

## **Jayanth R. Banavar**

Professor and Dean  
College of Computer, Mathematical, and Natural Sciences  
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### **1. Personal Information**

#### **Professional experience:**

Dean, College of Computer, Mathematical, and Natural Sciences (2011 -)  
Professor, Department of Physics, University of Maryland (2011 -)  
Downsbrough Department Head of Physics, Penn State (2006 - 2011)  
Distinguished Professor of Physics, Penn State (2003 - 2011)  
Head, Department of Physics, Penn State (1998 - 2011)  
Professor of Physics, Penn State (1991 - 2011)  
Associate Professor of Physics and Materials Research, Penn State (1988 -1991)  
Member of Professional Staff, Schlumberger - Doll Research (1983 - 1988)  
Postdoctoral Member of Technical Staff, Bell Laboratories (1981 - 1983)  
Research Associate, University of Chicago (1978 - 1981)

#### **Education:**

Ph.D., Physics, University of Pittsburgh 1978  
M.Sc., Physics, Bangalore University, India 1974  
B.Sc. (Hons), Physics, Bangalore University, India 1972

#### **Awards:**

Fellow, American Association for the Advancement of Science  
Fellow, American Physical Society  
Fulbright Fellowship, 1995

#### **Research Interests:**

- Metabolic scaling in living organisms
- River networks
- Patterns underlying gene expression profiles
- Continuum deductions from molecular hydrodynamics
- Biodiversity and ecology
- Geometry and physics of proteins
- Physics of porous media
- Nature of ordering of spin glasses

**Research Output:**

- More than 250 publications in refereed journals
- Co-edited 1 book
- 3 patents
- More than 200 invited talks in universities, research laboratories, and conferences

**2. Research, Scholarly and Creative Activities****Articles in Refereed Journals**

1. J. R. Banavar and F. Keffer, "Standing-Spin-Wave Resonance in Thin Films of Materials with Nearest Neighbour and Next-Nearest-Neighbour Exchange Interactions," *Phys. Rev. B* 17, 2974-2979 (1978).
2. J. R. Banavar and D. Jasnow, "Helicity Modulus at Low Temperatures," *J. Phys. A* 11, 1361-1368 (1978).
3. J. R. Banavar and D. Coon, "Widths and Spacing of Stark Ladder Levels," *Phys. Rev. B* 17, 3744-3749 (1978).
4. J. R. Banavar, D. Coon, and G. Derkits, "New Charge-Storage Effect in Silicon P-I-N Diodes at Cryogenic Temperatures," *Phys. Rev. Lett.* 41, 576-579 (1978).
5. J. R. Banavar, D. Coon, and G. Derkits, "Low-Temperature Field Ionization of Localized Impurity Levels in Semiconductors," *Appl. Phys. Lett.* 34, 94-96 (1979).
6. J. R. Banavar and F. Keffer, "Determination of Allowed Standing Exchange Modes in Nonmetallic Ferromagnetic Films," *Phys. Rev. B* 20, 1221-1228 (1979).
7. J. R. Banavar, D. Jasnow, and D. Landau, "Fluctuation-Induced First-Order Transition in a BCC Ising Model with Competing Interactions," *Phys. Rev. B* 20, 3820-3827 (1979).
8. J. R. Banavar and R. Gomer, "Density Fluctuation Autocorrelation Functions for Surface Diffusion with Various Boundary Conditions," *Surf. Sci.* 97, L345-350 (1980).
9. R. Ditzian, J. R. Banavar, G. Grest, and L. Kadanoff, "Phase Diagram for the Ashkin-Teller Model in Three Dimensions," *Phys. Rev. B* 22, 2542-2553 (1980).
10. J. R. Banavar, G. Grest, and D. Jasnow, "Ordering and Phase Transitions in Antiferromagnetic Potts Models," *Phys. Rev. Lett.* 45, 1424-1428 (1980).

11. S. Chaudhuri, D. Coon, G. Derkits, and J. R. Banavar, "Rate of Field Ionization From S States with a Quantum Defect," *Phys. Rev. A* 23, 1657-1661 (1981).
12. G. Grest and J. R. Banavar, "Monte Carlo Study of the Antiferromagnetic Potts Model in Two Dimensions," *Phys. Rev. Lett.* 46, 1458-1461 (1981).
13. J. R. Banavar, M. Cohen, and R. Gomer, "A Calculation of Surface Diffusion Coefficients of Absorbates on the (110) Plane of Tungsten," *Surf. Sci.* 107, 113-126 (1981).
14. G. Mazenko, J. R. Banavar, and R. Gomer, "Diffusion Coefficients and the Time AutoCorrelation Function of Density Fluctuations," *Surf. Sci.* 107, 459-468 (1981).
15. P. Sahni and J. R. Banavar, "Monte-Carlo Renormalization Group Studies of the Ising Model on a FCC Lattice," *Phys. Lett. A* 85, 56-58 (1981).
16. J. R. Banavar and M. Cieplak, "Nature of Ordering in Spin-Glasses," *Phys. Rev. Lett.* 48, 832-835 (1982).
17. T. R. Rosenbaum, L. Rupp, G. Thomas, W. Walsh, H. Chen, J. R. Banavar, and P. Littlewood, "Electron Spin Resonance Indication of the Ferromagnetic Spin-Glass Transition in Amorphous FeMn Alloys," *Solid State Commun.* 42, 725-727 (1982).
18. J. R. Banavar, G. Grest, and D. Jasnow, "Antiferromagnetic Potts and Ashkin-Teller Models in Three Dimensions," *Phys. Rev. B* 25, 4639-4650 (1982).
19. J. R. Banavar and M. Cieplak, "Area Dependence of Exchange Stiffness Energy in a SpinGlass," *Phys. Rev. B.* 26, 2662-2663 (1982).
20. J. R. Banavar and M. Cieplak, "Influence of Boundary Conditions on Random Unfrustrated Magnetic Systems," *Phys. Rev. B* 26, 2482-2489 (1982).
21. T. Rosenbaum, L. Rupp, G. Thomas, H. Chen, J. R. Banavar, and C. Varma, "Observation of ESR Non-Linearities in a Spin Glass," *J. Phys. C* 15, L975-979 (1982).
22. J. R. Banavar and M. Muthukumar, "Dynamic Monte Carlo Scaling Method for Polymers," *Chem. Phys. Lett.* 93, 35-37 (1982).
23. C. Varma, R. Dynes, and J. R. Banavar, "Thermally Created Tunneling States in Glasses," *J. Phys. C* 15, L1221-1225 (1982).
24. M. Cieplak and J. R. Banavar, "Sensitivity to Boundary Conditions of Ising Spin-Glasses," *Phys. Rev. B* 27, 293-296 (1983).

25. J. R. Banavar and M. Cieplak, "Scaling Stiffness of Spin Glasses," *J. Phys. C* 16, L755-759 (1983).
26. J. R. Banavar, A. Brooks-Harris, and J. Koplik, "Resistance of Random Walks," *Phys. Rev. Lett.* 51, 1115-1118 (1983).
27. J. R. Banavar and M. Cieplak, "Renormalization-Group Analysis on Fractals: Ising SpinGlass and the Schrodinger Equation," *Phys. Rev. B* 28, 3813-3817 (1983).
28. J. Aronovitz, J. R. Banavar, M. Marcus, and J. Phillips, "Structural Models and Vibrational Spectra of Tetrahedral Chalcogenide Crystals and Glasses," *Phys. Rev. B* 28, 4454-4460 (1983).
29. J. R. Banavar and J. Phillips, "Cluster Models of the Neutron and Infrared Vibrational Spectra of Vitreous Silica," *Phys. Rev. B* 28, 4716-4723 (1983).
30. J. R. Banavar and M. Cieplak, "Lower Critical Dimensionality of Heisenberg Spin-Glasses," *Phys. Rev. B* 29, 469-471 (1984).
31. J. R. Banavar and F. Wu, "Antiferromagnetic Potts Model with Competing Interactions," *Phys. Rev. B* 29, 1511-1513 (1984).
32. J. R. Banavar and J. Willemsen, "Probability Density for Diffusion on Fractals," *Phys. Rev. B* 30, 6778-6779 (1984).
33. J. R. Banavar and J. Willemsen, "Comment on Scaling Behaviour of Self-Avoiding Random Surfaces," *Phys. Rev. Lett.* 53, 1609 (1984).
34. J. R. Banavar, M. Muthukumar, and J. Willemsen, "Fractal Geometries in Decay Models," *J. Phys. A* 18, 61-65 (1985).
35. J. R. Banavar, M. Cieplak, and M. Muthukumar, "Dynamics of Frustrated Spin Clusters," *J. Phys. C* 18, L157-162 (1985).
36. J. R. Banavar, L. Kadanoff, and A. Pruisken, "Energy Spectrum for a Fractal Lattice in a Magnetic Field," *Phys. Rev. B* 31, 1388-1395 (1985).
37. J. R. Banavar, M. Lipsicas, and J. Willemsen, "Determination of the Random Walk Dimension of Fractals by Means of NMR," *Phys. Rev. B* 32, 6066 (1985).
38. R. G. Caflisch, J. R. Banavar, and M. Cieplak, "Critical Behavior of the Scaling Stiffness Coefficient of Spin Glasses," *J. Phys. C* 18, L991-996 (1985).
39. R. G. Caflisch and J. R. Banavar, "Renormalization Group Study of Interfacial Properties and its Applications to an Ising Spin Glass," *Phys. Rev. B* 32, 7617-7620 (1985).

40. S. Singh and J. R. Banavar, "Random Field Critical Behavior: Finite-Size Effects," *Phys. Rev. Lett.* 55, 2220-2222 (1985).
41. J. R. Banavar, M. Kohmoto, and J. Roberts, "Aggregate Models of Pattern Formation," *Phys. Rev. A* 33, 2065-2067 (1986).
42. R. Caflisch, M. Kaufman, and J. R. Banavar, "Comments on Origin of Nonuniversality in Micellar Solutions," *Phys. Rev. Lett.* 56, 2545 (1986).
43. M. Kohmoto and J. R. Banavar, "Quasiperiodic Lattice: Electronic Properties, Phonon Properties and Diffusion," *Phys. Rev. B* 34, 563-566 (1986).
44. M. Lipsicas, J. R. Banavar, and J. Willemsen, "Surface Relaxation and Pore Sizes in Rocks a Nuclear Magnetic Resonance Analysis," *Appl. Phys. Lett.* 48, 1544-1546 (1986).
45. R. Caflisch, H. Levine, and J. R. Banavar, "Glassy Dynamics in Icosahedral Systems," *Phys. Rev. Lett.* 57, 2679-2682 (1986).
46. J. R. Banavar, D. Sherrington, and N. Surlas, "Graph Bipartitioning and Statistical Mechanics," *J. Phys. A* 20, L1-8 (1987).
47. B. Harris, R. Caflisch, and J. R. Banavar, "Some Results on the Random Anisotropy Axis Magnet with Infinite Anisotropy," *Phys. Rev. B* 35, 4929-4934 (1987).
48. J. R. Banavar and D. Johnson, "Characteristic Pore Sizes and Transport in Porous Media," *Phys. Rev. B* 35, (Rapid Commun.) 7283-7286 (1987).
49. J. R. Banavar and L. Schwartz, "Magnetic Resonance as a Probe of Permeability in Porous Media," *Phys. Rev. Lett.* 58, 1411-1414 (1987).
50. J. R. Banavar, A. Bray, and S. Feng, "Critical Behaviour of Random Spin Systems at the Percolation Threshold," *Phys. Rev. Lett.* 58, 1463-1466 (1987).
51. J. R. Banavar and A. Bray, "Chaos in Spin Glasses - A Renormalization Group Study," *Phys. Rev. B* 35, (Rapid Commun.) 8888-8890 (1987).
52. C. Straley, A. Matteson, S. Feng, L. Schwartz, W. Kenyon, and J. R. Banavar, "Magnetic Resonance, Digital Image Analysis and Permeability of Porous Media," *Appl. Phys. Lett.* 51, 1146-1148 (1987).
53. J. Koplik, J. R. Banavar, and J. Willemsen, "Molecular Dynamics of Poiseuille Flow and Moving Contact Lines," *Phys. Rev. Lett.* 60, 1282-1285 (1988).

54. J. R. Banavar, M. Cieplak, and D. Johnson, "Surface Conduction and Length Scales in Porous Media," *Phys. Rev. B* 37, (Rapid Commun.) 7975-7978 (1988).
55. S. Luthi and J. R. Banavar, "A Borehole Image Study in the Permian Rotliegend (North Sea)," *Bulletin Amer. Assoc. Petroleum Geologists* 72 (9), 1074-1089 (1988).
56. J. R. Banavar and A. Bray, "Heisenberg and Potts Spin Glasses: A Renormalization Group Study," *Phys. Rev. B* 38, 2564-2569 (1988).
57. J. R. Banavar, D. Johnson, and S. Nagel, "Thermal Wave Spectroscopy - A New Probe of Porous Media," *Phys. Rev. Lett.* 61, 2748-2751 (1988).
58. J. R. Banavar and M. Cieplak, "Zero-Temperature Scaling for Potts Spin Glasses," *Phys. Rev. B* 39, 9633-9635 (1989).
59. L. M. Schwartz and J. R. Banavar, "Transport Properties of Disordered Continuum Systems," *Phys. Rev. B* 39, 11965-11970 (1989).
60. J. Koplik, J. R. Banavar, and J. Willemsen, "Molecular Dynamics of Fluid Flow at Solid Surfaces," *Physics of Fluids A* 1, 781-794 (1989).
61. L. M. Schwartz and J. R. Banavar, "Calculation of Electrical Transport in Continuum Systems by Diffusion Simulation," *Physica A* 157, 230-234 (1989).
62. J. R. Banavar and M. Cieplak, "Nature of ordering in Potts spin glasses," *Phys. Rev. B* 40, 4613-4620 (1989).
63. E. C. Subbarao, J. R. Banavar, A. S. Bhalla, L. E. Cross, S. K. Kurtz, R. E. Newnham, and R. Roy, "Crystal, Chemical and Structural Similarities of High  $T_c$  Superconductors and Ferroelectrics," *Phase Transitions* 22, 157-166 (1990).
64. L. M. Schwartz, J. R. Banavar, and B. I. Halperin, "Biased Diffusion Calculations of Electrical Transport in Inhomogeneous Continuum Systems," *Phys. Rev. B* 40, 9155-9161 (1989).
65. S. M. Luthi, J. R. Banavar, and U. Bayer, "Models to Interpret Bedform Geometries from Cross Bed Data," *J. Geology* 98, 171-187 (1990).
66. B. Sundaram, M. Cieplak, and J. R. Banavar, "Ordering Characterized by a Strange Attractor," *Phys. Rev. A* 41, (Rapid Commun.) 5713-5716 (1990).
67. M. Cieplak and J. R. Banavar, "Scaling of stiffness in Ising spin glasses," *J. Phys. A: Math. Gen.* 23, 4385-4398 (1990).

68. M. Cieplak, J. R. Banavar, and A. Khurana, "Gauge Invariance and the Vortex Glass," *J. Phys. A* 24, L145-L149 (1991).
69. T. R. Gawron, M. Cieplak, and J. R. Banavar, "Scaling of Energy Barriers in Ising Spin Glasses," *J. Phys. A* 24, L127-131 (1991).
70. J. R. Banavar, A. Maritan, and A. Stella, "Critical Behavior of 2D Vesicles in the Deflated Regime," *Phys. Rev. A* 43, 5752-5754 (1991).
71. J. R. Banavar, A. Maritan, and A. Stella, "Geometry, Topology and Universality of Random Surfaces," *Science* 252, 825-827 (1991).
72. J. R. Banavar, M. Cieplak, and A. Maritan, "II Monte-Carlo Mean Field Theory," *Phys. Rev. Lett.* 67, 1807(c) (1991).
73. A. Maritan, M. Swift, M. Cieplak, M. Chan, M. Cole, and J. R. Banavar, "Ordering and Phase Transitions in Random Field Ising Systems," *Phys. Rev. Lett.* 67, 1821-1824 (1991).
74. P. A. Crossley, L. M. Schwartz, and J. R. Banavar, "Image-based Models of Porous Media: Application to Vycor Glass and Carbonate Rocks," *Appl. Phys. Lett.* 59, 3553-3555 (1991).
75. L. M. Schwartz, D. J. Wilkinson, S. Kostek, D. L. Johnson, and J. R. Banavar, "Nuclear Magnetism and Transport in Porous Media," *J. Magn. Reson. Imag.* 9, 657-662 (1991).
76. J.-X. Yang, J. Koplik, and J. R. Banavar, "Molecular Dynamics of Drop Spreading on a Solid Surface," *Phys. Rev. Lett.* 67, 3539-3542 (1991).
77. M. Cieplak, J. R. Banavar, M. S. Li, and A. Khurana, "Frustration, Scaling and Local Gauge Invariance," *Phys. Rev. B* 45, 786-792 (1992).
78. E. Cheng, J. R. Banavar, M. W. Cole, and F. Toigo, "Physisorption in Flat Surfaces and Inside Square Wells: A transfer matrix study," *Surf. Sci.* 261, 389-393 (1992).
79. W. J. Ma, J. R. Banavar, and J. Koplik, "A Molecular Dynamics Study of Freezing in Confined Geometries," *J. Chem. Phys.* 97, 485-493 (1992).
80. W. J. Ma, A. Maritan, J. R. Banavar, and J. Koplik, "Dynamics of Phase Separation of Binary Fluids," *Phys. Rev. A* 45, R5347-5350 (1992).
81. J. Annett and J. R. Banavar, "Critical Dynamics, Spinodal Decomposition and Conservation Laws," *Phys. Rev. Lett.* 68, 2941-2943 (1992).

82. P. E. Sokol, W. J. Ma, W. M. Snow, Y. Yang, K. W. Herwig, J. Koplik, and J. R. Banavar, "Freezing in Restricted Geometries," *Appl. Phys. Lett.* 61, 777-779 (1992).
83. S. Kumar, S. K. Kurtz, J. R. Banavar, and M. G. Sharma, "Properties of a Three-Dimensional Poisson-Voronoi Tessellation," *J. Stat. Phys.* 67, 523-551 (1992).
84. A. Maritan, M. Cieplak, M. Swift, F. Toigo, and J. R. Banavar, "Random Anisotropy Blume-Emery-Griffiths Model," *Phys. Rev. Lett.* 69, 221-224 (1992).
85. J. Koplik and J. R. Banavar, "Molecular Structure of the Coalescence of Liquid Interfaces," *Science* 254, 1664-1666 (1992).
86. A. Maritan and J. R. Banavar, "Non-Universal Diffusion in a Chain with Deterministic Local Drifts," *Phys. Rev. E* 47, R769 (1993).
87. M. Cieplak, U. D'Ortona, D. Salin, R. Rybka, and J. R. Banavar, "Cellular Automata Studies of Mixing in Chaotic Flows," *Comp. Mat. Sci.* 1, 87-93 (1992).
88. J. Yang, J. Koplik, and J. R. Banavar, "Terraced Spreading of Simple Liquids on Solid Surfaces," *Phys. Rev. A* 46, 7738-7749 (1992).
89. Maritan, F. Toigo, J. Koplik, and J. R. Banavar, "Dynamics of Growing Interfaces," *Phys. Rev. Lett.* 69, 3193-3196 (1992).
90. M. Cieplak, M. S. Li, and J. R. Banavar, "Universality and Chaos in XY Spin Glasses," *Phys. Rev. B* 47, 5022-5026 (1993).
91. P. Koblinski, W. J. Ma, A. Maritan, J. Koplik, and J. R. Banavar, "Molecular Dynamics of Phase Separation in Narrow Channels," *Phys. Rev. E* 47, R2265-R2268 (1993).
92. J. Koplik and J. R. Banavar, "Molecular Dynamics of Interface Rupture," *Phys. Fluids A* 5, 521-536 (1993).
93. M. R. Swift, E. Cheng, M. W. Cole, and J. R. Banavar, "Phase Transitions in a Model Porous Medium," *Phys. Rev. B* 48, 3124-3129 (1993).
94. R. Rybka, M. Cieplak, U. D'Ortona, D. Salin, and J. R. Banavar, "Cellular Automata Studies of Circular Couette Flows and Chaotic Mixing," *Phys. Rev. E* 48, 757-766 (1993).
95. W. J. Ma, P. Koblinski, A. Maritan, J. Koplik, and J. R. Banavar, "Spinodal Decomposition in Confined Geometries," *Phys. Rev. E* 48, (Rapid Commun.) R2362-R2365 (1993).



96. A. L. Stella, M. R. Swift, J. G. Amar, T. L. Einstein, M. W. Cole, and J. R. Banavar, "Novel Critical Behavior in Inhomogeneous Systems," *Phys. Rev. Lett.* 71, 3818-3821 (1993).
97. M. R. Swift, A. Maritan, M. Cieplak, and J. R. Banavar, "Nature of Ordering in Random Field Ising Systems" *J. Phys. A* 27, 1525-1532 (1994).
98. M. Cieplak and J. R. Banavar, "Scaling and Phase Transitions in Random Systems," *Phys. Rev. A* 194, 63-71 (1993).
99. W. J. Ma, P. Koblinski, A. Maritan, J. Koplik, and J. R. Banavar, "Dynamical Relaxation of Surface Tension," *Phys. Rev. Lett.* 71, 3465-3468 (1993).
100. A. Maritan and J. R. Banavar, "Chaos, Noise and Synchronization," *Phys. Rev. Lett.* 72, 1451-1454 (1994).
101. M. Cieplak, A. Maritan, and J. R. Banavar, "Optimal Paths and Domain Walls in the Strong Disorder Limit," *Phys. Rev. Lett.* 72, 2320-2323 (1994).
102. P. Koblinski, A. Maritan, F. Toigo, and J. R. Banavar, "Continuum approach to diffusionlimited-aggregation type of growth," *Phys. Rev. E* 49, R4795-R4798 (1994).
103. J. Koplik and J. R. Banavar, "Fluid Cusps at the Molecular Scale," *Phys. Fluids* 6, 480-488 (1994).
104. A. Maritan, M. Cieplak, M. R. Swift, and J. R. Banavar, "Spin-Flip Avalanches and Dynamics of First Order Transitions," *Phys. Rev. Lett.* 72, 946(c) (1994).
105. A. Maritan, M. Cieplak, T. Bellini, and J. R. Banavar, "Nematic-Isotropic Transition in Porous Media," *Phys. Rev. Lett.* 72, 4113-4116 (1994).
106. P. Koblinski, W. J. Ma, A. Maritan, J. Koplik, and J. R. Banavar, "Domain Growth Near a Wall in Spinodal Decomposition," *Phys. Rev. Lett.* 72, 3738(c) (1994).
107. M. Cieplak, A. Maritan, and J. R. Banavar, "Interfacial Geometry and Overhanging Configurations," *J. Phys. A* 27, L765-L769 (1994).
108. G. Gonnella, A. Maritan, and J. R. Banavar, "Phase Diagram of Uniaxial Liquid Crystals," *J. Phys. A* 27, L771-L776 (1994).
109. U. D'Ortona, D. Salin, M. Cieplak, and J. R. Banavar, "Interfacial Phenomena in Boltzmann Cellular Automata," *Europhys. Lett.* 28, 317-322 (1994).
110. J. DeConinck, U. D'Ortona, J. Koplik, and J. R. Banavar, "Terraced Spreading of Chain Molecules via Molecular Dynamics," *Phys. Rev. Lett.* 74, 928-931 (1995).

111. J. Koplik and J. R. Banavar, "Continuum Deductions from Molecular Hydrodynamics," *Ann. Rev. Fluid Mech.* 27, 257-292 (1995).
112. W. J. Ma, L. K. Iyer, S. Vishveshwara, J. Koplik, and J. R. Banavar, "Molecular Dynamics of Systems of Confined Dumbbell Molecules," *Phys. Rev. E* 51, 441-453 (1995).
113. P. Keblinski, A. Maritan, F. Toigo, and J. R. Banavar, "Morphology and Scaling in Continuum Ballistic Deposition," *Phys. Rev. Lett.* 74, 1783-1786 (1995).
114. U. D'Ortona, D. Salin, M. Cieplak, R. B. Rybka, and J. R. Banavar, "2-Color Nonlinear Boltzmann Cellular-Automata-Surface-Tension and Wetting," *Phys. Rev. E* 51, 3718-3728 (1995).
115. A. Giacometti, A. Maritan, F. Toigo, and J. R. Banavar, "Real Space Renormalization Group for Langevin Dynamics in Absence of Translationallnvariance," *J. Stat. Phys.* 79, 648-668 (1995).
116. M. Vergeles, P. Keblinski, J. Koplik, and J. R. Banavar, "Stokes Drag at the Molecular Level," *Phys. Rev. Lett.* 75, 232-235 (1995).
117. I. Shrivastava, S. Vishveshwara, M. Cieplak, A. Maritan, and J. R. Banavar, "Lattice Model for Rapidly Folding Protein-like Heteropolymers," *Proc. Natl. Acad. Sci. USA* 92, 9206-9209 (1995).
118. A. Giacometti, A. Maritan, and J. R. Banavar, "Continuum Model for River Networks," *Phys. Rev. Lett.* 75, 577-580 (1995).
119. J. Koplik and J. R. Banavar, "Corner Flow in the Sliding Plate Problem," *Phys. Fluids* 7, 3118-3125 (1995).
120. W. R. Osborn, E. Orlandini, M. R. Swift, J. M. Yeomans, and J. R. Banavar, "Lattice Boltzmann Study of Hydrodynamic Spinodal Decomposition," *Phys. Rev. Lett.* 75, 4031-4034 (1995).
121. M. Cieplak, A. Maritan, M. R. Swift, A. Bhattacharya, A. L. Stella, and J. R. Banavar, "Optimal Paths and Universality," *J. Phys. A* 28, 5693-5700 (1995).
122. F. Seno, M. Vendruscolo, A. Maritan, and J. R. Banavar, "Optimal Protein Design Procedure," *Phys. Rev. Lett.* 77, 1901-1904 (1996).
123. M. Marsili, A. Maritan, F. Toigo, and J. R. Banavar, "Renormalization-Group Study of Growth-Processes with an Oblique Incident Flux of Atoms," *Europhys. Lett.* 35, 171176 (1996).

124. M. Vergeles, P. Keblinski, J. Koplik, and J. R. Banavar, "Stokes Drag and Lubrication Flows - A Molecular-Dynamics Study," *Phys. Rev. E* 53, 4852-4864 (1996).
125. A. Maritan, F. Colaiori, A. Flammini, M. Cieplak, and J. R. Banavar, "Universality Classes of Optimal Channel Networks," *Science* 272, 984-986 (1996).
126. M. Cieplak, A. Maritan, and J. R. Banavar, "Invasion Percolation and Eden Growth Geometry and Universality," *Phys. Rev. Lett.* 76, 3754-3757 (1996).
127. P. Keblinski, S. K. Kumar, A. Maritan, J. Koplik, and J. R. Banavar, "Interfacial Roughening Induced by Phase-Separation," *Phys. Rev. Lett.* 76, 1106-1109 (1996).
128. A. Giacometti, A. Maritan, F. Toigo, and J. R. Banavar, "Fluctuation-Dissipation Theorem and the Dynamical Renormalization Group," *J. Stat. Phys.* 82, 1669-1674 (1996).
129. U. D'Ortona, J. DeConinck, J. Koplik, and J. R. Banavar, "Terraced Spreading Mechanisms for Chain Molecules," *Phys. Rev. E* 53, 562-569 (1996).
130. P. Keblinski, A. Maritan, F. Toigo, R. Messier, and J. R. Banavar, "Continuum Model for the Growth of Interfaces," *Phys. Rev. E* 53, 759-778 (1996).
131. A. Dell'Aversana, J. R. Banavar, and J. Koplik, "Suppression of Coalescence by Shear and Temperature-Gradients," *Phys. Fluids* 8, 15-28 (1996).
132. M. Marsili, A. Maritan, F. Toigo, and J. R. Banavar, "Stochastic Growth Equations and Reparametrization Invariance," *Rev. Mod. Phys.* 68, 963-983 (1996).
133. M. Cieplak, S. Vishveshwara, and J. R. Banavar, "Cell-Dynamics of Model Proteins," *Phys. Rev. Lett.* 77, 3681-3684 (1996).
134. A. Rinaldo, A. Maritan, F. Colaiori, A. Flammini, R. Rigon, I. Rodriguez-Iturbe, and J. R. Banavar, "Thermodynamics of Fractal Networks," *Phys. Rev. Lett.* 76, 3364-3367 (1996).
135. M. R. Swift, A. Maritan, and J. R. Banavar, "Scaling Properties of Suboptimal Interfaces," *Phys. Rev. Lett.* 77, 5288-5291 (1996).
136. J. Koplik and J. R. Banavar, "Molecular Simulation of Reentrant Corner Flow," *Phys. Rev. Lett.* 78, 2116-2119 (1997).
137. M. Vergeles, A. Maritan, and J. R. Banavar, "Mean-Field Theory of Sandpiles," *Phys. Rev. E* 55, 1998-2000 (1997).
138. F. Colaiori, A. Flammini, A. Maritan, and J. R. Banavar, "Analytical and Numerical Study of Optimal Channel Networks," *Phys. Rev. E* 55, 1298-1310 (1997).

139. W. Jin, J. Koplik, and J. R. Banavar, "Wetting Hysteresis at the Molecular Scale," *Phys. Rev. Lett.* 78, 1520-1523 (1997).
140. M. R. Swift, F. Colaiori, A. Flammini, A. Maritan, A. Giacometti, and J. R. Banavar, "Scaling relationships in agglomeration and annihilation models," *Phys. Rev. Lett.* 79, 3278-3281 (1997).
141. M. Vergeles, A. Maritan, J. Koplik, and J. R. Banavar, "Adhesion of solids," *Phys. Rev. E* 56, 2626-2634 (1997).
142. M. Cieplak and J. R. Banavar, "Cell dynamics of folding in two-dimensional model proteins," *Folding and Design* 2, 235-245 (1997).
143. J. R. Banavar, F. Colaiori, A. Flammini, A. Giacometti, A. Maritan, and A. Rinaldo, "Sculpting of a fractal river basin," *Phys. Rev. Lett.* 78 (20), 3967-3970 (1997).
144. M. Vendruscolo, A. Maritan, and J. R. Banavar, "Stability threshold as a selection principle for protein design," *Phys. Rev. Lett.* 78, 3967-3970 (1997).
145. M. R. Swift, A. J. Bray, A. Maritan, M. Cieplak, and J. R. Banavar, "Scaling of the randomfield Ising model at zero temperature," *Europhys. Lett.* 38, 273-278 (1997).
146. J. Koplik and J. R. Banavar, "Reentrant corner flows of Newtonian and non-Newtonian fluids," *J. Rheology* 41, 787-805 (1997).
147. C. Micheletti, F. Seno, A. Maritan, and J. R. Banavar, "Design of Proteins with Hydrophobic and Polar Amino Acids," *Proteins* 32, 80-87 (1998).
148. R. Tehver, M. W. Cole, A. Maritan, J. Koplik, and J. R. Banavar, "Impurity solvation in a liquid," *J. Chem. Phys.* 108, 2104-2110 (1998).
149. F. Seno, A. Maritan, and J. R. Banavar, "Interaction Potentials for Protein Folding," *Proteins* 30, 244-248 (1998).
150. M. Cieplak, M. Henkel, J. Karbowski, and J. R. Banavar, "Master Equation Approach to Protein Folding and Kinetic Traps," *Phys. Rev. Lett.* 80, 3654-3657 (1998).
151. M. Cieplak, A. Giacometti, A. Maritan, A. Rinaldo, and J. R. Banavar, "Models of Fractal River Basins," *J. Stat. Phys.* 91, 1-15 (1998).
152. J. Koplik and J. R. Banavar, "No-Slip Condition for a Mixture of Two Liquids," *Phys. Rev. Lett.* 80, 5125-5128 (1998).

153. C. Micheletti, F. Seno, A. Maritan, and J. R. Banavar, "Protein Design in a Lattice Model of Hydrophobic and Polar Amino Acids," *Phys. Rev. Lett.* 80, 2237-2240 (1998).
154. J. R. Banavar, M. Cieplak, A. Maritan, G. Nadig, F. Seno, and S. Vishveshwara, "Structure-Based Design of Model Proteins," *Proteins* 31, 10-20 (1998).
155. R. Tehver, F. Toigo, J. Koplik, and J. R. Banavar, "Thermal walls in computer simulations," *Phys. Rev. E* 7, R17-R20 (1998).
156. M. Marani, J. R. Banavar, A. Maritan, and A. Rinaldo, "Stationary self-organized fractal structures in an open, dissipative electrical system," *J. Phys. A: Math. and Gen.* 31, L337-L343 (1998).
157. C. Micheletti, F. Seno, A. Maritan, and J. R. Banavar, "Steric Constraints in Model Proteins," *Phys. Rev. Lett.* 80, 5683-5686 (1998).
158. F. Seno, C. Micheletti, A. Maritan, and J. R. Banavar, "Variational Approach to Protein Design and Extraction of Interaction Potentials," *Phys. Rev. Lett.* 81, 2712-2715 (1998).
159. C. Clementi, A. Maritan, and J. R. Banavar, "Folding, Design and Determination of Interaction Potentials using Off-lattice Dynamics of Model Heteropolymers," *Phys. Rev. Lett.* 81, 3287-3290 (1998).
160. S. Lise, M. R. Swift, A. Maritan, and J. R. Banavar, "A Non-equilibrium Percolation Transition in Random Ising Ferromagnets," *J. Phys. A* 31, L713-L719 (1998).
161. C. Micheletti, F. Seno, A. Maritan, and J. R. Banavar, "Design of Proteins with Hydrophobic and Polar Amino Acids," *Proteins-Struct. Func. and Gen.* 32, 80-87 (1998).
162. M. Cieplak, J. Koplik, and J. R. Banavar, "Applications of statistical mechanics in subcontinuum fluid dynamics," *Physica A* 274, 281-293 (1999).
163. J. R. Banavar, J. L. Green, J. Harte, and A. Maritan, "Finite size scaling in ecology," *Phys. Rev. Lett.* 83, 4212-4214 (1999).
164. C. Micheletti, A. Maritan, and J. R. Banavar, "A comparative study of existing and new design techniques for protein models," *J. Chem. Phys.* 110, 9730-9738 (1999).
165. J. van Mourik, C. Clementi, A. Maritan, F. Seno, and J. R. Banavar, "Determination of interaction potentials of amino acids from native protein structures: Tests on simple lattice models," *J. Chem. Phys.* 110, 10123-10133 (1999).

166. J. R. Banavar, A. Maritan, and A. Rinaldo, "Size and form in efficient transportation networks," *Nature* 399, 130-132 (1999).
167. R. I. Dima, J. R. Banavar, M. Cieplak, and A. Maritan, "Statistical mechanics of proteinlike heteropolymers," *Proc. Natl. Acad. Sci. USA* 96, 4904-4907 (1999).
168. M. Cieplak, A. Maritan, and J. R. Banavar, "Optimal paths and growth processes," *Physica A* 266, 291-298 (1999).
169. C. Micheletti, J. R. Banavar, A. Maritan, and F. Seno, "Protein structures and optimal folding from a geometrical variational principle," *Phys. Rev. Lett.* 82, 3372-3375 (1999).
170. R. Tehver, F. Ancilotto, F. Toigo, J. Koplik, and J. R. Banavar, "Absence of many-body effects in interactions between charged colloidal particles," *Phys. Rev. E* 59, R1335-R1338 (1999).
171. R. Tehver, A. Maritan, J. Koplik, and J. R. Banavar, "Depletion forces in hard-sphere colloids," *Phys. Rev. E* 59, R1339-R1342 (1999).
172. J. Koplik and J. R. Banavar, "Comment on 'No-slip condition for a mixture of two liquids' - Reply," *Phys. Rev. Lett.* 82, 1333-1334 (1999).
173. A. Maritan, C. Micheletti, and J. R. Banavar, "Role of secondary motifs in fast folding polymers: A dynamical variational principle," *Phys. Rev. Lett.* 84, 3009-3012 (2000).
174. R. I. Dima, J. R. Banavar, and A. Maritan, "Scoring functions in protein folding and design," *Prot. Sci.* 9, 812-819 (2000).
175. J. R. Banavar, F. Colaiori, A. Flammini, A. Maritan, and A. Rinaldo, "Topology of the fittest transportation network," *Phys. Rev. Lett.* 84, 4745-4748 (2000).
176. J. Koplik and J. R. Banavar, "Molecular simulations of dewetting," *Phys. Rev. Lett.* 84, 4401-4404 (2000).
177. G. Giugliarelli, C. Micheletti, J. R. Banavar, and A. Maritan, "Compactness, aggregation, and prionlike behavior of protein: A lattice model study," *J. Chem. Phys.* 113, 5072-5077 (2000).
178. J. R. Banavar, A. Maritan, and A. Rinaldo, "Scaling- Rivers, blood and transportation networks- Reply," *Nature* 408, 159-160 (2000).
179. F. Cecconi, J. R. Banavar, and A. Maritan, "Scaling behavior in a nonlocal and nonlinear diffusion equation," *Phys. Rev. E* 62, R5879-R5882 (2000).

180. E. Orlandini, F. Seno, J. R. Banavar, A. Laio, and A. Maritan, "Deciphering the folding kinetics of transmembrane helical proteins," *Proc. Natl. Acad. Sci. USA* 97, 14229-14234 (2000).
181. N. S. Holter, M. Mitra, A. Maritan, M. Cieplak, J. R. Banavar, and N. V. Fedoroff, "Fundamental patterns underlying gene expression profiles: Simplicity from complexity," *Proc. Natl. Acad. Sci. USA* 97, 8409-8414 (2000).
182. A. Maritan, C. Micheletti, A. Trovato, and J. R. Banavar, "Optimal shapes of compact strings," *Nature* 406, 287-290 (2000).
183. R. I. Dima, G. Settanni, C. Micheletti, J. R. Banavar, and A. Maritan, "Extraction of interaction potentials between amino acids from native protein structures," *J. Chem. Phys.* 112, 9151-9166 (2000).
184. M. Cieplak, J. Koplik, and J. R. Banavar, "Boundary conditions at a fluid-solid interface," *Phys. Rev. Lett.* 86, 803-803 (2001).
185. C. Micheletti, F. Seno, J. R. Banavar, and A. Maritan, "Learning effective amino acid interactions through iterative stochastic techniques," *Proteins* 42, 422-431 (2001).
186. C. Micheletti, F. Seno, A. Maritan, and J. R. Banavar, "An optimal procedure to extract interaction potentials for protein folding," *Comp. Mater. Sci.* 20, 305-310 (2001).
187. N. S. Holter, A. Maritan, M. Cieplak, N. V. Fedoroff, and J. R. Banavar, "Dynamic modeling of gene expression data," *Proc. Natl. Acad. Sci. USA* 98, 1693-1698 (2001).
188. M. Cieplak, N. S. Holter, A. Maritan, and J. R. Banavar, "Amino acid classes and the protein folding problem," *J. Chem. Phys.* 114, 1420-1423 (2001).
189. J.R. Banavar, F. Colaiori, A. Flammini, A. Maritan, and A. Rinaldo, "Scaling, Optimality and Landscape Evolution," *J. Stat. Phys.* 104, 1-48 (2001).
190. C. Micheletti, J. R. Banavar, and A. Maritan, "Conformations of Proteins in Equilibrium Art No. 088102," *Phys. Rev. Lett.* 8708, 8102-1-8102-4 (2001).
191. M. S. Tomassone, A. Couzis, C. Maldarelli, J. R. Banavar, and J. Koplik, "Phase Transitions of Soluble Surfactants at a Liquid-Vapor Interface," *Langmuir* 17, 6037-6040 (2001).
192. M. S. Tomassone, A. Couzis, C. M. Maldarelli, J. R. Banavar, and J. Koplik, "Molecular Dynamics Simulation of Gaseous-Liquid Phase Transitions of Soluble

- and Insoluble Surfactants at the Fluid Interface," J. Chem. Phys. 115, 8634-8642 (2001).
193. I. Chang, M. Cieplak, R. I. Dima, A. Maritan, and J. R. Banavar, "Protein Threading by Learning," Proc. Natl. Acad. Sci. USA 98, 14350-14355 (2001).
  194. J. Koplik, S. Pal, and J. R. Banavar, "Dynamics of Nanoscale Droplets," Phys. Rev. E 65: art. 021504.1-021504.14 (2002).
  195. M. Cheon, I. Chang, J. Koplik, and J. R. Banavar, "Chain Molecule Deformation in a Uniform Flow - A Computer Experiment," Europhys. Lett. 58, 215-221 (2002).
  196. J.R. Banavar, A. Maritan, C. Micheletti, and A. Trovato, "Geometry and Physics of Proteins," Proteins 47, 315-322 (2002).
  197. A. Flammini, J. R. Banavar, and A. Maritan, "Energy Landscape and Native-State Structure of Proteins - A Simplified Model," Europhys. Lett. 58, 623-629 (2002).
  198. A. Maritan, R. Rigon, J. R. Banavar, and A. Rinaldo, "Network Allometry," Geophys. Res. Lett. 29, 3.1-3.4 (2002).
  199. J. R. Banavar, J. Damuth, A. Maritan, and A. Rinaldo, "Supply-Demand Balance and Metabolic Scaling," Proc. Nat. Acad. Sci. USA 99, 10506-10509 (2002).
  200. T. X. Hoang, M. Cieplak, J. R. Banavar, and A. Maritan, "Prediction of Protein Secondary Structures for Conformational Biases," Proteins 48, 558-565 (2002).
  201. F. Cecconi, M. Marsili, J. R. Banavar, and A. Maritan, "Diffusion, Peer Pressure and Tailed Distributions," Phys. Rev. Lett. 89, Art. No. 088102.1-088102.4 (2002).
  202. J. R. Banavar, A. Maritan, and F. Seno, "Anisotropic Effective Interactions in a Coarse Grained Tube Picture of Proteins," Proteins 49, 246-254 (2002).
  203. M. Cieplak, A. Maritan, M. R. Swift, F. Taiga, and J. R. Banavar, "Effects of Pore Walls and Randomness on Phase Transitions in Porous Media," Phys. Rev. E. 66 Art. No. 056124.1056124.9 (2002).
  204. I. Volkov, M. Cieplak, J. Koplik, and J. R. Banavar, "Molecular dynamics simulations of crystallization of hard spheres," Phys. Rev. E 66 Art. No. 061401.1-061401.9 (2002).
  205. B. Busic, J. Koplik, and J. R. Banavar, "Molecular dynamics simulation of liquid bridge extensional flows," J. Non-Newton Fluid 109, 51-89 (2003).
  206. J. R. Banavar, O. Gonzalez, J. H. Maddocks, and A. Maritan, "Self-Interactions of Strands and Sheets," J. Stat. Phys. 110, 35-50 (2003).



207. J. R. Banavar and A. Maritan, "A comment on the protein folds as platonic forms," *J. Theor. Biol.* 223, 263-265 (2003).
208. J. R. Banavar, J. Damuth, A. Maritan, and A. Rinaldo, "Allometric cascades," *Nature* 421, 713-714 (2003).
209. T. X. Hoang, F. Seno, J. R. Banavar, M. Cieplak, and A. Maritan, "Assembly of protein tertiary structures from secondary structures using optimized potentials," *Proteins* 52, 155-165 (2003).
210. J. R. Banavar and A. Maritan, "Colloquium: Geometrical Approach to Protein Folding: A Tube Picture," *Rev. Mod. Phys.* 75, 23-24 (2003).
211. J. Koplik and J. R. Banavar, "Extensional rupture of model non-Newtonian fluid filaments," *Phys. Rev. E* 67, Art. No. 011502.1-011502.12 (2003).
212. J. Koplik and J. R. Banavar, "Molecular dynamics simulations of non-Newtonian extensional fluid flows," *Int. J. Mod. Phys. B* 17, 27-32 (2003).
213. I. Volkov, J. R. Banavar, S. P. Hubbell, and A. Maritan, "Neutral theory and relative species abundance in ecology," *Nature* 424, 1035-1037 (2003).
214. J. R. Banavar, A. Flammini, D. Marenduzzo, A. Maritan, and A. Trovato, "Tubes near the edge of compactness and folded protein structures," *J. Phys. Condens. Mat.* 15, S1787S179 (2003).
215. I. Chang, M. Cieplak, J. R. Banavar, and A. Maritan, "What can one learn from experiments about the elusive transition state?" *Prot. Sci.* 13, 2446-2457 (2004).
216. A. Rinaldo, J. R. Banavar, V. Colizza, and A. Maritan, "On network form and function," *Physica A* 340, 749-755 (2004).
217. J. R. Banavar and A. Maritan, "Exemplars of proteins," *Curr. Sci.* 87, 152-158 (2004).
218. I. Volkov, J. R. Banavar, and A. Maritan, "Organization of ecosystems in the vicinity of a novel phase transition," *Phys. Rev. Lett.* 92, 218703 (2004).
219. T. X. Hoang, A. Trovato, F. Seno, J. R. Banavar, and A. Maritan, "Geometry and symmetry prescript the free-energy landscape of proteins," *Proc. Natl. Acad. Sci. USA* 101, 7960-7964 (2004).
220. V. Colizza, J. R. Banavar, A. Maritan, and A. Rinaldo, "Network structures from selection principles," *Phys. Rev. Lett.* 92, 198701 (2004).

221. T. Lezon, J. R. Banavar, and A. Maritan, "Recognition of coarse-grained protein tertiary structure," *Proteins Struct. Funct. Genet.* 55, 536-547 (2004).
222. J. R. Banavar, P. Del Los Rios, A. Flammini, N. S. Holter, and A. Maritan, "Scale-free behavior and universality in random fragmentation and aggregation," *Phys. Rev. E* 69, 036123 (2004).
223. I. Volkov, J. R. Banavar, A. Maritan, and S. P. Hubbell, "The stability of forest biodiversity," *Nature* 427, 696-696 (2004).
224. J. R. Banavar, M. Cieplak, and A. Maritan, "Lattice tube model of proteins," *Phys. Rev. Lett.* 93, 238101 (2004).
225. J. R. Banavar, T.X. Hoang, A. Maritan, F. Seno, and A. Trovato, "A unified perspective on proteins - a physics approach," *Phys. Rev. E* 70, 041905 (2004).
226. I. Volkov, J. R. Banavar, F. L. He, S. P. Hubbell, and A. Maritan, "Density dependence explains tree species abundance and diversity in tropical forests," *Nature* 438, 658-661 (2005).
227. T. Zillio, I. Volkov, J. R. Banavar, S. P. Hubbell, and A. Maritan, "Spatial scaling in model plant communities," *Phys. Rev. Lett.* 95, 098101 (2005).
228. J. R. Banavar, T. X. Hoang, and A. Maritan, "Proteins and polymers," *J. Chem. Phys.* 122, 234910 (2005).
229. A. Trovato, T. X. Hoang, J. R. Banavar, A. Maritan, and F. Seno, "What determines the structures of native folds of proteins?" *J. Phys. Cond. Matt.* 17, 51515-51522 (2005).
230. T. X. Hoang, A. Trovato, F. Seno, J. R. Banavar, and A. Maritan, "Geometrical model for the native-state folds of proteins," *Biophys. Chem.* 115, 289-294 (2005).
231. D. Marenduzzo, A. Flammini, A. Trovato, J. R. Banavar, and A. Maritan, "Physics of thick polymers," *J. Poly. Sci. B* 43, 650-679 (2005).
232. S. Azaele, I. Volkov, J. R. Banavar, and A. Maritan, "Linear one-step processes with artificial boundaries," *J. Stat. Phys.* 125, 495-515 (2006).
233. G. D. Rose, P. J. Fleming, J. R. Banavar, and A. Martan, "A backbone-based theory of protein folding," *Proc. Natl. Acad. Sci. USA* 103, 16623-16633 (2006).
234. I. Volkov, J. R. Banavar, and A. Maritan, "Comment on 'Computational improvements reveal great bacterial diversity and high metal toxicity in soil'," *Science* 313, 918 (2006).

235. T. X. Hoang, A. Trovato, F. Seno, J. R. Banavar, and A. Maritan, "Marginal compactness of protein native structures," *J. Phys-Cond. Matt.* 18, 5297-5306 (2006).
236. T. X. Hoang, L. Marsella, A. Trovato, F. Seno, J. R. Banavar, and A. Maritan, "Common attributes of native-state structures of proteins, disordered proteins, and amyloid," *Proc. Natl. Acad. Sci. USA* 103, 6883-6888 (2006).
237. A. Rinaldo, J. R. Banavar, and A. Maritan, "Trees, networks, and hydrology," *Water Resour. Res.* 42, W06D07 (2006).
238. I. Volkov, J. R. Banavar, F. He, S. Hubbell, and A. Maritan, "Theoretical biology: Comparing models of species abundance - Reply," *Nature* 441, E1-E2 (2006).
239. B. T. Grenfell, C. S. Williams, O. N. Bjornstad, and J. R. Banavar, "Simplifying biological complexity," *Nat. Phys.* 2, 212-214 (2006).
240. I. Volkov, J. R. Banavar, and A. Maritan, "A novel ensemble in statistical physics," *J. Stat. Phys.* 123, 167-180 (2006).
241. J. R. Banavar, M. Cieplak, A. Flammini, T. X. Hoang, R. D. Kamien, T. Lezon, D. Marenduzzo, A. Maritan, F. Seno, Y. Snir, and A. Trovato, "Geometry of proteins: Hydrogen bonding, sterics, and marginally compact tubes," *Phys. Rev. E* 73, 031921 (2006).
242. J. R. Banavar, J. Damuth, A. Maritan, and A. Rinaldo, "Comment on Revising the distributive networks models' of West, Brown and Enquist (1997) and Banavar, Maritan and Rinaldo (1999): Metabolic inequity of living tissues provides clues for the observed allometric scaling rules by Makarieva, Gorshkov and Li," *J. Theor. Biol.* 239, 391-393 (2006).
243. T. R. Lezon, J. R. Banavar, A. M. Lesk, and A. Maritan, "What determines the spectrum of protein native state structures?" *Proteins: Structure, Function and Bioinformatics* 63, 273-277 (2006).
244. M. Cieplak, J. Koplik, and J. R. Banavar, "Nanoscale fluid flows in the vicinity of patterned surfaces," *Phys. Rev. Lett.* 96, 114502 (2006).
245. T. R. Lezon, J. R. Banavar, and A. Maritan, "The origami of life," *J. Phys. Condensed Matt.* 18, 847-888 (2006).
246. J. Koplik and J. R. Banavar, "Slip, immiscibility, and boundary conditions at the liquid interface," *Phys. Rev. Lett.* 96, 044505 (2006).
247. S. Azaele, S. Pigolotti, J. R. Banavar, and A. Maritan, "Dynamics of ecosystems," *Nature* 444, 926-928 (2006).

248. T. Lezon, J. R. Banavar, M. Cieplak, A. Maritan, and N. V. Fedoroff, "Using entropy maximization to infer genetic interaction networks," *Proc. Natl. Acad. Sci. USA* 103, 19033-19038 (2006).
249. J. R. Banavar and A. Maritan, "Physics of proteins," *Ann. Rev. Biophys. Biomol. Struct.* 36, 261-280 (2007).
250. J. R. Banavar, T. X. Hoang, J. H. Maddocks, A. Maritan, C. Poletto, A. Stasiak, and A. Trovato, "Structural motifs of biomolecules," *Proc. Natl. Acad. Sci. USA* 104, 17283-17287 (2007).
251. A. Trovato, T. X. Hoang, J. R. Banavar, and A. Maritan, "Symmetry, shape, and order," *Proc. Natl. Acad. Sci. USA* 104, 19187-19192 (2007).
252. J. R. Banavar, J. Damuth, A. Maritan, and A. Rinaldo, "Scaling in Ecosystems and the Linkage of Macroecological Laws," *Phys. Rev. Lett.* 98, 068104 (2007).
253. I. Volkov, J. R. Banavar, S. P. Hubbell, and A. Maritan, "Patterns of relative species abundance in rain forests and coral reefs," *Nature* 450, 45-49 (2007).
254. D. Pfaff and J. R. Banavar, "A theoretical framework for CNS arousal," *Bioessays* 29, 803810 (2007).
255. M. Cieplak and J. R. Banavar, "Molecular dynamics of immiscible fluids in chemically patterned microchannels," *J. Chem. Phys.* 128, 104709 (2008).
256. F. Seno, A. Trovato, J. R. Banavar, and A. Maritan, "Maximum entropy approach for deducing amino acid interactions in proteins," *Phys. Rev. Lett.* 100, 078102 (2008).
257. C. Poletto, A. Giacometti, A. Trovato, J. R. Banavar, and A. Maritan, "Emergence of secondary motifs in tubelike polymers in a solvent," *Phys. Rev. E* 77, 061804 (2008).
258. T. X. Hoang, F. Seno, A. Trovato, J. R. Banavar, and A. Maritan, "Inference of the solvation energy parameters of amino acids using maximum entropy approach," *J. Chem. Phys.* 129, 035102 (2008).
259. T. Zillio, J. R. Banavar, J. L. Green, J. Harte, and A. Maritan, "Incipient criticality in ecological communities," *Proc. Natl. Acad. Sci. USA* 105, 18714-18717 (2008).
260. S. Azaele, J. R. Banavar, and A. Maritan, "Probing noise in gene expression and protein production," *Phys. Rev. E* 80, 031916 (2009).

261. I. Volkov, J. R. Banavar, S. P. Hubbell, and A. Maritan, "Inferring species interactions in tropical forests," *Proc. Natl. Acad. Sci. USA* 106, 13854-13859 (2009).
262. J. R. Banavar, M. Cieplak, T. X. Hoang, and A. Maritan, "First-principles design of nanomachines," *Proc. Natl. Acad. Sci. USA* 106, 6900-6903 (2009).
263. J. R. Banavar and A. Maritan, "Towards a theory of biodiversity," *Nature* 460, 334-335 (2009).
264. J. R. Banavar, A. Maritan, and I. Volkov, "Applications of the principle of maximum entropy: from physics to ecology," *J. Phys. Condensed Matter* 22, 063101 (2010).
265. A. N. Jha, S. Vishveshwara, and J. R. Banavar, "Amino acid interactions in proteins," *Protein Sci.* 19, 603-616 (2010).
266. F. Simini, T. Anfodillo, M. Carrer, J. R. Banavar, and A. Maritan, "Self-similarity and scaling in plant communities," *Proc. Natl. Acad. Sci. USA* 107, 7658-7662 (2010).
267. I. Volkov, K. M. Pepin, J. O. Lloyd-Smith, J. R. Banavar, and B. T. Grenfell, "Synthesizing within-host and population-level selective pressures on viral populations: the impact of adaptive immunity on viral immune escape," *J. Roy. Soc. Interface* 7, 1311-1318 (2010).
268. K. M. Pepin, I. Volkov, J. R. Banavar, C. O. Wilke, and J. R. Banavar, "Phenotypic differences in viral immune escape explained by linking within-host dynamics to hostpopulation immunity," *J. Theor. Biol.* 265, 501-510 (2010).
269. J. R. Banavar, M. E. Moses, J. H. Brown, J. Damuth, A. Rinaldo, R. M. Sibly, and A. Maritan, "A general basis for quarter-power scaling in animals," *Proc. Natl. Acad. Sci. USA* 107, 15816-15820 (2010).
270. J. R. Banavar, A. Maritan, and I. Volkov, "Applications of the principle of maximum entropy: from physics to ecology" *J. Phys.: Condensed Matter* 22 (6), 063101 (2010).
271. J. R. Banavar, M. E. Moses, J. H. Brown, J. Damuth, A. Rinaldo, R. M. Sibly, and A. Maritan, "A general basis for quarter-power scaling in animals," *Proc. Natl. Acad. Sci. USA* 107 (36), 15816-15820 (2010).
272. F. Di Patti, S. Azaele, J. R. Banavar, and A. Maritan, "System size expansion for systems with an absorbing state," *Phys. Rev. E* 83 (1), 010102 (2011).
273. A. N. Jha, S. Vishveshwara, and J. R. Banavar, "Amino acid interaction preferences in helical membrane proteins," *Protein Eng. Design & Selection* 24 (8), 579-588

(2011).

274. A. W. Quinkert, V. Vimal, Z. M. Weil, G. N. Reeke, N. D. Schiff, J. R. Banavar, and D. W. Pfaff, "Quantitative descriptions of generalized arousal, an elementary function of the vertebrate brain," *Proc. Natl. Acad. Sci. USA* 108 (3), 15617-15623 (2011).
275. M. Zamparo, S. Stramaglia, J. R. Banavar, and A. Maritan, "Inverse problem for multivariate time series using dynamical latent variables," *Physica A-Stat. Mech. and App.* 391 (11), 3159-3169 (2012).
276. T. X. Hoang, J. R. Banavar, and A. Maritan, "Shapes of hydrophobic thick membranes," *Europhys. Lett.* 98 (5), 56006 (2012).
277. A. Proekt, J. R. Banavar, A. Maritan, and D. W. Pfaff, "Scale invariance in the dynamics of spontaneous behavior," *Proc. Natl. Acad. Sci. USA* 109 (26), 10564-10569 (2012).
278. C. Borile, M. A. Munoz, S. Azaele, J. R. Banavar, and A. Maritan, "Spontaneously Broken Neutral Symmetry in an Ecological System," *Phys. Rev. Lett.* 109 (3), 038102 (2012).
279. J. R. Banavar, T. X. Hoang, F. Seno, A. Trovato, and A. Maritan, "Protein Sequence and Structure: Is One More Fundamental than the Other?" *J. Stat. Phys.* 148 (4), 636-645 (2012).
280. J. Grilli, S. Azaele, J. R. Banavar, and A. Maritan, "Absence of detailed balance in ecology," *Europhys. Lett.* 100 (3), 38002 (2012).
281. T. X. Hoang, A. Trovato, F. Seno, J. R. Banavar, and A. Maritan, "Sequence repeats and protein structure," *Phys. Rev. E* 86 (5), 050901 (2012).
282. J. Grilli, S. Azaele, J. R. Banavar, and A. Maritan, "Spatial aggregation and the species-area relationship across scales," *J. Theor. Biol.* 313, 87-97 (2012).
283. T. Anfodillo, M. Carrer, F. Simini, I. Popa, J. R. Banavar, and A. Maritan, "An allometry-based approach for understanding forest structure, predicting tree-size distribution and assessing the degree of disturbance," *Proc. Royal Soc. B: Biol. Sci.* 280, 1751 (2013).
284. S. Suweis, F. Simini, J. R. Banavar, and A. Maritan, "Emergence of structural and dynamical properties of ecological mutualistic networks," *Nature* 500 (7463), 449-452 (2013).

285. J. R. Banavar and S. Vishveshwara, "Protein structure and folding - simplicity within complexity," *J. Biomol. Struct. & Dyn.*, 31 (9-SI), 973-975 (2013).
286. J. Candia, R. Maunu, M. Driscoll, A. Biancotto, P. Dagur, J. P. McCoy Jr., H. N. Sen, L. Wei, A. Maritan, K. Cao, R. B. Nussenblatt, J. R. Banavar, and W. Losert, "From cellular characteristics to disease diagnosis: uncovering phenotypes with supercells," *PLOS Comp. Biol.* 9 (9), e1003215 (2013).
287. M. Cieplak and J. R. Banavar, "Energy landscape and dynamics of proteins – an exact analysis of a simplified lattice model," *Phys. Rev. E.* 88 (Rapid Comm.), 040702(R) (2013).

### Other Publications

1. J. Koplik and J. R. Banavar, "Molecular Simulation of Viscous Flow," *JSME Intl. J. Series B*, 41, 353-363 (1998).
2. J. Koplik and J. R. Banavar, "Physics of fluids - a molecular approach," *Comp. in Phys.* 12, 424-431 (1998).
3. F. Seno, C. Micheletti, A. Maritan, and J. R. Banavar, "Learning Effective Amino-Acid Interactions," *Mathematical Methods for Protein Structure Analysis and Design*, Lecture Notes in Computer Science 2666: 139-145 (2000).
4. J. R. Banavar and A. Maritan, "Computational Approach to the protein folding problem," Guest Editorial in *Proteins* 42, 433-435 (2001).
5. J. R. Banavar and A. Maritan, "The Science of Life," *Comput. Phys. Commun.* 146, 129130 (2002).
6. J. R. Banavar, Book Review, "The Quarterly Review of Biology" 81, 269 (2006).

### Books

#### *Book edited*

J. R. Banavar, J. Koplik, and K. Winkler, "Physics and Chemistry of Porous Media," *ALP Conf. Proc.* 154 (1987).

#### *Book chapters*

1. M. Cieplak and J. R. Banavar, "Frustration on Fractals," in *Proc. Workshop on Elementary Excitations and Fluctuations in Magnetic Systems*, San Miniato, Italy, May 1984, ed. by S. W. Lovesey, U. Balucani, F. Borsa and V. Tognetti, Springer-Verlag Vol. 54 (1984).

2. M. Muthukumar, J. R. Banavar, and J. Willemsen, "Fractal Geometry in Decay Models," in Proc. Intl. Topical Conf. Kinetics of Aggregation and Gelation, ed. by F. Family and D. Landau, North Holland (1984).
3. J. R. Banavar and L. Schwartz, "Probing Porous Media with Nuclear Magnetic Resonance," in Molecular Dynamics in Restricted Geometries, ed. by J. Klafter and J. M. Drake, John Wiley (1989).
4. J. Koplik, J. R. Banavar, and J. Willemsen, "Molecular Dynamics of Fluid Flow at Solid Surfaces" in Proc. 4th Intl. Conf. Supercomp., ed. by L. P. Kartashev and S. I. Kartashev, International Supercomputing Institute (1989).
5. J. Koplik, J. R. Banavar, and J. Willemsen, "Molecular Dynamics of Fluid Flow at Solid Surfaces" in Proc. NATO Advanced Research Workshop on Microscopic Simulation of Complex Flows, ed. by M. Mareschal, Plenum Press (1990).
6. J. R. Banavar, J. Koplik, and J. Willemsen, "Molecular Dynamics of Slow Viscous Flows," in Computer Simulation Studies in Condensed Matter Physics, edited by D. P. Landau, K. K. Mon, and H. B. Schuttler, Springer-Verlag (1990).
7. J. R. Banavar, "Effect of Disorder on Phase Transitions and Growth Dynamics," in Proc. Indo-U.S. Workshop on "Ordering Disorder," ALP Conf. Proc. 286 (1994).
8. Maritan, M. Cieplak, and J. R. Banavar, "Nematic-Isotropic Transition in Porous Media," in Liquid Crystals in Complex Geometries formed by Polymer and Porous Networks, ed. by G. P. Crawford and S. Zumer, Taylor and Francis, London (1996).
9. S. McNamara, J. Koplik, and J. R. Banavar, "Simulations of Surfactant-enhanced Spreading," in Comp. Sci. - ICCS 2001, ed. by V. N. Alexandrov, J. J. Dongarra, B. A. Juilano, R. S. Renner, and C. J. K. Tan, 551-559, Springer, New York (2001).
10. J. Koplik and J. R. Banavar, "Molecular Aspects of Contact-Line Dynamics," in Interfaces for the 21st Century - New Research Directions in Fluid Mechanics and Materials Science," ed. by M.K. Smith et al., Imperial College Press, London (2002).
11. T. Lezon, J. R. Banavar, M. Cieplak, N. V. Fedoroff, and A. Maritan, "The most probable genetic interaction networks inferred from gene expression patterns," in Analysis of microarray data, ed. by F. Emmett-Streib and M. Dehmer Wiley-VCH (2008).



## Patents

1. J. R. Banavar, D. D. Coon, and G. E. Derkits, "Non-volatile Information Storage Arrays of Cryogenic Pin Diodes," U. S. Patent 4,167,791 (1979).
2. W. Kenyon, P. Baker, P. Sen, and J. R. Banavar, "Method and Apparatus for Obtaining Properties of Subsurface Formation From Textural Models Derived from Formation Parameters," U. S. Patent 4,703,277 (1987).
3. J. R. Banavar, D. Johnson, S. Nagel, and K. Safinya, "Thermal Wave Spectroscopy," U. S. Patent 4,855,912 (1989).