

## CURRICULUM VITAE

### 1. Personal

*Name:* Jorge KURCHAN

*Birth date:* September 4<sup>th</sup> 1959

*Birth place:* Buenos Aires, Argentina

*Citizenship:* Argentinian/Italian

*Marital status:* Single

*Home address:* 22 rue Bobillot ,  
Paris 75013, France.

*Work address:* Physique et Mecanique des Milieux Hétérogènes,  
Ecole Supérieure de Physique et de Chimie Industrielles,  
10, rue Vauquelin - 75231 Paris Cedex 5 - FRANCE

### 2. Education and Degrees

*Licenciado en Física:* Universidad Nacional de Buenos Aires, 1985

*Doctor en Física :* Universidad Nacional de Buenos Aires, 1989.  
*(Ph.D. degree)* Thesis title: “Collective Coordinates in Many Body Problems”  
Supervisor: Prof. D.R. Bes.

### 3. Research Activities

#### A. Chronology

- 1985-1989    Scholarship. Department of Physics, National Atomic Energy Commission, Buenos Aires, Argentina.
- 1989-1990    Scholarship. Nuclear Physics Department , The Weizmann Institute of Science, Israel.
- 1990-1992    Scholarship. Istituto Nazionale di Fisica Nucleare. Universita di Roma I.
- 1992-1994    Research contract. Istituto Nazionale di Fisica Nucleare. Universita di Roma I.
- 1994-1996    Chercheur Associe,. Ecole Normale Superieure. Paris.
- 1996-2001    Charge de Recherches. CNRS.
- 2001-        Directeur de Recherches. CNRS.

#### 4. Teaching Experience

- 1980-1984 Teacher of Mathematics. Boys ages 10-12.
- 1982-1985 Teacher of Physics. Boys ages 12-17.
- 1993-1994 Theoretical Physics course.  
Universita di Roma I (with M. Virasoro)
- 1998/1999 Graduate course on Disordered systems.  
ENS-Lyon.
- 2000 'Tutorat' third year course.  
ESPCI

#### 5. Prizes:

- Prix Jean Langlois de Diffusion de la Recherche (2002)  
Prix Langevin Societe Francaise de Physique (2002)  
Prix Servant de la Academie des Sciences (2005)

#### 6. Editorial Work

1. Co-Editor Europhysics Letters (2002-2005)
2. Co-Editor of Journal of Statistical Physics (2003-)

#### 7. Patent

A new strategy for the separation of magnetically marked cells and macromolecules,  
J-L Iguain and J. Kurchan, see: <http://www.frinnov.com/index.php?wpe=a265>

## 8. List of Publications

1. *The Perturbative Treatment of a Superfluid System*  
D.R. Bes, J. Kurchan, M.T. Mehr and G. Zemba.  
Nucl.Phys. **A471**(1987)565
2. *Becchi-Rouet-Stora-Tyutin Treatment of Collective Coordinates*  
J. Kurchan, D.R. Bes and S. Cruz Barrios.  
Phys. Rev. **D38**(1988)3309.
3. *An Algebraic Method for the Treatment of Broken Symmetries in Many- Body Systems: A Simple Example*  
D.R. Bes, S. Cruz Barrios and J. Kurchan.  
Ann. of Phys. **194** (1989)227.
4. *A Systematic Treatment of Triaxial Systems at High Spins*  
J. Kurchan, D.R. Bes and S. Cruz Barrios.  
Nucl. Phys. **A509** (1990) 306.
5. *Semiclassical Approximations in the Coherent State Representation*  
J. Kurchan, P. Leboeuf and M. Saraceno.  
Phys. Rev. **A40** (1989)6800.
6. *Lecture Notes : The Treatment of Collective Coordinates in Many Body Problems, an Application of the BRST Invariance*  
World Scientific, Singapore (1990).  
D.R. Bes and J. Kurchan.  
(Approximately the same content as the Ph.D. thesis).
7. *The BRST treatment of collective rotational coordinates in axially-symmetric systems*  
D.R. Bes , R. DeLuca and J. Kurchan.  
Phys. Lett. **B248** (1990)1.
8. *Critical Capacity of Constrained Perceptrons*  
J. Kurchan and E. Domany.  
J. Phys. **A23** (1991) L847.
9. *Critical Capacity of Noisy and Asymmetrically Constrained Perceptrons*  
J. Kurchan and E. Domany.  
J. Phys. **A24** (1991) 1947.

10. *Phase Space Localization: Topological Aspects of Quantum Chaos*  
P. Leboeuf, J. Kurchan, M. Feingold and D.P. Arovas.  
Phys. Rev. Lett. **65** (1990) 3076.
11. *Replica Trick to Calculate Means of Absolute Values: Applications to Stochastic Equations*  
J. Kurchan  
J. Phys. **A24** (1991) 4969.
12. *Topological Aspects of Quantum Chaos*  
P. Leboeuf, J. Kurchan, M. Feingold and D. Arovas.  
Chaos **2** (1) (1992) 125.
13. *Supersymmetry in Spin Glass Dynamics*  
J. Kurchan  
Journal de Physique **I 2** (1992) 1333.
14. *On the Computation of Static Quantities from Dynamics in Spin Glasses*  
S. Franz and J. Kurchan.  
Europhys. Lett. **20** (1992) 197.
15. *Barriers and Metastable States as Saddle Points in the Replica Approach*  
J. Kurchan, G. Parisi and M. Virasoro.  
Journal de Physique I (France) **3** (1993), 1819.
16. *Analytical solution of the off-equilibrium dynamics of a long range spin-glass model*  
L.F. Cugliandolo and J. Kurchan;  
Phys. Rev. Lett. **71**, (1993) 173.
17. *Evidence of Aging in Mean-Field Spin-Glass Models*  
L.F. Cugliandolo, J. Kurchan and F. Ritort;  
Phys. Rev. **B 49** (1993) 6331.
18. *On the out of Equilibrium Dynamics of the Sherrington-Kirkpatrick Model*  
L.F. Cugliandolo and J. Kurchan;  
J. Phys. **A 27** (1994), 5749.
19. *Off equilibrium dynamics and aging in unfrustrated systems*  
L.F. Cugliandolo and J. Kurchan and G. Parisi;  
J. Physique I (France) **4** (1994) 1641.

20. *A Statistical investigation of bidirectional associative memories (BAM)*  
J. Kurchan and L. Peliti and M. Saber;  
J. Physique I (France) **4** (1994) 1627.
21. *Matrix Models as solvable glass models*  
L.F. Cugliandolo and J. Kurchan, G. Parisi and F. Ritort;  
Phys. Rev. Lett. **74** (1995) 1012.
22. *Weak-ergodicity breaking in mean-field spin-glass models*  
L.F. Cugliandolo and J. Kurchan;  
Philos. Magaz. **B71** (1995) 501.
23. *On the non-equilibrium order parameter in long-range spin-glasses*  
A. Baldassarri, L.F. Cugliandolo and J. Kurchan and G. Parisi.  
J. Phys. **A 28** (1995), 1831.
24. *A mean-field hard spheres model of glass*  
L.F. Cugliandolo, J. Kurchan, R. Monasson et G. Parisi.  
*J. Phys. A* **29**, (1996) 1347.
25. *Large time off-equilibrium dynamics of a manifold in a random potential*  
L.F. Cugliandolo, J. Kurchan et P. Le Doussal;  
*Phys. Rev. Lett.* **76**, (1996) 2390.
26. *Phase-space geometry and slow dynamics*  
J. Kurchan et L. Laloux  
*J. Phys.* **A29**, (1996) 1929.
27. *Mode-Coupling Approximations, Glass Theory and Disordered systems*  
J.P. Bouchaud, L.F. Cugliandolo, J. Kurchan et M. Mézard.  
*Physica* **A226**, (1996) 243.
28. *Out of equilibrium dynamics in spin-glasses and other glassy systems*  
J-P Bouchaud, L. F. Cugliandolo, J. Kurchan and M. Mézard  
to appear in *Spin-glasses and random fields*, A. P. Young ed. (World Scientific, Singapore).
29. *Glassy behaviour in disordered systems with nonrelaxational dynamics*  
L. F. Cugliandolo, J. Kurchan, P. Le Doussal and L. Peliti;  
Phys. Rev. Lett. **78**, (1997) 350.

30. *Energy flow, partial equilibration and effective temperatures in systems with slow dynamics*  
L. F. Cugliandolo, J. Kurchan and L. Peliti;  
*Phys. Rev.* **E55**, (1997) 3898.
31. *Aging in lattice-gas models with constrained dynamics*  
J. Kurchan, M. Sellitto and L. Peliti  
*Europhys. Lett.* **39** (1997) 365.
32. *Fluctuation-Dissipation theorems and entropy production in relaxational systems*  
L. F. Cugliandolo, D.S. Dean and J. Kurchan  
*Phys. Rev. Lett.* **79**, (1997) 2168.
33. *Canonically invariant formulation of Langevin and Fokker-Planck Equations*  
O. Cepas and J. Kurchan  
*Eur. Phys. J. B* **2**, (1998) 221.
34. *Fluctuation Theorem for stochastic dynamics*  
J. Kurchan  
*J. Phys. A* **31** (1998)3719 .
35. *Thermal properties of slow dynamics*  
L.F. Cugliandolo and J. Kurchan  
*Physica* **A263** (1999) 242.
36. *Mean-field theory of temperature cycling experiments in spin-glasses*  
L.F. Cugliandolo and J. Kurchan  
*Phys. Rev.* **B60**,(1999) 922.
37. *Rheology, and how to stop aging*  
J. Kurchan  
*Jamming and Rheology: Constrained Dynamics on Microscopic and Macroscopic Scales* eds. Liu, A. & Nagel, S. R., Taylor and Francis, London (2001) S. F. Edwards, A. Liu and R. S. Nagel Eds.
38. *Response Function of Coarsening Systems*  
L. Berthier, J-L Barrat and J. Kurchan  
*Eur. Phys. J.* **B 11**, (1999) 635-641.
39. *A Search for Fluctuation-Dissipation Theorem Violations in Spin-Glasses from Susceptibility Data*  
L. F. Cugliandolo, D. R. Grempel, J. Kurchan and E. Vincent  
*Europhys. Lett.* **48**, (1999) 699.

40. *Emergence of macroscopic temperatures in systems that are not thermodynamical microscopically: towards a thermodynamical description of slow granular rheology*  
Jorge Kurchan  
J. Phys. (Cond. Mat.) **29** (2000) 6611.
41. *Two-time scales, two-temperature scenario for nonlinear rheology*  
Ludovic Berthier, Jean-Louis Barrat and Jorge Kurchan  
Phys. Rev. **E 61**, (2000) 5464.
42. *A scenario for the dynamics in the small entropy production limit*  
Leticia F. Cugliandolo and Jorge Kurchan  
Journal of the Phys. Soc. Japan, Supp. A **69**, (2000) 247.
43. *Metastable states in glassy systems*  
Giulio Biroli and Jorge Kurchan  
Phys. Rev. **E 64**, 16101 (2001).
44. *Edwards measures for powders and glasses*  
A. Barrat, J. Kurchan, V. Loreto and M. Sellitto  
Phys. Rev. Lett. **85**, 5034 (2000)
45. *Dynamic ultrametricity in spin glasses*  
Ludovic Berthier, Jean-Louis Barrat and Jorge Kurchan  
Phys. Rev. **E 63**, 16105 (2001)
46. *A Quantum Fluctuation Theorem*  
Jorge Kurchan  
cond-mat/0007360
47. *Phase separation in a chaotic flow*  
Ludovic Berthier, Jean-Louis Barrat and Jorge Kurchan  
Phys. Rev. Lett. **86**, 2014 (2001)
48. \* *Recent theories of glasses as out of equilibrium systems*  
Jorge Kurchan  
Special issue 'Physics of Glasses' of  
Comptes Rendus de Physique de l'Academie des Sciences **IV** (2001) 239.
49. *Edwards' measures: a thermodynamic construction for dense granular media and glasses*  
A. Barrat, J. Kurchan, V. Loreto and M. Sellitto  
Phys. Rev. **bf E63** , 51301 (2001)

50. *Testing the thermodynamic approach to dense granular matter with a numerical model of a decisive experiment.*  
Nature **415** (2002) 614
51. *Elementary constraints on autocorrelation function scalings.*  
Jorge Kurchan  
Phys. Rev. **E 66**, 17101 (2002)
52. *Dense granular media as athermal glasses.*  
Jorge Kurchan  
J. Phys.: Condens. Matter **12** (2000) 6611
53. *Strong Soret effect in one dimension.*  
Adan Garriga, Jorge Kurchan, Felix Ritort  
J. Stat. Phys., **106** (2002)
54. *Supersymmetry, replica and dynamic treatments of disordered systems: a parallel presentation*  
Jorge Kurchan  
cond-mat/0209399, to appear in Journal of Markov Processes and Related Fields.
55. *Tailoring symmetry groups using external alternate fields.*  
I. Junier and J. Kurchan  
cond-mat/0209231, Europhysics Letters **63** 715 (2003)
56. *Statistical-mechanical formulation of Lyapunov exponents.* Sorin Tanase-Nicola and Jorge Kurchan  
cond-mat/0210380, J. Phys. **A36**, 10299 (2003)
57. *Topological methods for searching barriers and reaction paths .*  
Sorin Tanase-Nicola and Jorge Kurchan  
cond-mat/0302448, Phys. Rev. Lett **91** (2003).
58. *Putting hydrodynamic interactions to work: tagged particle separation.*  
Jose Luis Iguain and Jorge Kurchan,  
cond-mat/0211243, Europhysics Letters **63** (5) 715 (2003)
59. *Dynamics and geometric properties of the k-Trigonometric model*  
F.Zamponi, L.Angelani, L.F.Cugliandolo, J.Kurchan, G.Ruocco  
cond-mat/0304399, J Phys. **A36** 8565 (2003)
60. *Metastable states, transitions, basins and borders at finite temperatures .*  
Sorin Tanase-Nicola and Jorge Kurchan  
cond-mat/0311273, Journal of Statistical Physics, 116 (5): 1201 (2004).

61. *Microscopic realizations of the Trap Model.*  
I. Junier and J. Kurchan  
cond-mat/0311158, J. Phys. **A 37**, 3945 (2005)
  
62. *In and out of Equilibrium*  
J. Kurchan  
Nature **433** 222 (2005)
  
63. *Building a Thermodynamics on sand*  
*In: 'Stealing the Gold'.*  
N. Goldenfeld, P. Goldbart and D. Sherrington Eds.  
Oxford University Press, (2005).
  
64. *Fourier law in a momentum-conserving chain*  
C.Giardina', J.Kurchan  
cond-mat/0502485 (2005), J. Stat. Mech. 05009 (2005)
  
65. *Kramers equation and supersymmetry.*  
Julien Tailleur, Sorin Tanase-Nicola, Jorge Kurchan  
cond-mat/0503545 (2005), J. Stat. Phys. **122**, 557 (2006)
  
66. *Shear-thickening and entropy-driven reentrance,*  
Mauro Sellitto, Jorge Kurchan,  
cond-mat/0507128, Phys. Rev. Lett. **95** 236001 (2005)
  
67. *Fluctuation theorem for non-equilibrium relaxational systems driven by external forces,*  
F.Zamponi, F.Bonetto, L.F.Cugliandolo, J.Kurchan,  
cond-mat/0504750, J. Stat. Mech. (2005) P09013
  
68. *Nonequilibrium work relations,*  
J. Kurchan,  
cond-mat/0511073, J. Stat. Mech., to appear.
  
69. *Direct evaluation of large-deviation functions*  
C Giardina, J Kurchan and L Peliti  
Phys. Rev. Lett. **96** 120603 (2006)
  
70. *Probing rare physical trajectories with Lyapunov weighted dynamics*  
Julien Tailleur and Jorge Kurchan  
Nature Physics **3** 203 (2007)

71. *A Landscape Analysis of Constraint Satisfaction Problems.*  
Florent Krzakala and Jorge Kurchan  
cond-mat/0702546, Phys. Rev. **E**, to appear
  
72. *Gallavotti-Cohen theorem, Chaotic Hypothesis and the zero-noise limit.*  
Jorge Kurchan  
cond-mat/0612397, J. Stat. Physics, to appear.
  
73. *Duality and exact correlations for a model of heat conduction.*  
C. Giardin, J. Kurchan, F. Redig  
cond-mat/0612198 and J. Math. Phys. **48** 33301 (2007)
  
74. *Mapping out of equilibrium into equilibrium:  
the macroscopic fluctuations of simple transport models.*  
J. Tailleur, J. Kurchan and V. Lecomte  
cond-mat/07054033 and Phys. Rev. Lett., to appear.
  
75. *Conductivity as stiffness*  
J. Kurchan  
In preparation.