Résumé: Raphael Blumenfeld

Nationality: UK, Israel
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Education

1989 Ph.D., Physics - Tel Aviv University. *Random systems - Nonlinear conductivity and distributions*, Supervisors: Profs. Amnon Aharony and David J. Bergman, **Magna cum Laude**.
1986 M.Sc., Physics - Tel Aviv University. *Nonlinear random resistor networks, topological problems and fluctuations*, Supervisor: Prof. Amnon Aharony, **Magna cum Laude**.
1984 B.Sc., Physics - Tel Aviv University, **Distinction** (equivalent to a UK First).

Languages

English Speaking - excellent; Reading - excellent; Writing - excellent
Hebrew Speaking - excellent; Reading - excellent; Writing - excellent
Romanian Speaking - excellent; Reading - excellent; Writing - satisfactory

Employment / Appointments

2010-present Research Fellow, Inst. of Shock Physics, Imperial College London, UK
2005-present Research Fellow, Earth Science and Engineering, Imperial College London, UK
1997-present Long-Term Visiting Scientist, Cavendish Laboratory, Cambridge University, UK
2000-01 Research Associate, Physics Dept., University of Warwick, UK
1997-98 Project Leader, Mesoscale group, R & D, Molecular Simulations Inc (now Accelrys), Cambridge, UK
1996-97 Research Scientist, Cambridge Hydrodynamics Inc (led by Prof S.A. Orszag), Princeton, NJ, USA
1993-96 Director's Fellow, Los Alamos National Laboratory, NM, USA
1992-93 Research Associate, Princeton University, NJ, USA
1989-92 Research Associate, Cavendish Laboratory, Cambridge University, UK
1987 Visiting Research Scientist, IBM (with Prof B. B. Mandelbrot), Yorktown Heights, USA

Honors / Awards / Grants

2011 Nuffield Undergraduate Research Bursary URB/39915: 1440 GBP
2010-2014 EPSRC Grant EP/H051716/1: 271,432 GBP
2010 Visiting Grant, Tsukuba University, Japan: 772,000 yen
2009-present Life member, Gonville and Caius College, Cambridge, UK
2008-2011 Alan Howard Scholarship: 229,858 GBP
2008-2009 EOARD Grant 083046: 50,000 USD
2008 StatoilHydro Grant: 50,000 GBP
2007-present Member of the Room, Gonville and Caius College, Cambridge, UK
2005-2008 EPSRC Grant: 293,952 GBP
1993-6 Director's Fellowship, Los Alamos National Laboratory
1990-2 Leo Baeck Lodge Award
1989 Weiler Foundation Scholarship Award
1985, 1988-9 Distinction Award, Tel Aviv University
1982-8 Scholarship, Tel Aviv University

Organization / Professional Activities

2011 Session Chair, in *Workshop: Complexity in the Oil Industry*, Natal, Brazil, 14-18 Novempber

2008 Session Chair and Discussion Leader, *Structure and Packing* in *Gordon Conference on Granular and Granular-Fluid Flow*, Waterville, Maine, US, 22-26 July

2007 Session Chair, *Reservoir Simulation* in *Universities Forum on Reservoir Description and Simulation (UFORDS)*, Scarborough, UK, 2-6 September

2007 Organizer and chairman, *Workshop on Fractures, Complexity in the Oil Industry*, Natal, Brasil, 5-9 August

2007 Discussion leader on *Slow dynamics of granular materials and modeling quasi-statics*, in Workshop on **Jamming**, Aspen Center for Physics, Aspen, CO, USA, 20 June - 3 August

2007 Discussion leader on *Stress transmission and isostaticity theory*, in Workshop on **Jamming**, Aspen Center for Physics, Aspen, CO, USA, 20 June - 3 August

2004-2006 Organizer and Chairman, *Working Group on Dimensional Reduction in many-variable systems*, EU COST action P10 *Physics of Risk*

2004 Programme Committee, SPIE conference *Fluctuation and Noise, FaN2004*, Maspalomas, Gran Canaria, Spain, 25-28 May

2003 Chairman, *Statics and Dynamics of Systems of Rigid Particles*, Isaac Newton Institute, Cambridge, UK 10 December

2003 Organizing Committee, SPIE conference *Fluctuation and Noise, FaN2003*, Santa Fe, NM, USA, 1-4 June

1999-2001 Specialist Subject Reviewer, Quality Assurance Agency (QAA) for Higher Education, UK

2000 Organizing Committee Member, MESOMECHANICS2000, China

1995 Organizer and Chairman, Workshop on *Fractal Analysis and Modelling of Materials*, Los Alamos National Laboratory, USA

1994-96 Organizer and Chairman, *Working Group on Protein Dynamics*, CNLS, Los Alamos National Laboratory, USA

Students

1990-92, 99- Supervision / tutorials: Parts I, II and III Physics students, Cambridge University.

1995 Yi Jiang, Los Alamos National Laboratory, PhD (summer student) - 1. Growth of planar Laplacian surfaces; 2. Parameter flow in coarse-graining of disordered systems.

1994-95 Rudolph Held, Los Alamos National Laboratory, MSc (summer student) - Characterization of, and flow in, porous media.

2007 Arutchelvi Harichandran, Imperial College London, Part III (MSc) - Distribution of heights on top of a granular pack.

2007 Ian Hewett, Cavendish Laboratory, Part II - A Study of Gas Permeation Through Granular Beds.

2007 Michael Peyton-Jones, Cavendish Laboratory, Sixth Form summer student - Quantitative analysis of contact forces in a two-dimensional poly-distributed particle bed using photoelastic methods.

2007 Golnaz Alipour, Stanford University, US, PhD - Analysis and numerical simulations of stress propagation in granular materials (joint advisor with Prof. M. Gerritsen)

2008 Joe Jordan, Cavendish Laboratory, Part III (MSci) - Statistics of force chain networks in granular systems.

2008 Anna Timoshina, Cavendish Laboratory, Part III (MSci) - Statistics of force chain networks in granular systems - skeletonization.

2008 Hannah Davies, Cavendish Laboratory, Part III (MSci) - Shaken not Stirred: conductivity of shaken graphite particles.

2008 Phil Tooke, Cavendish Laboratory, Part III (MSci) - Structural analysis of deposited particles in two dimensions.

2009 Lauri Toikka, Cavendish Laboratory, Part III (MSci) - The famous particle packing problem.

2009-2013 Rebecca Hihinashvili, Imperial College London, PhD - Morphological characterization of porous electrodes and membranes for fuel cells.

2010 Zilvinas Rimas, Cavendish Laboratory, Part II (summer student) - Characterisation of force chain networks.

2010 Christopher Revell, Cavendish Laboratory, Part II (summer student) - Characterisation of packing of ellipses.

2010 Imbert Wang, Cavendish Laboratory, Part II (summer student) - Coarse-graining the fabric tensor of the Isostaticity stress field equations.

2010-2014 Joseph F.P. Jordan, Imperial College London, PhD - Computing entropy and ordering of granular materials: From description to prediction.

2010 Finn Grimwood, Cavendish Laboratory, Part III (MSci) - Gravitational Flow of a DaVinci Fluid.

2010 Harry R. Kennard, Cavendish Laboratory, Part III (MSci) - The famous packing problem ellipses.

2010 Simon Nathan, Cavendish Laboratory, Part III (MSci) - Couette Flow of a da Vinci Fluid.

2011 William Handley, Cavendish Laboratory, Part III (summer student) - Stress equations in isostatic and granular systems: hyperbolic or elliptic?

2011 Yipei Guo, Cavendish Laboratory, Part III (MSc) - Oscillatory shear flow of da Vinci fluids.

2011 Harrison Steggles, Cavendish Laboratory, Part III (MSci) - Dynamics of planar fractures in disordered media.

2011 Julian Ma, Cavendish Laboratory, Part III (MSci) - Stress transmission in disc-like granular systems.

2011 Christopher Revell, Cavendish Laboratory, Part III (MSci) - Shear flow of da Vinci fluids.

Invited colloquia and departmental seminars

2012 Open University, Norwich, UK *Statistical mechanics of granular, cellular and porous media and structure-property relations – a systematic approach*

2011 Institut fur Experimentelle Physik, Universitat Ulm, Ulm, Germany, *Controlled force mediation in the cytoskeleton: A dream model awaiting experimental verification*

2010 School of Physics and Astronomy, Tel Aviv University, Tel Aviv, Israel, *Colloquium: Da Vinci Fluid - a minimal model for flow of dense granular materials*

2010 School of Physics and Astronomy, Tel Aviv University, Tel Aviv, Israel, *From pore-scale structural characterization to macro-scale structure-property predictions*

2010 Department of Environmental Sciences, ETH, Zurich, Switzerland, *Da Vinci Fluid model for flow of dense granular materials*

2010 Engineering Dept, Tokyo University, Japan, *Understanding stress transmission in dense granular materials*

2010 Lecture course: Engineering Dept, Kyoto University, Japan, *1. Stress transmission in granular packs why do conventional theories struggle? 2. Stress transmission in granular packs isostaticity theory and beyond; 3. Entropic formalism for the statistics of granular packs; 4. Stresses and force chains in granular materials: misconceptions and new directions*

2009 Civil Engineering Dept, Sydney University, Australia, *Systematic derivation of structure-property relations in porous and cellular materials*

2009 Civil Engineering Dept, Sydney University, Australia, *Stress transmission and incipient yield flow in dense granular materials*

2008 Mathematics Dept, Brunel University, UK, *A Stresses in Granular Systems: A paradigm of Complexity*

2008 ICP, Stuttgart University, Germany, *Stresses in granular systems*

2008 Earth Sciences and Engineering, PERM Seminar, Imperial College London, UK, *The Rich Dynamics of Process Zone Limited Fracture Propagation in Heterogeneous Materials*

2008 DAMTP, Cambridge University, UK, *Stresses in granular systems and yield flow*

2008 Applied Modelling and Computation Group (AMCG), Earth Sciences and Engineering, Imperial College London, *Microstructural characterization of porous media and systematic derivation of transport properties*

2008 Earth Sciences and Energy Research, Weizmann Inst., Rehovot, Israel, *Structural-entropic characterization of porous media and flow properties*

2008 Physics Department, Tel Aviv University, Israel, *Stresses in isostatic systems and applications to granular materials*

2007 Physics Department, North Carolina State University, NC, USA, *Exact solutions to the isostaticity stresses equations in disordered 2d granular materials*

2007 Physics Department, Duke University, NC, USA, *Exact solutions to the isostaticity stresses equations in disordered 2d granular materials*

2006 Physics Department, Bar Ilan University, Tel Aviv, Israel, *Propagation of stresses in granular porous materials: between elasticity and isostaticity*

2006 Biology Department, Bar Ilan University, Tel Aviv, Israel, *Controlled force mediation in the cytoskeleton: A dream model awaiting experimental verification*

2006 Physics Department, University of Manchester, Manchester, UK, *Stresses in granular materials: between elasticity and isostaticity*

2006 Laboratoire de Physique Thorique, Ecole Normale Suprieure, Paris, Frances, *Propagation of stresses in granular porous materials: between elasticity and isostaticity*

2004 Applied Mathematics, Bristol University, UK, *Stress field equations in granular solids: A shift of paradigm*

2004 Institute of Physics of Geological Processes, Oslo, Norway, *Stress transmission in granular materials: Between elasticity and isostaticity*

2004 Cavendish Laboratory, Cambridge, *Stress transmission in granular materials: Between elasticity and isostaticity*

2003 Cavendish Laboratory, Cambridge, *Stress transmission in cellular solids: beyond elasticity.*

2003 Isaac Newton Institute, *Granular piles and marginal rigidity.*

2002 Kings College London, *Mechanics of cellular systems.*
2001 Leeds University, UK, *Pulling single chains and implications to rheology of dense polymers near the glass transition.*
2000 Max Planck Institute, Golm, *Chilling out polymer dynamics: Fluctuating disentanglement forces and rheological implications.*
1997 Max Planck Institute, Stuttgart, *Nonequilibrium mesoscale fracture propagation: Noise-free and noise-driven steady states, oscillations and intermittency.*
1996 Wake Forest University, North Carolina, *A new theoretical approach to surface growth: The Laplacian growth paradigm.*
1996 University of New Mexico, Albuquerque, *Growth of complex interfaces: Theory.*
1995 Santa Fe Institute, Santa Fe, *Theorizing on patterns of evolving interfaces: The Laplacian growth paradigm.*
1995 University of Texas, El Paso, *Statistics of interfaces in Laplacian growth.*
1995 New Mexico State University, Las Cruces, *A first-principles theory for Laplacian growth.*
1994 Emory University, Atlanta, Georgia, *Formulation of a first-principles theory for growing surfaces.*
1994 Arizona State University, *Characterization and analysis of morphologies of scale-invariant patterns and hierarchical structures beyond simple scaling.*
1993 Clarkson University, *Onset of scale-invariant side-branching in cracking patterns and comparison with diffusion-limited-aggregation.*

Invited presentations in conferences

2011 **Workshop: Complexity in the Oil Industry**, Inst. of Physics, Natal, Brazil, 14-18 November *From characterization of porous media to macroscale structure-property relations - A systematic approach*
2011 **Workshop: Fluctuations and Response in Active Materials: From Driven Granular Systems to Swarming Bacteria**, Lorentz Center, Leiden, The Netherlands, 20-24 June *Driven dense granular matter as a da Vinci fluid*
2011 **Pore-Scale Modelling Consortium meeting**, Imperial College London, London, UK, 11 January *Failure and flow of granular matter from yield rheology to da Vinci fluid*
2010 **Gordon Conference on Flow and Transport in Permeable Media**, Lewiston, ME, USA 11-16 July: *Systematic derivation of structure-property relations in porous and cellular materials*
2010 **Gordon Conference on Granular and Granular Flow** , Waterville, ME, USA 20-25 June: *Da Vinci fluid as a possible model for dense granular flow*
2010 **Mini-symposium on fractured reservoirs**, Delft, Nethrelands 10 June: *A model for dynamic fractures in inhomogeneous media*
2010 **PERM Affiliates meeting**, Imperial College London, UK 7 June: *Stress theory and fragility of granular matter*
2010 **Workshop - Particulate Matter: Does Dimensionality Matter?**, Dresden, Germany 30 May - 4 June: *Effects of dimensionality on statistical mechanics of granular matter*
2010 **Workshop on granular materials**, Tsukuba, Japan 4 March: *Continuum stress theory for large statically determinant structures and implications for granular materials*
2009 **IUTAM-ISIMM Symposium on Mathematical Modeling and Physical Instances of Granular Flows**, Reggio Calabria, Italy, 14-18 Sept.: *Stress transmission and yield flow of dense Granular materials*
2009 Workshop on **Statistical mechanics of static granular media**, Lorentz centre, Leiden, 6-10 July: Plenary talk, *Compactivity, Angoricity, and Open Issues in Granular Statistics*
2009 **Meeting of the PERM consortium**, London, 22 June: *Systematic characterization and analysis of pore space*
2008 Workshop on **Flow in Porous Media**, Brasilia, Brazil, 18-24 Oct: *Structural characteristics of porous media and systematic predictions of transport properties*
2008 Conference on **Granular Gases: Beyond the Dilute Limit**, Thurnau, Germany, 7-12 Sept: *Stress transmission in granular systems and incipient yield flow*
2008 **The BPI-Cavendish workshop**, BPI Inst, Cambridge University, UK, *Stresses in granular systems and yield flow*

2008 Petroleum Engineering and Rock Mechanics (PERM) Affiliates Meeting on **Pore-scale modelling**, London, UK, 16 June: *Microstructural characterization of porous media and systematic derivation of transport properties*

2008 IOP Meeting on **Condensed Matter and Materials Physics 2008**, London, UK, 26-28 March: *Granular matter as two-phase composites: Critical behaviour, stato-elasticity and new stress solutions*

2008 Air Force Office for Scientific Research and Air Force Research Lab Meeting on **Particulate Mechanics in Extreme Environments**, Eglin Florida, USA, 29-31 January: *Effects of formation dynamics on structural characteristics of grain assemblies*

2007 Meeting of the Society for Natural Philosophy on **The Interface Between Atomistic and Continuum Theories**, Houston Texas, US, 26-28 October: *Stress equations in statically determinate systems - a unique coarse-graining problem and solutions*

2007 **Universities Forum on Reservoir Description and Simulation (UFORDS)**, Scarborough, UK, 2-6 September: *Process zone driven fracture propagation - a first-principles equation and rich dynamics*

2007 **Universities Forum on Reservoir Description and Simulation (UFORDS)**, Scarborough, UK, 2-6 September: *Structural-entropic characterization of porous media and derivation of local permeability*

2007 Conference on **Complexity in the Oil Industry**, Natal, Brasil, 5-9 August *Process zone limited fracture propagation a first-principles equation and rich dynamics*

2007 Conference on **Complexity in the Oil Industry**, Natal, Brasil, 5-9 August *Force chains in granular porous media: emergent self-organized networks and criticality*

2007 StatPhys Satellite meeting on **Statics and Dynamics of Granular Media and Colloidal Suspensions**, Naples, Italy: *Entropic description of granular and cellular structures*

2007 Petroleum Engineering and Rock mechanics (PERM) Affiliates Meeting, Imperial College London: *Structural - entropic characterization of porous media and systematic derivation of transport properties*

2007 USAF Workshop on **Particulate Mechanics in Extreme Environments**, University of Florida, Florida, US 23-25 January: **Isostaticity theory and modelling propagation of stresses in granular materials**

2006 20th Canberra International Physics Summer School on **Granular Matter**, The Australian National University, Canberra, Australia: **Structural-entropic characterization of porous media and systematic derivation of transport properties**

2005 Summer School on **Econophysics and complexity**, Academy of Economics Studies, Bucharest, Romania: **Rational modelling of multi-agent systems**

2004 Summer School on **Bridging between economists and physicists**, Academy of Economics Studies, Bucharest, Romania: **Dimensional reduction in economic systems**

2004 IMA Workshop on **Modeling of Soft Matter**, Institute for Mathematics and its Applications (IMA), Minneapolis, US: **Stress field equations in granular solids: A shift of paradigm**

2004 IChemE meeting on the **Behaviour of Structured Granular Materials Across Length Scales**, Leeds, UK: **Stresses and yield in granular materials**

2004 **Physics of Risk**, Nyborg, Denmark: **Econo-string theory: Representation of many-agent systems as planar strings**,

2003 **Flow Regimes, Transitions and Segregation in Granular and Particle-laden Flows**, Cambridge, UK: (i) *Granular piles and marginal rigidity*; (ii) *Stress transmission in granular systems.*

2001 **International conference on geometry, nonlinearity, and integrability in condensed matter and soft condensed matter physics**, Bansko, Bulgaria: *Domain wall dynamics on antiferromagnetic chains: Interactions, conservation laws and stable lattice solutions.*

1998 **The Polymer Consortium Annual Meeting**, Cambridge, UK: *Mesoscale polymer modeling: The fracture case study.*

1997 **77th Statistical Mechanics Conference**, Rutgers Univ., USA: *Why fractal patterns: A first-principles approach.*

1997 **Workshop on Nonlinear Phenomena in Transforming Solids**, Penn State Univ., USA: *Hierarchical structure of domains in magnetic layers.*

1996 **Workshop on Fracture, Friction and Deformation**, Los Alamos, USA: *Nonequilibrium fracture propagation: Steady-state, periodicity and intermittency.*

1996 **Workshop on Nonequilibrium Phase Transformations**, Santa Fe, USA: *Domain Wall Textures in 2D Ferromagnets.*

1995 **FRACTALS 95**, Marseilles, France: *A theory for the morphology of Laplacian growth via statistics of equivalent many-body systems.*

1995 **MRS Fall Meeting**, Boston, USA: *Review of analyses of fracture roughness.*

1994 **Gordon conference** on **Fractals**, San Miniato, Italy: *Formulaing a First-principles theory for stochastic Laplacian growth.*

1994 **Nonlinear Evolution Equations and Dynamical Systems** (NEEDS94), Los Alamos, NM, USA: *A morphological theory for Laplacian nonlinear growth processes via statistics of equivalent many-body systems.*

1994 **MRS General Meeting**, Boston, USA: *On a first-principles theory for growing interfaces in Laplacian fields: A many-body formulation and statistical analysis.*

1993 **Fractals in Natural Sciences**, Budapest, Hungary: *Quantifying morphology of scale-invariant strucrures beyond the fractal dimension.*

1992 Forum in **Compaction Forming Operations**, Aston University, Birmingham, UK: *Percolation as a model for disordered systems.*

1990 **NATO ASI Summer school** on **Propagation of Correlations in Constrained Systems**, Institute d'Etudes Scientifiques de Cargese, Corsica, France: 1) *Universally correlated scale-invariant sidebranching in propagation of a two-dimensinal cracking growth*; 2) *Vortex-antivortex pairing of holes in frustrated XY spin system.*

Publications

Over 900 citations on April 2006 (ISI Science Citation Index)

I. Refereed and submitted papers in primary journals

78. R. Blumenfeld, G. F. Grimwood, M. Schwartz and S. F. Edwards,
Da Vinci Fluid as a model for dense granular flow, Granular Matter, submitted (2012)
77. R. Hihinashvili and R. Blumenfeld,
Structural-entropic characteristics of dense planar granular systems, Granular Matter, to appear (2012)
76. M. Schwartz and R. Blumenfeld,
Plug flow formation and growth in da Vinci Fluids, Granular Matter **13**, 241-245 (2011) (DOI 10.1007/s10035-011-0248-5)
75. R. Blumenfeld, M. Schwartz and S. F. Edwards,
The flow equations and catch-up dynamics of da Vinci Fluids, Eur. Phys. J **E 32**, 333-338 (2010)
74. G. Frenkel, R. Blumenfeld, P. King and M. Blunt,
Topological Analysis of Foams and Tetrahedral Structures, Adv. Eng. Mat. **11**, 169-176 (2009)
73. R. Blumenfeld and S. F. Edwards,
On granular stress statistics: compactivity, angoricity and some open issues, J. Phys. Chem. **B 113**, 3981 (2009)
72. M. Gerritsen, G. Kreiss, R. Blumenfeld,
Analysis of stresses in two-dimensional isostatic granular systems, Physica **A 387**, 6263 (2008)
71. M. Gerritsen, G. Kreiss, R. Blumenfeld,
Stress chain solutions in two-dimensional isostatic granular systems: fabric-dependent paths, leakage and branching, Phys. Rev. Lett. **101**, 098001 (2008)
70. G. Frenkel, R. Blumenfeld, Z. Grof, P. R. King,
The structure and statistics of 2D granular systems, Phys.Rev. **E 77**, 041304 (2008)
69. R. Blumenfeld and S. F. Edwards,
Blumenfeld and Edwards Reply to Comment on "Granular Entropy: Explicit Calculations for Planar Assemblies", Phys. Rev. Lett., **99**, 089402 (2007)
68. R. Blumenfeld,
Stresses in two-dimensional isostatic granular systems: Exact solutions, New Journal of Physics **9**, 160 (2007)
67. R. Blumenfeld,
Isostaticity and action at a distance in the cytoskeleton - A model awaiting experimental evidence, Biophysical Journal, **91**, 1970 (2006)
66. R. Blumenfeld and S. F. Edwards,
Geometric partition functions of cellular systems: Explicit calculation of the entropy in two and three dimensions, EuroPhys. J. **E 19**, 23 (2006)
65. R. Blumenfeld,
Auxetic strains - insight from iso-auxetic materials, Molecular Simulations **31**, 867 (2005)
64. R. Blumenfeld, S. F. Edwards and R. C. Ball,
Granular matter and the marginal rigidity state, J. Phys.: Cond. Mat. **17**, S2481 (2005); cond-mat/0105348
63. R. Blumenfeld,
Stresses in isostatic granular systems and emergence of force chains, Phys. Rev. Lett., **93**, 118301 (2004); cond-mat/0402556
62. R. Blumenfeld,
Stress in planar cellular solids: Coarse-graining the constitutive equation, Physica **A 336**, 361 (2004)
61. R. C. Ball and R. Blumenfeld,
From Plasticity to a renormalisation group, Phil. Trans. R. Soc. Lond. 360 , 731 (2003); cond-mat/0301562
60. R. Blumenfeld and S. F. Edwards,
Granular entropy: Explicit calculations for planar assemblies, Phys.Rev. Lett. **90**, 114303 (2003); cond-mat/0303418

59. R. Blumenfeld,
Stress transmission in planar disordered solid foams, J. Phys. A: Math. Gen., **36**, 2399-2411 (2003); cond-mat/0210336
58. R. C. Ball and R. Blumenfeld,
The stress field in granular systems: Loop forces and potential formulation, Phys. Rev. Lett. **88**, 115505 (2002); cond-mat/0008127
57. R. Blumenfeld,
Dynamics of twists on antiferromagnetic spin chains: Theory, Eur. Phys. J. **B 29**, 261 (2002)
56. R. Blumenfeld
Strange dynamics of domain walls and periodic stripes on antiferromagnetic chains, cond-mat/0108470 (2001)
55. R. Blumenfeld and R. Balakrishnan
Exact multi-twist solutions for the Belavin-Polyakov equation and application to magnetic systems, J. Phys. A, **33**, 2459 (2000)
54. R. Blumenfeld,
Pulling a chain's leg: The pullout dynamics of entangled chain, Macromolecules, **32**, 1082 (2000)
53. R. Blumenfeld
Hierarchical structure of domain walls in magnetic layers, Phase Transitions, **69**, 237 (1999)
52. R. Blumenfeld
Dynamics of fracture prpagation in the mesoscale: Theory, Theor. And Appl. Frac. Mech. **30**, 209 (1998)
51. R. Balakrishnan and R. Blumenfeld
On the twist excitations in a classical anisotropic antiferromagnetic chain, Phys. Lett. **A 237**, 69 (1997)
50. A.E. Garcia, R. Blumenfeld, G. Hummer and J. A. Krumhansl,
Multi-Basin Dynamics of a Protein in a Crystal Environment, Physica **D 107**, 225, (1997)
49. R. Balakrishnan and R. Blumenfeld
Transformation of general curve evolution to a modified Belavin-Polyakov equation, J. Math. Phys.**38**, 5878 (1997)
48. R. Blumenfeld and Benoit B. Mandelbrot
Mass fractal lacunarity, Lévy dusts, Mittag-Leffler statistics, and perceived dimension, Phys. Rev. **E 56**, 112 (1997)
47. R. Blumenfeld
Planar curve representation of many-body systems and dynamics, Phys. Rev. Lett., **78**, 1203 (1997)
46. B. L. Holian, R. Blumenfeld and P. Gumbsch
An Einstein model of brittle crack propagation, Phys. Rev. Lett. **78**, 78 (1997)
45. R. Blumenfeld and D. J. Bergman
Strongly nonlinear composite dielectrics: a method for exact solution for the potential field and effective bulk properties - Addition, Phys. Rev. **B 54**, 9555 (1996)
44. R. Blumenfeld
Nonequilibrium brittle fracture propagation: Steady state, oscillations and intermittency, Phys. Rev. Lett. **76**, 3703 (1996)
43. R. Blumenfeld
Pattern formation in Laplacian growth: Theory, Center for Nonlinear Studies Newsletter **112**, April (1995); cond-mat/9505116
42. R. Blumenfeld and R. C. Ball
Two dimensional Laplacian growth as a system of creating and annihilating particles, Phys. Rev. **E**, Physical Review **E 51**, 3434 (1995); cond-mat/9401068
41. R. Blumenfeld
Formulating a first-principles statistical theory of growing surfaces in two-dimensional Laplacian fields, Phys. Rev. **E 50**, 2952 (1994); cond-mat/9408039.
40. V. Milman, N. A. Stelmashenko and R. Blumenfeld

Fracture surfaces: A critical review and a morphological analysis of scanning tunneling microscopy measurements, Progress in Materials Science **38**, 425-474 (1994)

39. R. Blumenfeld
Two dimensional Laplacian growth can be mapped onto Hamiltonian dynamics, Phys. Lett. **A 186**, 317-322 (1994)
38. R. Blumenfeld and R. C. Ball
Quantifying morphology of scale-invariant structures beyond the fractal dimension, Fractals **1**, 985-991 (1993)
37. R. Blumenfeld and S. Torquato
A coarse-graining procedure to generate and analyze heterogeneous materials: Theory, Phys. Rev. **E 48**, 4492-4500 (1993)
36. V. Milman, R. Blumenfeld, N. A. Stelmashenko and R. C. Ball
Experimental measurements of the roughness of brittle cracks, Phys. Rev. Lett. **71**, 204 (1993)
35. R. Blumenfeld
Explicitly exact solutions for waves in a family of nonlinear media, Physica **D 66**, 7-13 (1993)
34. R. Blumenfeld and R. C. Ball
A probe for morphology and hierarchical correlations in scale invariant structures, Phys. Rev. **E 47**, 2298-2302 (1993)
33. J. Adler, A. Aharony, R. Blumenfeld, A. B. Harris and Y. Meir
The distribution of the logarithms of currents in percolating resistor networks, II. Series expansion, Phys. Rev. **B 47**, 5770-5782 (1993)
32. A. Aharony, R. Blumenfeld and A. B. Harris
The distribution of the logarithms of currents in percolating resistor networks, I. Theory, Phys. Rev. **B 47**, 5756-5769 (1993)
31. C. Bowen, D. L. Hunter, R. Blumenfeld and N. Jan
Magnetism and high Tc superconductors, J. Physique I France **3**, 83-92 (1993)
30. R. C. Ball and R. Blumenfeld
Universal scaling of the stress field at the vicinity of a wedge crack in two dimensions and oscillatory self-similar corrections to scaling, Phys. Rev. Lett. **68**, 2254 (1992)
29. E. Duering, R. Blumenfeld, D. J. Bergman, A. Aharony and M. Murat
Current distributions in a two-dimensional random-resistor-network, J. Stat. Phys. **67**, 113-121 (1992)
28. R. Blumenfeld,
An exact solution for electromagnetic waves in strongly nonlinear media, J. Phys. **A**: Math. Gen. **25**, L275-L282 (1992)
27. R. Blumenfeld and R. C. Ball
Onset of scaling behaviour in 2D slow cracking, Modern Phys. Lett. **B 5**, 1567-1573 (1991)
26. R. Blumenfeld and D. J. Bergman
Strongly nonlinear composite dielectrics: a method for exact solution for the potential field and effective bulk properties, Phys. Rev. **B 44**, 7378-7386 (1991)
25. R. Blumenfeld and R. C. Ball
Onset of scale-invariant pattern in growth processes: The cracking problem, Physica **A 177**, 407-415 (1991)
24. R. C. Ball, P. W. H. Barker and R. Blumenfeld
Sidebranch selection in fractal growth, EuroPhys. Lett. **16**, 47-52 (1991)
23. R. Blumenfeld
The functional form of the $T_c(x)$ line in the phase diagram of high temperature superconductors, Physica **C 178**, 119-124 (1991)
22. R. C. Ball and R. Blumenfeld
Exact results on exponential screening in two-dimensional diffusion limited aggregation, Phys. Rev. **A 44**, R828-R831 (1991)
21. R. Blumenfeld and D. J. Bergman
Nonlinear susceptibilities of granular matter, Phys. Rev. **B 43**, 13682-13683 (1991)
20. R. Blumenfeld

Geometrical correlations and the origin of x values at the maximum and intersects of $T_c(x)$ in $La_{2-x}Sr_xCuO_4$, J. de Physique **1**, 159-166 (1991)

19. G. Corsten, C. Liem, R. Blumenfeld and N. Jan
Pairing of holes via vortex/antivortex attraction in doped $La_{2-x}Sr_xCuO_4$, J. de Physique **51**, 2229-2233 (1990)
18. R. Blumenfeld and A. Aharony
Reply to Comment on "Breakdown of multifractal behaviour in diffusion limited aggregates", Phys. Rev. Lett. **64**, 1843 (1990)
17. R. C. Ball and R. Blumenfeld
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16. R. Blumenfeld
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Book

R. Blumenfeld
Continuous Mechanics of Statically Determinate Systems.

Papers

(a): Granular, colloidal, and cellular systems

1. R. Blumenfeld
   Skeletonization of bi-continuous structures by functional minimization).
2. *R. Blumenfeld*
   Theory of stress transmission in three-dimensional isostatic granular systems.
3. *R. Blumenfeld*
   Cohesionless granular systems as two-phase stato-elastic composites.
4. *R. Blumenfeld and Sebastien Courty*
   Evidence of hyperbolic stresses in cellular solids.
5. *R. Blumenfeld, G. Kreiss and M. Gerritsen*
   Stress transmission in Stato-elastic media.
6. *R. Blumenfeld and M. Gerritsen*
   Stress distributions in isostatic protoplanets.

(b): Pullout and dynamics of long molecules and disentanglement

1. *R. Blumenfeld,*
   Large fluctuations in disentaglement forces and implications for glassy dynamics
2. *R. Blumenfeld,*
   Hysteretic force response in pullout of long molecules
3. *R. Blumenfeld*
   Disentaglement dynamics and applications to strength of polymer interfaces

(c): Magnetic and stagger-ordered systems

1. *R. Blumenfeld and Avadh Saxena*
   Exact multi-twist solutions for Heisenberg spins on elastically deformable cylinders
2. *R. Blumenfeld and A. B. Saxena*
   Wrinkling and magneto-active control in single-wall carbon nanotubes
3. *R. Blumenfeld*
   Bipolar Heisenberg Spins and applications to director fields
4. *R. Blumenfeld*
   Ribbon dynamics in three dimensions
5. *R. Blumenfeld*
   Position dependent velocities of twists along inhomogeneous antiferromagnetic Heisenberg spin chains

(d): Miscellaneous

1. *R. Blumenfeld*
   An algorithm for the minimal path length in random networks using variational approach.
2. *R. Blumenfeld and Pål-Eric Øren*
   Theoretical and practical solutions of the Calderon problem for networks and continua.