Committee of GSNP, APS,  
2002–                                    Member, Board of Directors, Boulder School for Condensed Matter and Materials Physics  
2007–                                    Organizing Committee of Gordon Conference on Granular Materials

# 1 Publications

1. “Single Polymer Confinement in a tube: Correlation between structure and dynamics”, Joshua Kalb and Bulbul Chakraborty, *J. Chem. Phys* (2008)
2. “Shape of Semiflexible Polymers in Confined Spaces”, Ya Liu and Bulbul Chakraborty, *Physical Biology* 5, 026004 (2008)
3. “Jamming of Granular Matter” R. P. Behringer and Bulbul Chakraborty, Invited article in Springer Encyclopedia of Complexity and System Science.
4. “Why Do Granular Materials Stiffen with Shear Rate? A Test of Novel Stress-Based Statistics”, R.P. Behringer, B. Chakraborty, S. Henkes, and R. R. Hartley, submitted to *Phys. Rev. Lett.*
5. “Dynamics of an idealized model of microtubule growth and catastrophe”, T. Antal, P. L. Krapivsky, S. Redner, M. Mailman, and B. Chakraborty, *Phys. Rev. E* 76, 041907 (2007)
6. “Entropy and Temperature of a Static Granular Assembly: An Ab Initio Approach”, Silke Henkes, Corey S. O’Hern and Bulbul Chakraborty, *Phys. Rev. Lett.* 99, 038002 (2007)
7. “Spatially heterogeneous dynamics in dense, driven granular flows, A. Ferguson and B. Chakraborty, *Europhys. Letters* 78, 28003 (2007)
8. “Numerical studies of the compressible spin glass”, Adam H. Marshall, Bulbul Chakraborty and Sidney R. Nagel, *Europhys. Lett.* 74, 699 (2006)
9. “Stress and large-scale spatial structures in dense, driven granular flows”, A. Ferguson and B. Chakraborty, *Phys. Rev. E* 73, 011303 (2006)
10. “Jamming as a critical phenomenon: a field theory of zero-temperature grain packings” S. Henkes and B. Chakraborty, *Phys. Rev. Lett.* 95, 198002 (2005)
11. “Critical Dynamics of Dimers: Implications for the Glass Transition”, D. Das, G. Farrell, J. Kondev and B. Chakraborty, *J. Phys. Chem. B* 109, 21413 (2005)
12. “Landau Theory of the glass transition”, Satya Majumdar, Dibyendu Das, Jane’ Kondev and Bulbul Chakraborty, *Phys. Rev. E* **70**, 060501(R) (2004)
13. “ Impulse Distributions in dense granular flows: signatures of large-scale spatial structures”, Allison Ferguson, Ben Fisher and Bulbul Chakraborty, *Europhys Lett.* **66**, 277 (2004)
14. “Activated Dynamics at a non-disordered critical point”, Dibyendu Das, Jane’ Kondev and Bulbul Chakraborty, *Europhys Lett.* **61**, 506 (2003)
15. “Jamming in a model glass: interplay of dynamics and thermodynamics”, Bulbul Chakraborty, Dibyendu Das and Jane’ Kondev, *Physica A* **318**, 23 (2003)

16. “Topological jamming and the glass transition in a frustrated system”, Bulbul Chakraborty, Dibyendu Das and Jane’ Kondev, *Eur. Phys. J. E.* **9**, 227 (2002)
17. “Clustering in a model with aggregation and mass-dependent diffusion” , R. Rajesh, Dibyendu Das, Bulbul Chakraborty, and M. Barma, *Phys. Rev.* **E66**, 056104 (2002)
18. “Slow dynamics and aging in a non-randomly frustrated spin system”, Hui Yin and Bulbul Chakraborty, *Phys. Rev.* **E65**, 036119-1 (2002).
19. H. Yin and B. Chakraborty, “Entropy-vanishing transition and glassy dynamics in frustrated spins,” *Physical Review Letters*, vol. 86, pp. 2058–2061, 2001.
20. H. Yin, B. Chakraborty, and N. Gross, “Effective held theory of the zero-temperature triangular-lattice antiferromagnet: A monte carlo study,” *Physical Review E*, vol. 61, pp. 6426–6433, 2000.
21. N. Gross, M. Ignatiev, and B. Chakraborty, “Kinetics of ordering in fluctuation-driven first-order transitions: Simulation and theory,” *Physical Review E*, vol. 62, pp. 6116–6125, 2000.
22. B. Chakraborty, L. Gu, and H. Yin, “Glassy dynamics in a frustrated spin system: the role of defects,” *Journal of Physics-Condensed Matter*, vol. 12, pp. 6487–6495, 2000.
23. M. Ignatiev and B. Chakraborty, “Ergodicity-breaking transition and high-frequency response in a simple free-energy landscape,” *Physical Review E*, vol. 60, pp. R21–R24, 1999.
24. D. Olmsted and B. Chakraborty, “Comment on ”origin of the modulated phase in copper-gold alloys”,” *Physical Review Letters*, vol. 83, pp. 460–460, 1999.
25. O. Malis, K. Ludwig, D. Olmsted, and B. Chakraborty, “Monte carlo study of short-range order and displacement effects in disordered cuau,” *Philosophical Magazine B-Physics of Condensed Matter Statistical Mechanics Electronic Optical and Magnetic Properties*, vol. 79, pp. 869–879, 1999.
26. K. Elder, O. Malis, K. Ludwig, B. Chakraborty, and N. Goldenfeld, “An x-ray scattering and simulation study of the ordering kinetics in cuau,” *Europhysics Letters*, vol. 43, pp. 629–634, 1998.
27. B. Chakraborty, K. Elder, and N. Goldenfeld, “Influence of modulated structures on ordering dynamics in cuau,” *Physica a*, vol. 224, pp. 113–127, 1996.
28. Sobkowicz1996 “Ising Model with Frustration, Elasticity and Competing Interactions”, Mark Sobkowicz and Bulbul Chakraborty, *J. Stat. Phys.* vol. 83, 739 (1996).
29. L. Gu, B. Chakraborty, Pedro Garrido, Mohan Phani and Joel Lebowitz “Monte carlo study of a compressible ising antiferromagnet on a triangular lattice,” *Physical Review B*, vol. 53, pp. 11985–11992, 1996.

30. B. Chakraborty and Z. Xi, "Microscopic modeling of the growth of order in an alloy: Nucleated and continuous ordering," *Physical Review B*, vol. 53, pp. 5063–5066, 1996.
31. "Static Displacements and Chemical Correlations in Alloys: A Theoretical Model", Bulbul Chakraborty, *Europhys. Letters* vol. 30, 531 (1995).
32. B. CHAKRABORTY and Z. XI, "Atomistic Landau theory of ordering and modulated phases in Cu-Au alloys," *Physical Review Letters*, vol. 68, pp. 2039–2042, 1992.
33. Z. XI, B. CHAKRABORTY, K. JACOBSEN, and J. NORSKOV, "An effective-medium theory approach to ordering in Cu-Au alloys," *Journal of Physics-Condensed Matter*, vol. 4, pp. 7191–7202, 1992.
34. B. CHAKRABORTY, "Positron-annihilation from nearly localized Fermi liquids - a probe of pairing," *Physical Review B*, vol. 43, pp. 378–382, 1991.
35. B. CHAKRABORTY, N. READ, C. KANE, and P. LEE, "Spiral phases and time-reversal-violating resonating-valence-bond states of doped antiferromagnets," *Physical Review B*, vol. 42, pp. 4819–4822, 1990.
36. C. KANE, P. LEE, T. NG, B. CHAKRABORTY, and N. READ, "Mean-field theory of the spiral phases of a doped antiferromagnet," *Physical Review B*, vol. 41, pp. 2653–2656, 1990.
37. N. READ and B. CHAKRABORTY, "Statistics of the excitations of the resonating-valence-bond state," *Physical Review B*, vol. 40, pp. 7133–7140, 1989.
38. B. CHAKRABORTY, "Positron-annihilation in the high- $T_c$  superconductors," *Physical Review B*, vol. 39, pp. 215–221, 1989.
39. B. CHAKRABORTY, "From quasicrystals to icosahedral glass," *Physical Review B*, vol. 38, pp. 345–349, 1988.
40. A. BHARATHI and B. CHAKRABORTY, "Response of positrons to clustering in Al-Zn alloys," *Journal of Physics F-Metal Physics*, vol. 18, pp. 363–375, 1988.
41. B. CHAKRABORTY, A. SOOD, and M. VALSAKUMAR, "Discommensurations in icosahedral phases," *Physical Review B*, vol. 34, pp. 8202–8206, 1986.
42. S. FROYEN, S. HOLLOWAY, J. NORSKOV, and B. CHAKRABORTY, "Quantum motion of chemisorbed hydrogen," *Journal of Electron Spectroscopy and Related Phenomena*, vol. 38, pp. 313–315, 1986.
43. B. CHAKRABORTY, S. HOLLOWAY, and J. NORSKOV, "Oxygen-chemisorption and incorporation on transition-metal surfaces," *Surface Science*, vol. 152, pp. 660–683, 1985.
44. M. FLUSS, S. BERKO, B. CHAKRABORTY, P. LIPPEL, and R. SIEGEL, "A mono-vacancy divacancy model interpretation of positron-annihilation measurements in aluminum," *Journal of Physics F-Metal Physics*, vol. 14, pp. 2855–2868, 1984.

45. M. FLUSS, S. BERKO, B. CHAKRABORTY, K. HOFFMANN, P. LIPPEL, and R. SIEGEL, "Positron-annihilation spectroscopy of the equilibrium vacancy ensemble in aluminum," *Journal of Physics F-Metal Physics*, vol. 14, pp. 2831–2854, 1984.
46. M. PUSKA, R. NIEMINEN, M. MANNINEN, B. CHAKRABORTY, S. HOLLOWAY, and J. NORSKOV, "Quantum motion of chemisorbed hydrogen on ni surfaces," *Physical Review Letters*, vol. 51, pp. 1081–1084, 1983.
47. M. FLUSS, L. SMEDSKJAER, B. CHAKRABORTY, and M. CHASON, "Positron-annihilation in solid and liquid ni," *Journal of Physics F-Metal Physics*, vol. 13, pp. 817–825, 1983.
48. B. CHAKRABORTY and R. SIEGEL, "Electron and positron response to atomic defects in solids - a theoretical-study of the monovacancy and divacancy in aluminum," *Physical Review B*, vol. 27, pp. 4535–4552, 1983.
49. B. CHAKRABORTY, "Effects of electron-positron correlation on positron-annihilation - self-consistent band-structure calculations in Al," *Physical Review B* vol. 24, pp. 7423–7426, 1981.
50. P. ALLEN and B. CHAKRABORTY, "Infrared and dc conductivity in metals with strong scattering - non-classical behavior from a generalized boltzmann-equation containing band-mixing effects," *Physical Review B*, vol. 23, pp. 4815–4827, 1981.
51. B. CHAKRABORTY, R. SIEGEL, and W. PICKETT, "Self-consistent electronic-structure of a vacancy in aluminum," *Physical Review B*, vol. 24, pp. 5445–5454, 1981.
52. B. CHAKRABORTY and P. ALLEN, "Boltzmann theory generalized to include band mixing - possible theory for resistivity saturation in metals," *Physical Review Letters*, vol. 42, pp. 736–738, 1979.
53. B. CHAKRABORTY and P. ALLEN, "Theory of temperature-dependence of optical-properties of solids," vol. 11, pp. L9–L14, 1978. *Journal of Physics C-Solid State Physics*.
54. B. CHAKRABORTY and P. ALLEN, "Solids with thermal or static disorder .2. optical-properties," *Physical Review B*, vol. 18, pp. 5225–5235, 1978.
55. B. CHAKRABORTY, W. PICKETT, and P. ALLEN, "Density of states, optical mass, and dc electrical-resistance of ta, w, nb, and mo using slater-koster interpolation," *Physical Review B*, vol. 14, pp. 3227–3230, 1976.

## 2 Recent Invited Talks at Conferences

1. Discussion Leader, Gordon Conference on Granular Matter, June 2008
2. Invited to Lorentz Center Workshop on Dynamical Heterogeneties in Glasses, August 2008

3. 98th Statistical Mechanics Meeting, Rutgers, December 2007
4. Aspen summer institute on Jamming, August 2007
5. Gordon Conference on Nonlinear Science, Colby College, Maine, July 2007
6. Gordon Conference on Granular Materials, Oxford, July 2006
7. Lecturer at Boulder School on Complex Fluids, June 2006
8. Aspen summer institute on Glassy Dynamics, June 2005
9. New England Complex Fluid meeting, MIT, March 2005
10. March meeting of the American Physical Society Montreal, March 22-26, 2004
11. Fall Meeting of the American Chemical Society Meeting, New York, Sep 7-11, 2003
12. "Conference on Complex Systems", University of Illinois at Urbana-Champaign, May 19-21, 2003
13. "Statphys Kolkata IV", Kolkata, India, January 14-19, 2002.
14. "Workshop on slow dynamics and the glass transition", Bangalore, India, January 6-9, 2002.
15. "Horizons in Complex Systems", Messina, Sicily, December 5-8, 2001.
16. "Mini Workshop on Systems far From Equilibrium", Virginia Tech., March, 2000.
17. "Winter School on Electronic Structure and the Physics of Materials", Calcutta, India, November, 1999.
18. "Trieste Workshop on Unifying Concepts in Glass Physics", September, 1999.
19. "International Conference on Computational Physics", Granada, Spain, August, 1998.
20. "ITP Workshop on Jamming and Rheology", Santa Barbara, October, 1997.
21. "Rutgers Statistical Mechanics Meeting", May, 1997.

### **3 Ph.D. Thesis of Students**

1. "Dynamics of confined polymers", Joshua Kalb, February, 2008
2. "Driven granular matter", Allison Ferguson, May, 2006
3. "Studies of a frustrated spin model-compressible Ising antiferromagnet on a triangular lattice", Hui Yin, May, 2001.
4. "Elastic Effects in Binary Alloy Ordering", David Olmsted, May, 1999.

5. “Studies of Static and Dynamic Properties of a Compressible Ising Antiferromagnet on a Triangular Lattice”, Lei Gu, February, 1999.
6. “Ergodicity Breaking and High-Frequency Response in a Simple Free-Energy Landscape”, Michael Ignatiev, June, 1998.
7. “Effective medium Theory Description of Ordering in Alloys”, Zhigang Xi, 1994.