Résumé: Raphael Blumenfeld

Nationality: UK, Israel
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(1) Earth Science and Engineering, Imperial College London, London SW7 2AZ
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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, **Summa cum Laude**.
1986 M.Sc., Physics - Tel Aviv University. *Nonlinear random resistor networks, topological problems and fluctuations*, Supervisor: Prof. Amnon Aharony, **Summa cum Laude**.
1984 B.Sc., Physics - Tel Aviv University, **Distinction** (equivalent to a UK high First).

Languages

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

Appointments

2014-present Distinguished Professor, College of Science, National University of Defense Technology, Changsha, Hunan, China
2013-present Editor, Granular Matter Journal, Springer
2012-present Bye-Fellow, Gonville and Caius College, Cambridge, UK
2010-2012 Senior Visiting Fellow, Inst. of Shock Physics, Imperial College London, UK
2009-2012 College Lecturer, Gonville and Caius College, Cambridge, UK
2005-present Research Fellow, Earth Science and Engineering, Imperial College London, UK
1997- Long-Term Associate member, 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

2015 Awardee of the 1000-Talent plan, China
2014-present Distinguished Professor, NUDT, Hunan, China
2013-2016 Alan Howard PhD Student Scholarship:
2011 Nuffield Undergraduate Research Bursary URB/39915:
2010-2014 EPSRC Grant EP/H051716/1:
2010 Visiting Grant, Tsukuba University, Japan:
2008-2011 Alan Howard phd Student Scholarship:
2008-2009 EOARD Grant 083046:
2008 StatoilHydro Grant:
2007-2012 Member of the Room, Gonville and Caius College, Cambridge, UK
2005-2008 EPSRC Grant GR/T28959/01:
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

2015 Session Chair, *Beijing Soft Matter Workshop*, Beijing, China, 17 April
2015 Sole organiser, Workshop on *Computational methods in flow dynamics and granular science*, Changsha, Hunan, China, 14 April
2014 Sole organiser, International Workshop on *Soft and granular matter in ambient and extreme conditions*, Changsha, Hunan, China, 15-18 September
2014 Conference Scientific Committee member, *International Symposium on Energy Challenges and Mechanics*, Aberdeen, UK, 10-14 July
2012 Session Chair, in *8th European Solid Mechanics Conference*, Graz, Austria, 9-13 July
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-present Supervision / tutorials: Parts I (2nd year), II (third year), and III (MSci) 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 materials for fuel cell technology.

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.

2012-2015 Christopher Revell, Cavendish Laboratory, PhD - Stem cell sorting in mammalian embryos as a self-organising physical process.

2012 Giovanni Camisasca, Cavendish Laboratory, Part III (MSci) - Loop forces and mechanical equilibrium of 2D granular structures.

2012 Andrew Gibbons, Cavendish Laboratory, Part III (MSci) - Development of a systematic method to describe shapes of 3D objects.

2013 Alan Bowman, Cavendish Laboratory, Part III (MSci) - Ribbon dynamics in 3D.

2013 Reuven Shirazi, Cavendish Laboratory, Part III (MSci) - The Calderon problem in random resistor networks.

2013 Marise Westbroek, Cavendish Laboratory, Part III (MSci) - Dynamics of director fields in 2D.

2013-2016 Shahar Amitai, Imperial College London, PhD - Predictive model for the design of porous media with application to fuel cells.

2014 Louis Bortolozzo, Cavendish Laboratory, Part III (MSci) - Development of a continuous stress field theory for 3D isostatic systems.

2015 Ling Huang (Walter), Physics Dept., NUDT, Hunan, China (MSc) - Dynamics and effects of penetrators into granular materials

Publications

Summary

85 papers in primary peer reviewed journals
26 contributions to Symposia and compiled volumes
1743 citations, H Index - 21, i10 Index - 40, April 2015
(Source: Google Scholar - https://scholar.google.com/citations?user=t1e0xRQAAAAJ&hl=en)

I. Refereed and submitted papers in primary journals

86. T. Matsushima and R. Blumenfeld,
Fundamental structural characteristics of planar granular assemblies: scaling away friction and initial state, Phys. Rev.**E**, submitted (2015) (also http://arxiv.org/pdf/1207.2988.pdf)
85. R. Blumenfeld, S. Amitai, J.F. Jordan and R. Hihinashvili,
On the failure of the volume function in granular statistical mechanics and an alternative formulation, Phys. Rev. Lett., submitted (2015) (also http://arxiv.org/pdf/1507.03779v2.pdf)
84. S. Amitai and R. Blumenfeld,
The failure of isotropic continuous time random walk to model finite-size particle diffusion in porous media and a redeeming modification, Phys. Rev.**E**, to appear (2015) (also http://arxiv.org/pdf/1501.03998v2.pdf)
83. R. Blumenfeld,
Structural evolution of granular systems: Theory, Phys. Rev. Lett., submitted (2015) (also http://arxiv.org/pdf/1412.6933v1.pdf)
82. M. Schwartz and R. Blumenfeld,
Flow equations for dense granular fluids: New insight from a first-principles derivation, Phys. Rev. Lett., submitted (2015) (also http://arxiv.org/pdf/1310.0983.pdf)
81. R. Blumenfeld and S. F. Edwards,
Granular statistical mechanics - a personal perspective, Euro. Phys. J. **223**, 2189-2204 (2014); DOI: 10.1140/epjst/e2014-02258-y
80. T. Matsushima and R. Blumenfeld,
On universal structural characteristics of granular packs, Phys. Rev. Lett. **112**, 098003 (2014) (also http://arxiv.org/pdf/1305.6093.pdf)
79. R. Blumenfeld, J. F. Jordan and Sam F. Edwards,
Inter-dependence of the volume and stress ensembles and equipartition in statistical mechanics of granular systems, Phys. Rev. Lett. **109**, 238001 (2012) (http://arxiv.org/pdf/1204.2977.pdf)
78. R. Hihinashvili and R. Blumenfeld,
Structural-entropic characteristics of dense planar granular systems, Granular Matter **14**, 277-282 (2012); DOI: 10.1007/s10035-012-0332-5.
77. R. Blumenfeld and Sam F. Edwards,
Theory of strains in auxetic materials, J. Superconductivity and Novel Magnetism **25**, 565-571 (2012); cond-mat/1111.6684 (http://arxiv.org/abs/1111.6684); DOI: 10.1007/s10948-012-1464-x.
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 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
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. **65**, 1784-1787 (1990)
16. R. Blumenfeld
Phase coherence oscillation of holes in $La_{2-x}Sr_xCuO_4$, dynamics of single holes in the CuO plane and the typical pairing time, Physica **A 168**, 705-713 (1990); (Erratum) Physica **A 180**, 462 (1991)
15. R. Blumenfeld
Novel flux solutions in nonlinear continuum systems with negative dynamic resistance, Physica **A 168**, 697-704 (1990)
14. O. Entin-Wohlman, U. Sivan, R. Blumenfeld and Y. Meir
Dynamic structure factor of fractals, Physica **D 38**, 93-97 (1989)
13. R. Blumenfeld and D. J. Bergman
Exact calculation to second order of the effective dielectric constant of a strongly nonlinear composite, Phys. Rev. **B 40**, (Rapid Comm.) 1987-1989 (1989)

12. R. Blumenfeld
Universality and superuniversality of multifractals in nonlinear networks, J. Stat. Phys. **56**, 233-241 (1989)
11. R. Blumenfeld and A. Aharony
Breakdown of multifractal behaviour in diffusion limited aggregates, Phys. Rev. Lett. **62**, 2977-2980 (1989)
10. R. Blumenfeld and D. J. Bergman
Nonlinear dielectrics: electrostatics of random media and propagation of waves in a homogeneous slab, Physica **A 157**, 428-436 (1989)
9. A. Aharony, R. Blumenfeld, P. Breton, B. Fourcade, A. B. Harris, Y. Meir and A. -M. S. Tremblay
Negative moments of currents in percolating resistor networks, Phys. Rev. **B 40**, (Brief Report) 7318 (1989)
8. U. Sivan, R. Blumenfeld, Y. Meir and O. Entin-Wohlman
Dynamic structure factor of a deterministic fractal, Europhys. Lett. **7**, 249-253 (1988)
7. R. Blumenfeld
Probability densities of homogeneous functions: Explicit approximation and applications to percolating networks, J. Phys. A: Math. Gen. **21**, 815-825 (1988)
6. Y. Meir, R. Blumenfeld, A. B. Harris and A. Aharony
Series analysis of randomly diluted nonlinear networks with negative nonlinearity exponent, Phys. Rev. **B 36**, 3950-3952 (1987)
5. R. Blumenfeld and D. J. Bergman
Fluid flow in a random porous medium: A network model and effective medium approximation, J. Appl. Phys. **62**, 1616-1621 (1987)
4. R. Blumenfeld, Y. Meir, A. Aharony and A. B. Harris
Resistance fluctuations in randomly diluted networks, Phys. Rev. **B 35**, 3524-3535 (1987)
3. Y. Meir, R. Blumenfeld, A. Aharony and A. B. Harris
Series analysis of randomly diluted nonlinear resistor networks, Phys. Rev. **B 34**, 3424-3428 (1986)
2. R. Blumenfeld, Y. Meir, A. B. Harris and A. Aharony
Infinite set of exponents describing physics on fractal networks, J. Phys. A: Math. Gen. **19**, L791-L796 (1986)
1. R. Blumenfeld and A. Aharony
Nonlinear resistor fractal networks, topological distances, singly connected bonds and fluctuations, J. Phys. A: Math. Gen. **18**, L443-L448 (1985)

II. Refereed contributions to symposia and compiled volumes

27. R. Blumenfeld,
Obituary: Professor Sir Sam F. Edwards FLSW FRS FIMA (19282015), Mathematics TODAY, August issue (2015).
26. R. Blumenfeld, S. F. Edwards and S. M. Walley,
Physics of granular systems, in "The Oxford Handbook of Soft Condensed Matter", eds. E.M Terentjev, D.A. Weitz, (Oxford University Press, Oxford, UK 2015); ISBN-13: 978-0-19-966792-5.
25. T. Matsushima and R. Blumenfeld,
Microstructural characteristics of planar granular solids, 7th International Conference on Micromechanics of Granular Media (Powders and Grains 2013), AMER INST PHYSICS, 325-328, doi: 10.1063/1.4811933.
24. R. Blumenfeld, J. F. Jordan and S. F. Edwards,
Granular statistical mechanics: volume-stress phase space, equipartition and equations of state, 7th International Conference on Micromechanics of Granular Media (Powders and Grains 2013), AMER INST PHYSICS, Pages:1186-1189, doi: 10.1063/1.4812149.
23. R. Hihinashvili and R. Blumenfeld,
Structural characterisation of porous and granular materials, in Proceedings of 16th European Symposium on Improved Oil Recovery 2011, Cambridge, UK.
22. R. Hihinashvili and R. Blumenfeld,

Structural characterisation of porous and granular materials, in XVIII International conference on water resources, CMWR 2010, J. Carrera (Ed), CIMNE, Barcelona (2010).

21. R. Blumenfeld,
Stress Transmission and Incipient Yield Flow in Dense Granular Materials, in IUTAM-ISIMM Symposium on Mathematical Modeling and Physical Instances of Granular Flows, pp 167-182, eds. J. Goddard, P. Giovine and J. Jenkins (AIP Publications, Melville New York, 2010,)
20. R. Blumenfeld,
On entropic characterization of granular materials, in Lecture Notes in Complex Systems Vol. **8**: *Granular and Complex Materials*, pp 43-53, eds. T. Aste, A. Tordesillas and T. D. Matteo (World Scientific Singapore, 2007)
19. G. Frenkel, R. Blumenfeld, P. R. King and M. Blunt,
Topological Analysis of Foams and Tetrahedral Structures, in Proceedings of MetFoam 2007 - Conference on Porous Metals and Metallic Foams, Montreal, Canada
18. R. Blumenfeld and P. King,
Entropy-mediated structure-permeability relations in skeletal porous materials, in Proceedings of CMWR XVI 2006 - Computational Methods in Water Resources XVI International Conference, Copenhagen, Denmark
17. S. F. Edwards and R. Blumenfeld,
Thermodynamics of granular materials, in Physics of Granular Materials, ed. A. Mehta (Cambridge University Press, Cambridge 2007)
16. R. Blumenfeld,
Stress transmission and isostatic states of non-rigid particulate systems, IMA Volumes in Mathematics and its Applications, Vol. **141**: *Modeling of Soft Matter*, eds. M-.C.T. Calderer and E. M. Terentjev, (Springer-Verlag, New York 2005); (Also: arXiv:cond-mat/0501700 [cond-mat.soft])
15. R. Blumenfeld,
Dynamics of twists on antiferromagnetic spin chains: Theory, International conference on geometry, nonlinearity, and integrability in condensed matter and soft condensed matter physics, Bansko, Bulgaria
14. R. Blumenfeld
Dynamics of fracture propagation in the mesoscale: Theory MESOMECHANICS98, Tel Aviv, Israel
13. A. E. Garcia, R. Blumenfeld, G. Hummer and J. Sobehart
Diffusion of a protein in configuration space in Proceedings of the 9th Conversation in Biomolecular Stereodynamics, Eds. R.H. Sarma and M.H. Sarma (Adenine Press, Schenectady, NY 1996)
12. S. Zhou, R. Blumenfeld, B. Holian and P. S. Lomdahl
Study of fiber composite failure criterion in 1996 MRS Proceedings **V409** *Fracture-instability dynamics, scaling, and ductile/brittle behavior*, Eds. R. L. Blumberg Selinger et al.
11. R. Blumenfeld and Robin C. Ball
Characterization of fractal and hierarchical morphologies beyond the fractal dimension in 1995 MRS General Meeting, Boston, MA, USA
10. R. Blumenfeld
A theory for growing interfaces in Laplacian fields: a many-body formulation and statistical analysis in 1994 MRS General Meeting, Boston, MA, USA
9. R. Blumenfeld
A theory for the morphology of Laplacian growths from statistics of equivalent many-body systems in Fractal Reviews in the Natural and Applied Sciences, Ed. M.M. Novak (Chapman-Hill, 1995)
8. R. Blumenfeld
A morphological theory for Laplacian nonlinear growth processes via statistics of equivalent many-body systems in Nonlinear Evolution Equations and Dynamical Systems (NEEDS94), Eds. V.G. Makhankov, A.R. Bishop, and D.D. Holm (World Scientific, 1995)
7. R. Blumenfeld
Towards a theory of growing surfaces: Mapping Laplacian growth onto Hamiltonian dynamics and statistics in Fluctuations and Order: The New Synthesis, Ed. M. M. Millonas (Springer-Verlag, 1995); cond-mat/9401069
6. R. Blumenfeld

Novel flux solutions in nonlinear conducting continuum systems with negative dynamic resistance in Proceedings of the EPS-8 meeting "Trends in Physics", Ed. F. Pleiter (1990)

5. R. Blumenfeld, N. Jan, G. Corsten and C. Liem
   Evidence for vortex/antivortex mediated pairing of holes in doped $La_{2-x}Sr_xCuO_4$ and a possible mechanism for the holes movement in Proceedings of the EPS-8 meeting "Trends in Physics", Ed. F. Pleiter (1990)
4. R. C. Ball and R. Blumenfeld
   Universal scaling of the stress field generated by a two dimensional wedge crack and periodic self-similar corrections to scaling in Proceedings of the EPS-8 meeting "Trends in Physics", Ed. F. Pleiter (1990)
3. G. Corsten, C. Liem, R. Blumenfeld, N. Jan and C. Bowen
   Vortex-antivortex pairing of holes in frustrated XY spin systems in Correlations and connectivity, Eds. H. E. Stanley and N. Ostrowsky (Kluwer Academic Publishers, Dordrecht, 1990) pp. 121-130
2. R. Blumenfeld and R. C. Ball
   Universally correlated scale-invariant sidebranching in propagation of a two-dimensional cracking growth in Correlations and connectivity, Eds. H. E. Stanley and N. Ostrowsky (Kluwer Academic Publishers, Dordrecht, 1990) pp. 313-316
1. R. Blumenfeld and A. Aharony
   Nolinear resistor fractal networks in Scaling phenomena in disordered systems, Eds. R. Pynn and A Skjeltorp (Plenum, 1985)

Invited colloquia and departmental seminars

2015 Physics, Jiao Tong University, Shanghai, China *Towards a stress theory for real granular materials*

2015 Engineering, Tsukuba University, Tsukuba, Japan *Towards a fundamental stress theory for real granular materials*

2015 Engineering, Tsukuba University, Tsukuba, Japan *A local morphological descriptor of granular materials and its uses*

2014 College of Civil Engineering, Tongji University, Shanghai, China *Fracture propagation in geo-materials The single fracture dynamics*

2014 Inst. of Theoretical Physics, Chinese Academy of Science, Beijing, China *Structural characterisation and statistical mechanics of granular and porous systems: A systematic method to derive structure-property relation and equations of state*

2014 Center of soft matter physics and its applications, Beihang University, Beijing, China *Towards a fundamental stress theory for real granular materials*

2013 Dept. of physics, University of Cambridge, UK *Recent perspectives in the science of granular matter*

2013 Graduate Lecture, Dept. of physics, University of Cambridge, UK *The science of granular matter*

2013 Dept. of chemical and environmental engineering, University of Nottingham, UK *Structural Characterization and Statistical Mechanics of Granular Matter*

2012 Physics Dept., University of Kent, Canterbury, UK *From statistical mechanics of granular, cellular and porous materials to structure-property relations a systematic approach*

2012 Dept. of Mathematics, 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

2015 **The Annual Meeting of Thermodynamic and Statistical Mechanics Education and Research Association of China 2015**, Changsha, Hunan, China, 12-15 July *A three-lecture series: 1. Statistical mechanics of athermal systems; 2. Statistical mechanics of granular, porous and cellular materials; 3. Discussion: Necessary curriculum for physics undergraduates*

2015 **EMI 2015**, Stanford, USA, 16-19 June *Two talks: 1. Structural evolution of 2D granular solid under shear deformation; 2. From local structural characterisation of porous materials to structure-property relations: a systematic approach*

2015 **Beijing Soft Matter Workshop**, Beijing, China, 17 April *A local morphological descriptor of granular materials and its uses*

2014 **Avalanches in Functional Materials and Geophysics**, Cambridge, UK, 4-8 December *Local structural characterisation and statistical mechanics of porous and cellular media*

2014 **International Symposium on Geomechanics from Micro to Macro**, Cambridge, UK, 1-3 September *Structural characterisation and understanding stress transmission in dense granular materials*

2014 **Dynamic Systems: From Statistical Mechanics to Engineering Applications**, Zurich, Switzerland, 9-10 January *Flow of dense granular fluids - a first-principle approach*

2014 **International Winter School and Symposium on Statistical Mechanics and Simulation of Nonlinear Dynamics**, Changsha, China, 3-7 Jan - *A six-lecture series: 1. Stress transmission in granular packs why do conventional theories fail; 2. Isostaticity theory as a baseline model for stress transmission in granular assemblies; 3. Extension of isostaticity theory for real granular matter statoelasticity theory; 4. Statistical mechanics of granular media (i) the Edwards formalism; 5. Statistical mechanics of granular media (ii) the volume-stress ensemble; 6. Fracture propagation in heterogenous media process zone statistics and rich dynamics*

2013 **Powders and Grains 2013 Conference**, Sydney, Australia, 7-13 July *Statistical Mechanical Characteristics of Dense Planar Granular Matter*

2012 **8th European Solid Mechanics Conference**, Graz, Austria, 9-13 July *Statistical Mechanical Characteristics of Dense Planar Granular Matter*

2012 **8th European Solid Mechanics Conference**, Graz, Austria, 9-13 July *Elementary Volumes Distribution and Cell Structural Stability in 2D Granular Assemblies*

2012 **Petroleum Engineering and Rock Mechanics (PERM) Affiliates Meeting**, London, UK, 11 June *A systematic programme for predicting fracture network characteristics*

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.*