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Education

- Ph.D. in Physics, Boston University (Prof. H. E. Stanley, advisor), 1993–1996.
- “Licenciatura” in Physics, Universidad de Buenos Aires, Argentina, 1987–1991.

Academic Experience

- Sep 2008–present. Professor of Physics, Levich Institute and Department of Physics, City College of New York.
- Jan 2005–Sep 2008. Associate Professor of Physics, Levich Institute and Department of Physics, City College of New York.
- Sep 2000–Dec 2004. Assistant Professor of Physics, Levich Institute and Department of Physics, City College of New York.
- Sep 1997–Sep 2000. Postdoctoral Fellow, Schlumberger-Doll Research, Ridgefield, CT, USA. Drs. David Johnson and Larry Schwartz. Granular Matter.
- Aug 1996–Sep 1997. Postdoctoral period shared between laboratories of Prof. P.-G. de Gennes, Collège de France, Paris, and Prof. R. C. Ball, Cavendish Laboratory, University of Cambridge, UK.

Awards and Major Grants

- Cesar Milstein Award. Secretaria de Ciencia y Tecnica. Programa Raices. Argentina. 2007.
- New York City Mayor’s Young Investigator Award for Excellence in Science and Technology, 2005.
- *Statistical analysis of jammed matter*, PI, National Science Foundation, Division of Materials Research, Materials Theory, \$270,000, 2009-2012.
- *Mathematical frameworks for biological modular networks*, PI, National Science Foundation, \$523,333, 2008-2011. Co-PI: Thomas Rattei, Department of Computational Systems Biology, University of Vienna.

- *Dynamics of social networks*, PI, National Science Foundation, Human and Social Dynamics Program, \$680,000, 2007-2010.
- *Study of damping of acoustic modes in granular materials*, PI, Department of Energy, Office of Basic Energy Sciences, Division of Chemical Sciences, Geosciences and Biosciences, \$855,000, 2003-2012. Co-PI: Dr. David L. Johnson, Schlumberger-Doll Research, Cambridge, MA.
- *Career Advancement Award, Self-organization and robustness in evolving biological networks*, PI, National Science Foundation, Molecular and Cellular Biosciences, \$148,000, 2006-2008.
- *CAREER Award, Statistical mechanics of particulate systems far from equilibrium*, PI, National Science Foundation, Division of Materials Research, Condensed Matter and Materials Theory, \$400,000, 2003-2008.
- *Nonequilibrium thermodynamics of densely packed granular matter and compressed emulsions*, PI, Department of Energy, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering, \$305,000, 2003-2007.
- *Avalanche segregation in granular flows*, PI, Petroleum Research Fund Grant, \$25,000, 2001-2003.
- “The Year in Science: Top 100 Science Stories of 1997” in the periodical *Discover*, January 1998.
- Goldhaber Prize for Achievements by a First Year Graduate Student, Boston University, 1995.

Press Coverage

- Urban Economics:
Article [19] was accompanied by *News & Views* editorial “New ways of looking at cities” by M. Batty, *Nature* **377**, 574 (1995). Cover story, I. Peterson “The Shapes of Cities: Mapping out Fractal Models of Urban Growth”, *Science News* **149**, 8-9 (Jan 6 1996). *Physics World*, May 1997, p. 29. *Daily Telegraph* (London), Sept. 25, 1996. *Scienza & Vita*, April 1996. *Diario El Pais* (Spain), November 1995.
- Granular Flow:
The stratification experiments depicted in Article [17] were described as the “Top 100 Science Stories of 1997” in the periodical *Discover*, **18** [1], 52 (Jan 1998). Article [17] was accompanied by *News & Views* editorial “From Cinderella’s dilemma to rock slides” by J. Fineberg, *Nature* **386**, 323–324 (1997), and described in detail in P. Ball, *The Self-Made Tapestry: Pattern Formation in Nature* (Oxford Univ. Press, NY, 1999), *BBC World News*, “World in Action”, August 1997. “Les couches de sable”, *Pour la Science* **237**, 24 (July 1997). “Schutten schafft Ordnung”, *Geo Magazine*, June 1997, p. 134. *Frankfurter Allgemeine Zeitung*, June 1997. “Deadly rock slide explained at last”, *The Ottawa Citizen* (Canada), April 6, 1997. “Grains sort themselves into layers”, *Science News* **151**, 206 (April 5 1997). “Rocks that roll across the plain”, *Daily Telegraph* (London), March 29, 1997. *MRS Bulletin*, March 1997, p. 72.

- Jamming in Granular Materials:
Article [14] was accompanied by *News & Views* editorial “Granular materials: taking the temperature” by B. Behringer, *Nature* **415**, 594-595 (2002), and featured in a *News Feature* editorial “Think outside the sandbox” by Mark Buchanan, *Nature* **425**, 556-557 (2003).
- Complex Networks:
Article [13] was accompanied by a *News & Views* editorial “Complex systems: Romanesque networks” by S. H. Strogatz, *Nature* **433**, 365-366 (2005) and featured in *Science News* **167**, No. 5, Jan. 29, 2005, p. 68, “Sizing Up Complex Webs: Close or far, many networks look the same” by E. Klarreich.
- Packing of Hard-Spheres:
Article [8] was accompanied by a *News & Views* editorial “Mathematical physics: Packings close and loose” by Francesco Zamponi, *Nature* **453**, 606-607 (29 May 2008) and featured in the Editor Summary. Research Highlights, *Nature Physics*, **4** 435 (2008). Press release in *Physics World*, *Science Daily*, *Physorg.com*, *Genetic Engineering and Biotechnology News*.
- Spreading of Information in Complex Networks:
Article [4] was featured in the cover of *Nature Physics*, November 2010. Press release in NSF-BIO news, *Physics World*, *Science Daily*, *Physorg.com*, *Technology Review*, *India Times*, NSF Highlights website. Chosen 2011 winner GSNP (APS) Gallery. Feature in cover *Chaos Journal*, December 2011.

Other Academic Activities

- Member of the Editorial Board of *Journal of Statistical Mechanics: Theory and Experiments*. Member of Scientific Committee for Powders and Grains, AEMMG, L’Association pour L’Etude de la Micromecanique des Milieux Granulaires.
- Reviewer of granting agencies: National Science Foundation, Division of Materials Research. Department of Energy, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering, Geosciences Division. National Science Foundation, Division of Chemistry. Petroleum Research Fund. United States-Israel Binational Science Foundation. European Science Foundation. Foundation for Fundamental Research on Matter, Netherlands. Conicyt, Chile.
- Reviewer of journals: *Nature*, *Nature Physics*, *Science*, *PNAS*, *Physical Review Letters*, *Physical Review E*, *Physica A*, *Journal of Non-Newtonian Fluid Mechanics*, *Physics of Fluids*, *European Physical Journal*, *Physica D*, *Europhysics Letters*, *J. Stat. Mech.: Theor. Exp.*, *Geophysics Journal*, *Granular Matter*, *Microfluidics and Nanofluidics*, *Soft Matter*, *International Journal of Modern Physics B*, *Journal of the Royal Society Interface*.

LIST OF PUBLICATIONS

I. MOST RELEVANT PUBLICATIONS

1. L. K. Gallos, S. Havlin, F. Liljeros, H. A. Makse, *How people interact in evolving online affiliation networks*, **Phys. Rev. X**, accepted (2011).
2. L. K. Gallos, H. A. Makse, M. Sigman, *The conundrum of functional brain networks: small-world efficiency or fractal modularity*, **Proc. Nat. Acad. Sci.**, submitted (2011). arXiv:1102.0604
3. H. D. Rozenfeld, D. Rybski, X. Gabaix, H. A. Makse, *The area and population of cities: New insights from a different perspective on cities*, **American Economic Review** **101**, 560-580 (2011).
4. M. Kitsak, L. K. Gallos, S. Havlin, F. Liljeros, L. Muchnik, H. Eugene Stanley, H. A. Makse, *Identification of influential spreaders in complex networks*, **Nature Phys.** **6**, 888-893 (2010).
5. V. Galvao, Jose G. V. Miranda, R. F. S. Andrade, J. S. Andrade Jr., L. K. Gallos, H. A. Makse, *Modularity map of the network of human cell differentiation*, **Proc. Nat. Acad. Sci.** **107**, 5750-5755 (2010).
6. D. Rybski, S. Buldyrev, S. Havlin, F. Liljeros, and H. A. Makse, *Scaling laws of human interaction activity*, **Proc. Nat. Acad. Sci.** **106**, 12640-12645 (2009).
7. H. D. Rozenfeld, D. Rybski, J. S. Andrade Jr., M. Batty, H. E. Stanley, and H. A. Makse, *Laws of population growth*, **Proc. Nat. Acad. Sci.** **105**, 18702-18707 (2008).
8. C. Song, P. Wang, H. A. Makse, *A phase diagram for jammed matter*, **Nature** **453**, 629-632 (2008).
9. L. K. Gallos, C. Song, S. Havlin, H. A. Makse, *Scaling theory of transport in complex biological networks*, **Proc. Nat. Acad. Sci.** **104**, 7746-7751 (2007).
10. P. Wang, C. Song, and H. A. Makse, *Dynamic particle tracking reveals the aging temperature of a colloidal glass*, **Nature Phys.** **2**, 526-531 (2006).
11. C. Song, S. Havlin, and H. A. Makse, *Origins of fractality in the growth of complex networks*, **Nature Physics** **2**, 275-281 (2006).
12. C. Song, P. Wang, and H. A. Makse, *Experimental measurement of an effective temperature for jammed granular materials*, **Proc. Nat. Acad. Sci.** **102**, 2299-2304 (2005).
13. C. Song, S. Havlin and H. A. Makse, *Self-similarity of complex networks*, **Nature** **433**, 392-395 (2005).
14. H. A. Makse and J. Kurchan, *Testing the thermodynamic approach to granular matter with a numerical model of a decisive experiment*, **Nature** **415**, 614-617 (2002).
15. H. A. Makse, D. L. Johnson, and L. M. Schwartz, *Packing of compressible granular materials*, **Phys. Rev. Lett.** **84**, 4160-4163 (2000).

16. T. Boutreux, H. A. Makse and P. G. de Gennes, *Surface flows of granular mixtures: III. Canonical model*, **Eur. Phys. J.-B** **9**, 105-115 (1999).
17. H. A. Makse, S. Havlin, P. R. King, and H. E. Stanley, *Spontaneous stratification in granular mixtures*, **Nature** **386**, 379-381 (1997).
18. R. Cuerno, H. A. Makse, S. Tomassone, S. Harrington, and H. E. Stanley, *Stochastic model for surface erosion via ion-sputtering: Dynamical evolution from ripple morphology to rough morphology*, **Phys. Rev. Lett.** **75**, 4464-4470 (1995).
19. H. A. Makse, S. Havlin, and H. E. Stanley, *Modelling urban growth patterns*, **Nature** **377**, 608-612 (1995).

II. OTHER PUBLICATIONS

20. L. K. Gallos, P. Barttfeld, S. Havlin, M. Sigman, H. A. Makse, *Collective behavior in the geographical spreading of obesity and diabetes*, in preparation.
21. K. Wang, C. Song, P. Wang, H. A. Makse, *Edwards thermodynamics of the jamming transition for frictionless packings: ergodicity test and role of anisotropy and compactivity*, submitted to **Phys. Rev. E**, arXiv:1101.5634
22. M. Danisch, A. Baule, H. A. Makse, *Jamming of hard rods I: From Onsager to Edwards*, arXiv:1102.0608
23. L. K. Gallos, C. Song, T. Weinmaier, T. Rattei, H. A. Makse, *Unraveling the modular evolution of the yeast protein interaction network*, arXiv:1006.2761
24. L. La Ragione, V. Magnanimo, J. T. Jenkins, H. A. Makse, *Irreversible incremental behavior in a granular material*, arXiv:1001.5466
25. D. Rybski, S. V. Buldyrev, S. Havlin, F. Liljeros, H. A. Makse, *Communication activity in social networks: growth and correlations*. **Eur. Phys. J.-B** **84** (2011) arXiv:1002.0216
26. Y. Jin and H. A. Makse, *A first-order phase transition defines the random close packing of hard spheres*, **Physica A** **389**, 5362 (2010).
27. K. Wang, C. Song, P. Wang, H. A. Makse, *Anisotropy and compactivity describe the jamming transition in soft particulate matter*, **Europhys. Lett.** **91**, 68001 (2010). EPL Best 100 papers of 2010.
28. M. Danisch, Y. Jin, and H. A. Makse, *Model of random packings of different size balls*, **Phys. Rev. E** **81**, 051303 (2010).
29. H. D. Rozenfeld, L. K. Gallos, and H. A. Makse, *Explosive percolation in the human protein homology network*, **Eur. Phys. J. B** **75**, 305 (2010).
30. H. D. Rozenfeld, C. Song and H. A. Makse, *The small world-fractal transition in complex networks: a renormalization group approach*, **Phys. Rev. Lett.** **104**, 025701 (2010).
31. C. Song, P. Wang, Y. Jin, H. A. Makse, *Jamming I: A volume function for jammed matter*, **Physica A** **389**, 4497-4509 (2010).

32. P. Wang, C. Song, Y. Jin, H. A. Makse, *Jamming II: Edwards' statistical mechanics of packing of hard spheres*, **Physica A** **390**, 427-455 (2010).
33. C. Briscoe, C. Song, P. Wang, H. A. Makse, *Jamming III: Characterizing Randomness via the Entropy of Jammed Matter*, **Physica A** **389**, 3978-3999 (2010).
34. S. Meyer, C. Song, Y. Jin, H. A. Makse, *Jamming in two-dimensional packings*, **Physica A** **389**, 5137-5144 (2010).
35. P. Wang, C. Song, C. Briscoe, K. Wang, H. A. Makse, *From force distribution to average coordination number in frictional granular matter*, **Physica A** **389**, 3972-3977 (2010).
36. P. Wang, C. Song, Y. Jin, H. A. Makse, *Distribution of volumes and coordination number in jammed matter: mesoscopic ensemble*, **J. Stat. Mech.**, P12005 (2010).
37. S. Carmi, S. Havlin, C. Song, K. Wang, H. A. Makse, *An energy landscape's network approach to the glass transition*, **J. Phys. A: Math. Theor.** **42**, 105101 (2009).
38. C.-J. Hsu, D. L. Johnson, J. Valenza, R. Ingale, N. Gland, and H. A. Makse, *Dynamic effective mass of granular media and the attenuation of structure-borne sound*, **Phys. Rev. E** **80**, 051304 (2009).
39. H. D. Rozenfeld, and H. A. Makse, *Fractality and the percolation transition in complex networks*, **Chem. Eng. Sci.** **64**, 4572-4575 (2009).
40. C.-J. Hsu, D. L. Johnson, J. Valenza, R. Ingale, N. Gland, and H. A. Makse, *Dynamic effective mass of granular media*, **Phys. Rev. Lett.** **102**, 058001 (2008).
41. C. Briscoe, C. Song, P. Wang, H. A. Makse. *Entropy of jammed matter*, **Phys. Rev. Lett.** **101**, 188001 (2008).
42. H. D. Rozenfeld, L. K. Gallos, C. Song, H. A. Makse. *Fractal and Transfractal Scale-Free Networks*. Encyclopedia of Complexity and Systems Science, R. A. Meyers, ed. (Springer, 2008). <http://arxiv.org/abs/0808.2206>
43. P. Wang, C. Song, C. Briscoe, H. A. Makse, *Particle dynamics and effective temperature of jammed granular matter in a slowly sheared 3D Couette cell*, **Phys. Rev. E** **77**, 6 (2008).
44. L. K. Gallos, C. Song, and H. A. Makse, *Scaling of Degree Correlations and Its Influence on Diffusion in Scale-Free Networks*, **Phys. Rev. Lett.** **100**, 248701 (2008).
45. V. Magnanimo, L. La Ragione, J. T. Jenkins, P. Wang, and H. A. Makse, *Characterizing the shear and bulk moduli of an idealized granular material*, **Europhys. Lett.** **81**, 34006 (2008).
46. J. Brujić, C. Song, P. Wang, C. Briscoe, G. Marty, and H. A. Makse, *Fluorescent contacts measure the coordination number and entropy of a 3D jammed emulsion packing*, **Phys. Rev. Lett.** **98**, 248001 (2007).
47. C. Song, L. K. Gallos, S. Havlin, H. A. Makse, *How to calculate the fractal dimension of a complex network: the box covering algorithm*, **J. Stat. Mech.** P03006 (2007).
48. N. Gland, P. Wang, and H. A. Makse, *Numerical Study of Stress Response Functions of Dense Isotropic Granular Packings*, **Eur. Phys. J.-E** **20**, 179-184 (2006).

49. F. Potiguar and H. A. Makse, *Effective Temperature and Jamming Transition in Dense, Gently Sheared Granular Assemblies*, **Eur. Phys. J.-E** **19**, 171-183 (2006).
50. J. Brujić, P. Wang, D. Johnson, O. Sindt, and H. A. Makse, *Granular dynamics in compaction and stress relaxation*, **Phys. Rev. Lett.** **95**, 128001 (2005).
51. H. Zhang and H. A. Makse, *Jamming Transition in Emulsions and Granular Materials*, **Phys. Rev. E** **72** 011301 (2005).
52. C. M. Song, P. Wang, F. Potiguar, H. A. Makse, *Experimental and computational studies of jamming*, **J. Phys.: Condens. Matter** **17** S2755-S2770 (2005).
53. H. A. Makse, N. Gland, D. L. Johnson, and L. M. Schwartz, *Nonlinear Elasticity, Sound Propagation and Collective Relaxation Dynamics*, **Phys. Rev. E** **70**, 061302 (2004).
54. J. Jenkins, D. L. Johnson, L. La Ragione, and H. A. Makse, *Fluctuations and the Effective Moduli of an Isotropic, Random Aggregate of Identical, Frictionless Spheres*, **J. Mech. and Phys. of Sol.** **53**, 197-225 (2004).
55. H. A. Makse, J. Brujić, and S. F. Edwards, *Statistical Mechanics of Jammed Matter*, in *The Physics of Granular Media*, edited by H. Hinrichsen and D. E. Wolf (Wiley-VCH, 2004).
56. S. F. Edwards, J. Brujić, and H. A. Makse, *A Basis for the Statistical Mechanics of Granular Systems*, in *Unifying Concepts in Granular Media and Glasses*, edited by A. Coniglio, A. Fierro, H. J. Herrmann and M. Nicodemi (Elsevier, Amsterdam, 2004).
57. B. Jin, F. Xu, and H. A. Makse, *Surface Shape of Two-dimensional Granular Piles*, **J. Stat. Mech.** **3** 1-8 (2004).
58. J. Brujić, S. F. Edwards, I. Hopkinson, and H. A. Makse, *Measuring Distribution of Interdroplet Forces in a Compressed Emulsion System*, **Physica A** **327**, 201-212 (2003).
59. J. Brujić, S. F. Edwards, D. Grinev, I. Hopkinson, D. Brujić, and H. A. Makse, *3D Bulk Measurements of the Force Distribution in a Compressed Emulsion System*, **Faraday Disc.** **123**, 207 (2003).
60. A. D. Araujo, A. A. Moreira, H. A. Makse, H. E. Stanley, and J. S. Andrade, *Traveling Length and Minimal Traveling Time for Flow through Percolation Networks with Long-range Spatial Correlations*, **Phys. Rev. E** **66**, 046304 (2002).
61. H. A. Makse, *Grain Segregation Mechanism in Aeolian Sand Ripples*, **Eur. Phys. J.-E** **1**, 127-135 (2000).
62. H. A. Makse, J. S. Andrade Jr., and H. Eugene Stanley, *Tracer Dispersion in a Percolation Network with Spatial Correlations*, **Phys. Rev. E** **61**, 583-586 (2000).
63. H. A. Makse, N. Gland, D. L. Johnson, and L. M. Schwartz, *Why Effective Medium Theory Fails in Granular Materials*, **Phys. Rev. Lett.** **83**, 5070-5073 (1999).
64. H. A. Makse, *Continuous Avalanche Segregation of Granular Mixtures in Thin Rotating Drums*, **Phys. Rev. Lett.** **83**, 3186-3189 (1999).
65. H. A. Makse, *Kinematic Segregation of Flowing Grains in Sandpiles*, **Eur. Phys. J.-B** **7**, 271-276 (1999).

66. J. S. Andrade Jr., U. M. S. Costa, M. P. Almeida, H. A. Makse, and H. E. Stanley, *Inertial Effects on Fluid Flow Through Disordered Porous Media*, **Phys. Rev. Lett.** **82**, 5249-5252 (1999).
67. P. Cizeau, H. A. Makse, and H. E. Stanley, *Mechanism for Spontaneous Granular Stratification and Segregation in Two-Dimensional Silos*, **Phys. Rev. E** **59**, 4408-4421 (1999).
68. H. A. Makse and H. J. Herrmann, *Microscopic Model for Granular Stratification and Segregation*, **Europhys. Lett.** **43**, 1-6 (1998).
69. L. A. N. Amaral and H. A. Makse, *Comment on: Kinetic Roughening in Slow Combustion of Paper*, **Phys. Rev. Lett.** **80**, 5706 (1998).
70. H. A. Makse, R. C. Ball, H. E. Stanley, and S. Warr, *Dynamics of Granular Stratification*, **Phys. Rev. E** **58**, 3357-3367 (1998).
71. A. Károlyi, J. Kertész, S. Havlin, H. A. Makse, and H. E. Stanley, *Filling a Silo with a Mixture of Grains: Friction-induced Segregation*, **Europhys. Lett.** **44**, 388-393 (1998).
72. H. A. Makse, S. Buldyrev, H. Leschhorn and H. E. Stanley, *The Pinning Paths of an Elastic Interface*, **Europhys. Lett.** **41**, 251-256 (1998).
73. H. A. Makse, J. S. de Andrade, M. Batty, S. Havlin, and H. E. Stanley, *Modeling Urban Growth Patterns with Correlated Percolation*, **Phys. Rev. E** **58**, 7054-7062 (1998).
74. H. A. Makse, P. Cizeau, and H. E. Stanley, *Possible Stratification Mechanism in Granular Mixtures*, **Phys. Rev. Lett.** **78**, 3298-3301 (1997).
75. H. A. Makse, *Stratification Instability in Granular Flows*, **Phys. Rev. E** **56**, 7008-7016 (1997).
76. K. L. Lauritsen, R. Cuerno, and H. A. Makse, *Noisy Kuramoto-Sivashinsky Equation for an Erosion Model*, **Phys. Rev. E** **54**, 3577-3580 (1996).
77. H. A. Makse, A.-L. Barabási, and H. E. Stanley, *Elastic String in a Random Medium*, **Phys. Rev. E** **53**, 6573-6576 (1996).
78. H. A. Makse, S. Havlin, M. Schwartz, and H. E. Stanley, *Method for Generating Long-Range Correlations for Large Systems*, **Phys. Rev. E** **53**, 5445-5449 (1996).
79. H. E. Stanley, L. A. N. Amaral, S. V. Buldyrev, A. L. Goldberger, S. Havlin, H. Leschhorn, P. Maass, H. A. Makse, C.-K. Peng, M. A. Salinger, M. H. R. Stanley, and G. M. Viswanathan, *Scaling and Universality in Animate and Inanimate Systems*, **Physica A** **231**, 20-48 (1996).
80. H. A. Makse, G. Davies, S. Havlin, P.-Ch. Ivanov, P. R. King, and H. E. Stanley, *Long-range Correlations in Permeability Fluctuations in Porous Rock*, **Phys. Rev. E** **54**, 3129-3134 (1996).
81. H. A. Makse and L. A. N. Amaral, *Scaling Behavior of Driven Interfaces Above the Depinning Transition*, **Europhys. Lett.** **31**, 379-384 (1995).
82. H. A. Makse, *Singularities and Avalanches in Interface Growth with Quenched Disorder*, **Phys. Rev. E** **52**, 4080-4086 (1995).

83. L. A. N. Amaral, A.-L. Barabási, H. A. Makse, and H. E. Stanley, *Scaling Properties of Driven Interfaces in Disordered Media*, **Phys. Rev. E** **52**, 4087-4104 (1995).
84. H. A. Makse and R. P. J. Perazzo, *The Thermodynamics of Dyslexic Learning*, **International Journal of Neural Systems** **4**, 351-360 (1992).

III. OTHER PUBLICATIONS

85. D. Futer, A.-L. Barabási, S. Buldyrev, S. Havlin, and H. A. Makse, “*Self-Affine Surfaces*”, in “*Fractal in Science: An Introductory Course*” (Springer-Verlag, New York, 1994).
86. H. A. Makse, S. Havlin, P. R. King, and H. E. Stanley, “*Novel Pattern Formation in Granular Matter*”, in “*Lectures on Stochastic Dynamics*”, edited by L. Schimansky-Geier and T. Poeschel (Springer, Heidelberg, 1997), pp. 319–333.
87. H. A. Makse, H. E. Stanley, and S. Havlin, *Power Laws for Cities*, **Physics World** **10**, 22-23 (October 1997).

IV. CONFERENCE PROCEEDINGS

88. H. A. Makse, S. Havlin, H. E. Stanley, and M. Schwartz, *Novel Method to Generate Long-Range Correlations*, [Proc. of the First International Conference in Complex Systems in Computational Physics, Buenos Aires, 1993], **Chaos, Solitons, and Fractals** **6**, 295-303 (1995).
89. H. A. Makse, S. Havlin, P. R. King, and H. E. Stanley, “Influence of Spatial Correlations on Permeability and Connectivity of Sandstone,” in *Disordered Materials and Interfaces* [Proc. Symposium of Materials Research Society, 1995], edited by H. Z. Cummins, D. J. Durian, D. L. Johnson, and H. E. Stanley (Materials Research Society, Pittsburgh, 1996), pp. 57–62.
90. R. Cuerno, H. A. Makse, S. Tomassone, S. T. Harrington, and H. E. Stanley, “A Model for Ion-Sputtering: From Pattern Formation to Rough Surfaces,” in *Disordered Materials and Interfaces* [Proc. Symposium of Materials Research Society, 1995], edited by H. Z. Cummins, D. J. Durian, D. L. Johnson, and H. E. Stanley (Materials Research Society, Pittsburgh, 1996), pp. 307–312.
91. H. A. Makse, S. Havlin, P.-Ch. Ivanov, P. R. King, S. Prakash, and H. E. Stanley, *Pattern Formation in Sedimentary Rocks: Connectivity, Permeability, and Spatial Correlations*, [Proc. Int’l Conf. on Pattern Formation, Australia], **Physica A** **233**, 587–605 (1996).
92. H. E. Stanley, L. A. N. Amaral, S. V. Buldyrev, A. L. Goldberger, S. Havlin, B. T. Hyman, H. Leschhorn, P. Maass, H. A. Makse, C.-K. Peng, M. A. Salinger, M. H. R. Stanley, and G. M. Viswanathan, *Scaling and Universality in Living Systems*, **Fractals** **4**, 427–451 (1996).
93. H. E. Stanley, L. A. N. Amaral, J. S. Andrade, Jr., S. V. Buldyrev, S. Havlin, H. A. Makse, C.-K. Peng, B. Suki, and G. Viswanathan, *Scale-Invariant Correlations in the Biological and Social Sciences*, [Proc. Minerva Conf., Eilat, Israel, March 1997], **Phil. Mag.** **B**, **77** 1373-1388 (1998).

94. H. A. Makse, S. Havlin, P. R. King, and H. E. Stanley, *Experimental studies of stratification in a granular Hele-Shaw cell*, [Proc. Minerva Conf., Eilat, Israel, March 1997], *Phil. Mag. B*, **77** 1341-1351 (1998).
95. H. A. Makse, P. Cizeau, and H. E. Stanley, *Modeling Stratification in Two-Dimensional Sandpiles*, [Proc. Bar-Ilan Conf], *Physica A* **249**, 391-396 (1998).
96. H. A. Makse, P. Cizeau, S. Havlin, P. R. King, and H. E. Stanley, *Spontaneous Self-Stratification Without Shaking: 'Potatoes from Mashed Potatoes'* in *Physics of Dry Granular Media*, [Proc. 1997 NATO ASI, Cargese], edited by H.J. Herrmann, J.-P. Hovi, and S. Luding (Kluwer, Dordrecht, 1998), pp. 671-680.
97. A. Károlyi, J. Kertész, H. A. Makse, H. E. Stanley, and S. Havlin, *Cellular Automata models for granular media*, [Proc. 1997 NATO ASI, Cargese] in *Granular Matter*, ed. by H.J. Herrmann (Kluwer, Dordrecht, 1998).
98. H. E. Stanley, L. A. N. Amaral, S. V. Buldyrev, S. Havlin, T. H. Keitt, H. A. Makse and G. Viswanathan, *Scale-Invariant Correlations in the Social Sciences*, in *Econophysics: An Emerging Science* [Proc. 1997 Budapest Conference], edited by J. Kertész and I. Kondor (Kluwer, Dordrecht, 1998).
99. U. M. S. Costa, J. S. Andrade Jr., H. A. Makse, and H. E. Stanley, *The role of inertia on fluid flow through disordered porous media*, [Proc. Giessen Conf. on Percolation] *Physica A* **266**, 420-424 (1999).
100. H. E. Stanley, J. S. Andrade, Jr., S. Havlin, H. A. Makse, and B. Suki, *Percolation Phenomena: A Broad-Brush Introduction and Some Recent Applications to Porous Media, Liquid Water, and City Growth*, [Proc. Giessen Conf. on Percolation], *Physica A* **266**, 5-16 (1999).
101. H. A. Makse, P. Cizeau, S. Havlin, P. R. King, and H. E. Stanley, *Dynamics of Stratification and Segregation in Two-Dimensional Silos*, in *Slow Dynamics in Complex Systems* [Proc. Tohwa University Symposium, Fukuoka, Japan], edited by M. Tokuyama, and I. Oppenheim (1999).
102. D. L. Johnson, H. A. Makse, N. Gland, and L. M. Schwartz, *Nonlinear Elasticity of Granular Media*, Proc. of Electrical Transport and Optical Properties of Inhomogeneous Media V (ETOPIM5), Hong Kong, *Physica B*, **279** 134-138 (2000).
103. H. A. Makse, N. Gland, D. L. Johnson, and L. M. Schwartz, *The apparent failure of effective medium theory in granular materials*, *Phys. Chem. Earth A*, **26**, 107-111 (2001).
104. H. A. Makse, *Nonlinear Elasticity and Thermodynamics of Granular Materials*, ICTP Workshop on Challenges in Granular Physics, Trieste, *Advances in Complex Systems* **4**, 491-501 (2001).
105. H. A. Makse, *Thermodynamics and effective temperatures in sheared granular matter and emulsions*, *Eur. Phys. J.-E* **9** 265-270 (2002).
106. H. A. Makse, *A Thermodynamic Approach to Slowly Sheared Granular Matter*, Proceedings of Randomness and Complexity, Eilat, January 2003, *Physica A* **330**, 83-90 (2003).

107. L. K. Gallos, C. Song and H. A. Makse, *A review of fractality and self-similarity in complex networks*, Physica A **386**, 686 (2007).
108. C. Song, P. Wang, H. A. Makse, *Theory of random packings*, AIP Workshop on Granular Matter, Regio Calabria (2010).

TALKS

Plenary Talks:

1. German-American Frontiers of Science 2000, organized by the US National Academy of Sciences, the Alexander von Humboldt Foundation and the Max Planck Society, Irvine, California, June 8-10 2000, "Pattern Formation in Granular Media".

Invited talks to conferences:

2. European Physical Society, Annual Meeting (Condensed Matter Physics), York, UK, 16–19 December 1996, "Segregation Phenomena".
3. Minerva Workshop on Mesoscopics, Fractals, and Neural Networks, Eilat, Israel, 24-28 March 1997, "Stratification Instability in Granular Flows".
4. Workshop on Complex Systems, Brasilia, May 04-08, 1998, "Granular Flow".
5. Tohwa University Symposium, Fukuoka, Japan, Nov. 9-13, 1998, "Dynamics of Stratification and Segregation in Granular Mixtures".
6. 85th Statistical Mechanics Conference, Rutgers University, May 6-8, 2001, "Fluctuation-dissipation Relation in Slowly Sheared Dense Granular Materials".
7. STATPHYS 21, Cancún, July 19, 2001, "Fluctuation-dissipation Relation in Slowly Sheared Dense Granular Materials".
8. ICTP-Trieste Workshop on Challenges in Granular Physics, August 7-11, 2001, "Nonlinear Elasticity and Thermodynamics of Granular Matter".
9. Horizons in Complex Systems, Messina, Italy, December 5-8, 2001, "Thermodynamics and Effective Temperatures in Dense Granular Materials".
10. SIAM50, Pittsburgh, July 8-12, 2002, "Thermodynamics, jamming and effective temperatures in granular materials and glasses".
11. Minerva Workshop on Disordered Systems, Eilat, Israel, January 5-8, 2003, "Jamming".
12. APCTP Winter School on Granular Material and Complex Systems, Phoenix Park, Korea, February 4-7, 2003, "Jamming and effective temperature in out-of-equilibrium systems".
13. APS March 2003 Meeting, March 2003, "Testing the thermodynamics for granular matter".
14. Unifying concepts in granular media and glasses, Anacapri, Italy, June 25 - 28, 2003, "Jamming and effective temperatures in granular media".

15. Isaac Newton Institute Programme, Granular and Particle-Laden Flows, September 4, 2003, “Thermodynamics of Jammed Matter”.
16. SIAM51, Los Angeles, May 23-26, 2004, “Experimental measurements of effective temperatures in granular matter”.
17. Granular Matter Workshop, Yale University, June 3, 2004, “Effective temperatures in slowly sheared granular matter”.
18. STATPHYS 22, Bangalore, India, July 9, 2004, “Statistical mechanics of jammed matter”.
19. School and Workshop on Structure and Function of Complex Networks, ICTP, Trieste, May 16-28, 2005, “Complex Networks are Self-similar”.
20. Powders & Grains 2005, July 18-22, 2005, Stuttgart, “Reversibility and Effective Temperatures in Granular Matter”.
21. XXV Dynamics Days Europe, Berlin, July 25-28, 2005, “Self-similarity of complex networks”.
22. X International workshop on Disordered Systems, Molveno, Italy, 18-21 March 2006, “Jamming and glass transitions”.
23. NetSci, 2006, Indiana University, May 22-25, 2006, “Complex Networks”.
24. Dygram2006, Workshop of granular dynamics, jamming, rheology and instabilities, Rennes, France, June, 19-23 2006, “Granular matter”.
25. PASI ”From Disordered systems to Complex systems”, Mar del Plata, Argentina, December 11-23 2006, “Complex systems”.
26. BES Geosciences Symposium, Gaithersburg, MA, May 3-4 2007, “Stress-dependent acoustic propagation and dissipation in granular materials”.
27. Gordon Conference on Nonlinear Science, Colby College, Maine, June 24 - June 29, 2007, “The phase diagram of jammed matter”.
28. Statphys satellite meeting, Statics and dynamics of granular media and colloidal suspensions, Napoli, July 4-6 2007, “Statistical mechanics predicts the phase diagram of jammed matter”.
29. DYSONET meeting, Palermo, November 27, 2007. “Renormalization in complex networks”.
30. Workshop on The Structure and Dynamics of Complex Networks, ICCMP, Brasilia, December 10-14, 2007. “Scaling in complex networks”.
31. Workshop in Statistics for System Biology, Institut Henri Poincaré, Paris, December, 17-18, 2007. “Modularity and renormalization in biological networks”.
32. 99th Statistical Mechanics Conference, Rutgers University, May 11-13, 2008. “Phase diagram for jamming”.
33. APS March Meeting 2009, Pittsburgh, March 16-12, 2009, “Theory of random packings”.
34. Minerva Workshop on The Science of Complexity, Eilat, Israel, March 29- April 1, 2009, “Renormalization group describes information flow in complex networks”.

35. Traffic and Granular Flow, TGF 09, Shanghai University, June 21-25, 2009, “Jamming transition in granular matter”.
36. Workshop on Statistical mechanics of static granular media, Lorentz Center, Leiden, July 05-11, 2009. “Theory of random packings”.
37. IUTAM Symposium, Mathematical Modeling and Physical Instances of Granular Flows, 14-18 September 2009, Reggio Calabria, Italy, “Theory of random packings”.
38. XI Latin American Workshop on Nonlinear Phenomena, LAWNP 2009, October 5-9 2009, Buzios, Brazil, “Jamming in granular matter”.

Invited talks to universities:

39. Harvard University, Materials Science Seminar, February 1996, “Scaling of Rough Surfaces”, invited talk with Prof. H. E. Stanley.
40. Princeton University, Materials Science Institute Seminar, February 1996, “A Model for Erosion via Ion-Sputtering: from Pattern Formation to Rough Surfaces”.
41. University of Massachusetts at Amherst, Physics Department Colloquium, April 1996, “Size Segregation and Layering in a Sandpile: Experiment and Model”.
42. Lehman College, CUNY, Physics Department Colloquium, May 22, 1997, “Granular Matter”.
43. Schlumberger-Doll Research, Ridgefield, Connecticut, Colloquium, May 29, 1997, “Pattern Formation in Sandstone”.
44. Universidade de Ceara, Fortaleza, Brazil, Physics Department Colloquium, July 24, 1997, “Granular Segregation and Stratification”.
45. LASSP Seminar, Cornell University, Jan. 18, 1999, “Granular Matter”.
46. Clark University, Physics Colloquium, February 18, 1999, “Patterns in Nature”.
47. California State University at Northridge, Physics Colloquium, March 5, 1999, “Pattern Formation in Nature: Growing Order out of Disorder”.
48. State University of New York at Stony Brook, Physics Colloquium, April 16, 1999, “The Unusual Properties of Granular Materials”.
49. NIST, Inorganic Building Materials Group Seminar, Nov. 5, 1999, “Granular Matter: a liquid, a fragile solid, a nonlinear elastic solid?”
50. MIT, Physics Department Seminar, January 25, 2000, “Granular Matter”
51. Cornell University, Applied Mechanics Seminar, February 9, 2000, “Segregation in Rapid Granular Flows”.
52. Levich Institute, Fluid Mechanics Series, City College of New York, February 15, 2000, “Pattern Formation in Granular Flows”.

53. NEC Research Institute, Princeton, February 18, 2000, "Pattern Formation in Sandpiles".
54. Michigan Technological University, Physics Department Colloquium, February 22, 2000, "Granular Flows".
55. University of Missouri-Rolla, Physics Department Colloquium,, March 1, 2000, "Packing of Compressible Granular Materials".
56. University of Central Florida, Physics Department Seminar, March 30, 2000, "Pattern Formation in Granular Flows".
57. George Washington University, Physics Department Seminar, April 3, 2000, "Granular Flows".
58. Stanford University, Geophysics Department, April 27, 2000, "Granular Flows".
59. City College of New York, Chemical Engineering Seminar, September 18, 2000, "Solid and Liquid-like Properties of Granular Materials".
60. Rutgers University, Pharmaceutical Engineering Seminar, October 9, 2000, "Segregation of Granular Materials in 2D Cascades".
61. PMMH-ESPCI, Paris, November 24, 2000, "Numerical Granular Simulations and Amazing Poisson's Ratios in Sands".
62. ExxonMobil Research and Engineering Co, New Jersey, Colloquium, June 5, 2001, "Non-linear Elasticity of Granular Materials".
63. Universidade Federal de Ceará, Physics Department Colloquium, July 21, 2001, "Thermodynamics of Granular Materials".
64. City College of New York, Physics Department Colloquium, December 12, 2001, "Thermodynamics, Jamming, and Effective Temperatures in Granular Matter and Glasses".
65. University of Massachusetts at Amherst, Physics Department Colloquium, May 2, 2002, "Thermodynamics of Granular Materials".
66. Yale University, Mechanical Engineering Seminar, October 23, 2002, "Granular matter needs a new statistical mechanics".
67. New York University, Courant Institute, Applied Mathematics Seminar, February, 27, 2003, "Jamming and thermodynamics in soft-matter systems"
68. Northwestern University, Nonlinear Seminar, October 25, 2003, "Jamming is even cooler than you thought".
69. Universidade de Ceará, Fortaleza, Brasil, Physics Department Seminar, December 2, 2004, "From grains to proteins: the physics of energy landscapes and complex networks".
70. City College of New York, Physics Department Colloquium, March 9, 2005, "Complex Networks".

71. Emory University, Physics Department Colloquium, March 11, 2005, “The physics of energy landscapes and complex networks”.
72. Princeton University, Condensed Matter Seminar, April 4, 2005, “The physics of energy landscapes and complex networks”.
73. Columbia University, Biological Sciences Colloquium, April 27, 2005. “Principles of self-organization in complex networks: from sand to proteins”.
74. Yeshiva University, Physics Department Colloquium. May 4th, 2005, “From the grains to the WWW: the physics of energy landscapes and complexity”.
75. University of Maryland, Applied Mathematics Seminar. November 12, 2005. ”Complex Networks”.
76. Queens College, Physics Department Colloquium. December 12, 2005. ”Complexity”.
77. New York University, Biology Department. September 23, 2006. “Emergence of modularity in protein interaction networks”.
78. ETH, Zurich. January 10, 2007. “Scaling, renormalization and self-similarity in complex networks”.
79. Universidad de Amazonas, Manaus, Brasil, February 26, 2007. “Scaling, renormalization and self-similarity in complex networks”.
80. Levich Institute, CCNY. December 4, 2007. “Statistical mechanics of jammed matter”.
81. NJIT, Mechanical Engineering Dept. December 11, 2007. “Phase diagram for jamming”.
82. Physics Department Colloquium, CCNY. September 10, 2008. “Statistical mechanics of jammed matter and the nature of fruit packings”.
83. Mathematical Sciences, NJIT Colloquium, Feb 23, 2009, “Theory of random packings”.
84. Physics Department Colloquium, Shanghai University, June 26, 2009, “Renormalization group in Complex Networks”.
85. ETH, Zurich. September 12, 2009. “Renormalization group analysis of complex networks, modularity and information flow”.

Chaired sessions:

- March 1998, Chair, Granular Matter II Session, APS March Meeting.
- November 1998, Chair, Complex Fluids Session, Tohwa University Symposium, Fukuoka, Japan.
- September 26, 2003, Chair, Flow Regimes, Transitions and Segregation in Granular and Particle-Laden Flows, Isaac Newton Institute, Cambridge, UK.

- Powders & Grains 2005, Jamming Session, July 18-22, 2005, Stuttgart, Germany.
- XXV Dynamics Days Europe, Dynamical Networks Symposium. July 25-28, 2005, Berlin.
- Minerva Workshop on The Science of Complexity, Eilat, Israel, March 29- April 1, 2009.