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Education

- Ph.D. in Physics, Boston University (Prof. H. E. Stanley, advisor), 1993–1997
- “Licenciatura” in Physics, University of Buenos Aires, Argentina, 1987–1991

Appointments

- Sep 2008–present. Professor of Physics, Levich Institute and Department of Physics, City College of New York
- Sep 2008–present. Professor, Graduate Center, City University 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. Laboratory of Dr. D. L. Johnson
- Aug 1996–Sep 1997. Postdoctoral period shared between laboratories of Prof. R. C. Ball, Cavendish Laboratory, University of Cambridge and Prof. P.-G. de Gennes, Collège de France, Paris

Fellowships, Awards, Honors, Visiting Positions

- 2017-present. Associated Editor, Journal of Computational Social Science
- 2016–2017. Visiting Professor, Physics Department, Federal University of Ceará
- 2016-present. Co-Editor, Europhysics Letters
- 2015-present. Editorial Board Member, Heliyon, Elsevier
- Oct 2013. Visiting Professor, Department of Thermal Engineering, Tsinghua University, Beijing, China
- 2012-present. Editorial Board Member, Nature Scientific Reports

- 2012. Fellow of the American Physical Society. Citation: *For his contributions to a broad range of topics in non-equilibrium systems ranging from urban dynamics and complex networks to statistical mechanics of jammed matter, in particular, the elucidation of the random close packing state of granular matter.*
- 2012–2015. Visiting Professor, Physics Department, Federal University of Ceará, Brazil
- Nov 2012. Visiting Adjunct Professor, Physics Department, University of Buenos Aires, Argentina
- 2011–2013. Consultant. Schlumberger-Doll Research, Cambridge, MA, USA
- 2007. Cesar Milstein Award, Secretaría de Ciencia y Técnica, Programa Raíces, Argentina
- 2006. Career Advancement Award, NSF-MCB, *Self-organization and robustness in evolving biological networks*
- 2005. New York City Mayor’s Young Investigator Award for Excellence in Science and Technology, New York Academy of Sciences
- 2005-present. Member of Scientific Committee for Powders and Grains, AEMMG, L’Association pour L’Etude de la Micromecanique des Milieux Granulaires
- 2004-present. Editor, Journal of Statistical Mechanics: Theory and Experiments
- 2004. Consultant. Schlumberger-Doll Research, Ridgefield, CT, USA
- 2003. Career Award, NSF-DMR, *Statistical mechanics of particulate systems far from equilibrium*
- 2000. Sixth German-American Frontiers of Science. US National Academy of Sciences, Alexander von Humboldt Foundation and Max Planck Society, Irvine, CA
- 1998. *The Year in Science: Top 100 Science Stories of 1997*, Periodical *Discover*. Article [27]
- 1995. Goldhaber Prize by a Graduate Student, Boston University

Press Coverage and Media

- **Predicting opinion trends from Twitter using Machine Learning:**
Article [29] has been featured in a Special Issue of Science on *Prediction and its limits*, Science **355** (Feb 3, 2017) by B. Jasny and R. Stone (cover), and in an feature article by *The Pulse of the People* by J. Bohannon, Science **355**, 470-472 (2017), Science Daily, *Analytics developed to predict poll trends* (October 2017), NCC News, *Twitter Can Predict The Presidential Election*, Democracy Chronicles, *Physicists Promise Accurate Election Predictions Using Twitter*.

- **Maximization Influence in Big-Data Social Networks:**

Article [8] was featured in a News & Views Nature Editorial by I. A. Kovács, A.-L. Barabási, “Destruction Perfected”, Nature **524**, 38-39 (August 6, 2015). Phys.Org, July 1, 2015, “Smaller is smarter in superspreading of influence in social network.” Press release in Daily News & Analysis, Times of India, Financial Express, TeCake, Odisha Samaya, Delhi Daily News, Microfinance Monitor, Austrian Tribune, Uncover Michigan, Bharat Press, AniNews, Ibcworldnews, New Kerala, Business Standard.

- **Brain Networks:**

Article [9] was featured in a News & Views Nature Physics editorial “Multilayer Networks: Dangerous Liaisons?” by Ginestra Bianconi, October 2014; Phys.org: “Why natural networks are more stable than man-made networks”; El Pais: “Tus neuronas mejorarán las redes que mueven el mundo”; Sociedade Brasileira de Física: sbfisica.org.br; Pesquisa FAPESP: “A estabilidade do cerebro”; abc.es: “Diseñan redes tecnológicas mediante experimentos con el cerebro humano”.

- **Obesity Epidemic, Urban Growth and Health:**

Article [63] was featured in USNews, Science Daily, NSF Highlights, Medicalxpress, Science Blog, Care2.com, The visible embryo, The Atlantic Cities. Article [53] on green cities was featured in MIT Technology Review and Arizona News and article [48] on suicides in cities appeared in MIT Technology Review, Medical Daily, The Guardian and Olga Khazan’s piece in The Atlantic: “Hell might be other people, but they might just save you from yourself”, and nextcity.org.

- **Superspreading of Information in Complex Networks:**

Article [15] 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. Chosen 2011 winner GSNP group in the Gallery of the American Physical Society. Feature in cover Chaos Journal, December 2011. Featured in Faculty of 1000, f1000.com. MIT Technology Review, “The Emerging Science of Superspreaders (And How to Tell If You’re One Of Them)”, May 2014.

- **Packing of Hard-Spheres:**

Article [19] 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.

- **Self-similarity in Complex Networks:**

Article [24] 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.

- **Jamming in Granular Materials:**

Article [25] 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).

- **Pattern Formation in Granular Flows:**

The stratification experiments depicted in Article [27] were described as the “Top 100 Science Stories of 1997” in the periodical *Discover*, **18** [1], 52 (Jan 1998). Article [27] 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.

- **Urban Economics:**

Article [28] 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.

Funding

A. Current Grants

- NIH Brain Initiative, 1R01EB022720-01, 2016-2019, \$1,217,825. *Graph theoretical analysis of the effect of brain tumors on functional MRI networks*, PIs: Makse, Holodny, MSKCC
- NIH/NCI, U54 MSKCC-CCNY Partnership for Cancer Research, Prevention, and Community Outreach, 2016-2018, \$125,000. *Graph Theoretical Analysis of Pre-Operative fMRI Data in Bilingual Patients with Brain Tumors*, PIs: Makse, Holodny, MSKCC
- NSF-CRCNS, IIS-1515022, 2015-2018, \$749,000. *Targeted Stimulations in Brain Network of Networks*, PI: Makse. co-PI: Lucas Parra, Biomedical Engineering, CCNY.
- ARL-NSCTA, W911NF-09-2-0053, 2009-2019, \$1,060,000. *Social Dynamics, Opinion Spreading, and Influencing in Social Networks*, PI: Boleslaw Szymanski (RPI). co-PI: Makse, in one thrust.
- NSF-PoLS, PHY-1305476, 2013-2017, \$285,000. *Statistical Physics of Brain Networks*, PI: Makse.
- NSF-CMMT, DMR-1308235, 2013-2017, \$270,000. *Packings of Non-Spherical Objects*, PI: Makse.

B. Previous Grants

- NIH-NIGMS, 1R21GM107641-01, 2013-2016, \$375,000. *Multiscale Theory of Disease Spreading in Social Networks*, PI: Makse.
- DOE-BES. Geosciences, DE-FG02-03ER15458, 2003-2016, \$855,000. *Study of Elasticity, Acoustics, and Dissipation in Earth Materials*, PI: Makse. Co-PI: David L. Johnson, Schlumberger-Doll Research.
- NSF-CMMT, DMR-0907004, 2008-2012, \$270,000. *Statistical Analysis of Jammed Matter*, PI: Makse.
- NSF-Emerging Frontiers, EF-0827508, 2008-2011, \$523,333. *Mathematical Frameworks for Biological Modular Networks*, PI: Makse. Co-PI: Thomas Rattei, Systems Biology, University of Vienna.
- NSF-HSD. SES-0624116, 2007-2011, \$680,000. *Dynamics of Social Networks*, PI: Makse.
- NSF-MCB. MCB-0615660, Career Advancement Award, 2006-2008. \$149,957. *Self-Organization and Robustness in Evolving Biological Networks*, PI: Makse.
- CUNY Equipment Award, 2005, \$66,000. *Transmitted light and epi-fluorescence microscopy systems with ultrafast image acquisition and processing for studies of jamming in emulsions, smooth muscle cell contraction, and intracellular protein distribution*, PI: Makse.
- DoD. Equipment grant, 2004, \$354,000. *Confocal Microscopy of Particulate Systems Far from Equilibrium*, Co-PI: Makse.
- DOE-BES. Division of Materials Sciences and Engineering, 2003-2007, \$305,000. *Non-equilibrium thermodynamics of densely packed granular matter and compressed emulsions*, PI: Makse.
- NSF-CMMT, Career Award, DMR-0239504, 2003-2008, \$400,000. *Statistical Mechanics of Particulate Systems Far from Equilibrium*, PI: Makse.
- PSC-CUNY Award Year 34, 2003-2004, \$3,840. *Slowly Driven Granular Materials*, PI: Makse.
- NSF-CREST, 2002-2007, \$2,000,000. *Center for Mesoscopic Modeling and Simulations*, Participate in one IRG.
- CUNY Equipment Grant Competition, 2002-2003, \$75,000. *High speed/high resolution visualization system and diffusing-wave spectrometer for the study of out-of-equilibrium disordered systems*, PI: Makse. Co-PI: Prof. M. Shattuck, CCNY.
- CUNY Institute for Software Design & Development, 2002, \$8,000. *Discrete element methods for the study of unconsolidated granular materials through computational modeling*, PI: Makse.
- ExxonMobil Research, Annandale, NJ, 2002, \$15,000. *Summer 2002 Graduate Student Internship*
- Schlumberger-Doll Research, Ridgefield, CT, 2002, \$12,000. *Summer 2002 Graduate Student Internship*.

- Petroleum Research Fund, 2001-2003, \$25,000. *Avalanche Segregation in Granular Flows*, PI: Makse.
- PSC-CUNY Award Year 32, 2001-2002, \$5,000. *Thermodynamic Approach to Slowly Driven Dense Granular Materials*, PI: Makse.

Reviewer Activity

- **Reviewer of granting agencies:** NSF-CMMT. NSF-CRCNS. NSF-PoLS. NSF-DMR. NSF-BIO. NSF-Physics Frontiers Centers. NIH-NIGMS. NIH-Brain Initiative. Department of Energy. Petroleum Research Fund. United States-Israel Binational Science Foundation. European Science Foundation. Foundation for Fundamental Research on Matter, Netherlands. Conicyt, Chile. European Commission, Future Emerging Technologies. Italian Ministry for Education University and Research.
- **Reviewer of journals:** Nature, Nature Physics, Nature Communications, Nature Biotechnology, Science, Proceedings of the National Academy of Sciences, Physical Review Letters, Physical Review E, Physical Review X, 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, PlosOne, Fluctuation and Noise Letters, Chaos, Solitons & Fractals, Frontiers, Scientific Reports, Powder Technology, Physics Letters A, New Journal of Physics, NeuroImage: Clinical, Biomicrofluidics, Journal of Urban Health, Proceeding A: Royal Society, Palgrave Communications, Cogent Physics, Physical Chemistry Chemical Physics, Journal of Complex Networks, Fractals, Computational Social Networks, Particulate Science and Technology, Nonlinearity, Journal of the Operational Research Society, Complexity, Applied Computing and Informatics, The Computer Journal.

Panelist

- Mar 19-20, 2018. NSF-NIH, CRCNS Computational Neuroscience, Panelist
- Feb 15-16, 2018. NSF, CRCNS Collaborative Research in Computational Neuroscience USA - Spain, Participant
- Mar 9-10, 2017. NSF-NIH, CRCNS Computational Neuroscience, Panelist
- Feb 21, 2017. NSF, Neuronex, Brain Initiative. Panelist
- May 22, 2015. NSF, Ideas Lab, Cracking the olfactory code. Panelist
- Feb 12-13, 2015. NSF-PoLS, Panelist
- Jan 29, 2015. NIH-NIGMS, ZRG1 HDM-J (55) Modeling Social Behavior, Panelist
- Nov 4, 2014. European Commission, Future Emerging Technologies, H2020-FET Open, Novel Ideas for Radical New Technologies. Panelist

- Oct 30, 2014. NIH-NIGMS, ZRG1 HDM-Q Modeling Social Behavior, Online Panelist
- Jun 1, 2014. NIH-NIGMS, ZRG1 HDM-Q Modeling of Social Behavior, Online Panelist
- Feb 3-4, 2014. NSF-PolS, Panelist
- Jul 24-25, 2012. NIH-NIGMS, ZGM1 BBCB-9, Panelist
- Feb 27 - Mar 3, 2012. European Commission, Future Emerging Technologies, FP7-ICT, Panelist
- Jan 23-24, 2012. NSF-NIH, CRCNS Computational Neuroscience, Panelist

Meeting Organization

- July 22-27, 2018, Program Committee, International Conference on Complex Systems (ICCS 2018), Cambridge, MA.
- Nov 29-Dec 1 2017. Program Committee, 6th International Conference on Complex Networks and Their Applications, Complex Networks 2017, Lyon, France
- Jul 10-14 2017. Advisory Committee, International Conference on Statistical Physics (SigmaPhi2017), Statistical and Nonlinear Physics Division of the European Physical Society, Corfu, Greece
- Oct 10-14, 2016. International Advisory, Committee Collaborative Conference on Big Data (CCBD), Las Vegas
- Jun 1-3, 2016. Scientific Program Committee, NetSci2016, Seoul, Korea
- Jun 20-22, 2016. Scientific Program Committee, Summer Solstice 2016 - 8th International Conference on Discrete Models of Complex Systems. University of Aveiro, Portugal
- Nov 23-27, 2015. Program Committee, The 4th International Workshop on Complex Networks and their Applications and The 11th International Conference on Signal Image Technology & Internet Based Systems, Bangkok, Thailand
- Nov 23-27 2014. Program Committee, Third International Workshop on Complex Networks and their Applications, and The 11th International Conference on Signal Image Technology & Internet Based Systems SITIS, Marrakesh, Morocco
- Sep 15-18, 2014. Chair of Packing Session, Jam-Packed - Packing and Jamming of Particulate Systems, Erlangen, Germany
- Jul 8-12, 2013. Session Chair, International School on Biological Complex Networks, Natal, Brazil
- Mar 29-Apr 1, 2009. Session Chair, Minerva Workshop, Science of Complexity, Eilat, Israel

- Jun 6, 2006. Co-organizer of 4th Northeastern Granular Materials Workshop, City College of New York, New York
- Jul 18-22, 2005. Chair of Jamming Session, Powders & Grains 2005, Stuttgart, Germany
- Jul 25-28, 2005. Session Chair, Dynamical Networks Symposium, XXV Dynamics Days Europe, Berlin
- Sep 26, 2003. Session Chair, Flow Regimes, Transitions and Segregation in Granular and Particle-Laden Flows, Isaac Newton Institute, Cambridge, UK
- Mar 1998. Session Chair of Granular Matter II, APS March Meeting
- Nov 9-13, 1998. Chair of Complex Fluids Session, Tohwa University Symposium, Fukuoka, Japan, November 1998

LIST OF PUBLICATIONS

A. Most Relevant Publications

1. A. Babino, H. A. Makse, R. DiTella, M. Sigman, *The breakdown of trust*, under review **Proc. Nat. Acad. Sci.** (2018).
2. A. Bovet, H. A. Makse, *Influence of fake news in Twitter during the 2016 US presidential election*, under review **Nature Phys.** (2018).
3. F. Morone, H. A. Makse, *The k-core structural collapse of dynamical complex systems*, under review **Nature Phys.** (2017).
4. B. Min, A. Moreno, F. Morone, U. Pérez-Ramírez, L. Pérez-Cervera, L. C. Parra, A. Holodny, S. Canals, H. A. Makse, *Finding essential nodes for integration in the brain using network optimization theory*, under review **Nature Comm.** (2017).
5. A. Baule, F. Morone, H. J. Herrmann, H. A. Makse, *Edwards statistical mechanics for jammed granular matter*, **Rev. Mod. Phys.** **90**, 015006 (2018).
6. F. Morone, K. Roth, B. Min, H. E. Stanley, H. A. Makse, *A model of brain activation predicts the neural collective influence map of the brain*, **Proc. Nat. Acad. Sci.** **114**, 3849-3854 (2017).
7. S. Luo, F. Morone, C. Sarraute, H. A. Makse, *Inferring personal economic status from social network location*, **Nature Comm.** **8**, 15227 (2017).
8. F. Morone, H. A. Makse, *Influence maximization in complex networks through optimal percolation*, **Nature** **524**, 65-68 (2015).
9. S. D. S. Reis, Y. Hu, A. Babino, J. S. Andrade Jr., S. Canals, M. Sigman, H. A. Makse, *Avoiding catastrophic failure in correlated network of networks*, **Nature Phys.** **10**, 762-767 (2014).

10. Y. Hu, S. Havlin, H. A. Makse, *Conditions for viral influence spreading through correlated multiplex networks*, **Phys. Rev. X** **4**, 021031 (2014).
11. A. Baule, R. Mari, L. Bo, L. Portal, H. A. Makse, *Mean-field theory of random close packings of axisymmetric particles*, **Nature Comms** **4**, 2194 (2013).
12. L. K. Gallos, S. Havlin, F. Liljeros, H. A. Makse, *How people interact in evolving online affiliation networks*, **Phys. Rev. X** **2**, 031014 (2012).
13. L. K. Gallos, H. A. Makse, M. Sigman, *A small world of weak ties provides optimal global integration of self-similar modules in functional brain networks*, **Proc. Nat. Acad. Sci.** **109**, 2825-2830 (2012).
14. 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).
15. 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).
16. 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).
17. 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).
18. 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).
19. C. Song, P. Wang, H. A. Makse, *A phase diagram for jammed matter*, **Nature** **453**, 629-632 (2008).
20. 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).
21. 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).
22. C. Song, S. Havlin, and H. A. Makse, *Origins of fractality in the growth of complex networks*, **Nature Physics** **2**, 275-281 (2006).
23. 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).
24. C. Song, S. Havlin and H. A. Makse, *Self-similarity of complex networks*, **Nature** **433**, 392-395 (2005).
25. 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).
26. T. Boutreux, H. A. Makse and P. G. de Gennes, *Surface flows of granular mixtures: Canonical model*, **Eur. Phys. J.-B** **9**, 105-115 (1999).

27. H. A. Makse, S. Havlin, P. R. King, and H. E. Stanley, *Spontaneous stratification in granular mixtures*, **Nature** **386**, 379-381 (1997).
28. H. A. Makse, S. Havlin, and H. E. Stanley, *Modelling urban growth patterns*, **Nature** **377**, 608-612 (1995).

B. Other Publications

29. A. Bovet, F. Morone, H. A. Makse, *Validation of Twitter opinion trends with national polling aggregates: Hillary Clinton vs Donald Trump*, **Sci. Rep.** (2017).
30. H. P. M. Melo, S. D. S. Reis, A. A. Moreira, H. A. Makse, J. S. Andrade Jr., *The price of a vote: diseconomy in proportional elections* (2018).
31. E. A. Oliveira, V. Furtado, J. S. Andrade, H. A. Makse, *A worldwide model for boundaries of urban settlements*, **R. Soc. open sci.** **5**, 180468 (2018).
32. E. Kyeyune-Nyombi, F. Morone, W. Liu, S. Li, M. L. Gilchrist, H. A. Makse, *High-resolution of particle contacts via fluorophore exclusion in deep-imaging of jammed colloidal packings*, **Physica A** **490**, 1387-1395 (2018).
33. K. Roth, F. Morone, B. Min, H. A. Makse, *Emergence of robustness in network of networks*, **Phys Rev. E** **95**, 062308 (2017).
34. S. Pei, X. Teng, J. Shaman, F. Morone, H. A. Makse, *Efficient collective influence maximization in cascading processes with first-order transitions*, **Sci. Rep.** **7**, 45240 (2017).
35. K. Burleson-Lesser, F. Morone, P. DeGuzman, L. C. Parra, H. A. Makse, *Collective behaviour in video viewing: A thermodynamic analysis of gaze position*, **PLoS ONE** **12**, e0168995 (2017).
36. F. Morone, L. Ma, H. A. Makse, A. Scala, *Enhancing network resilience via self-healing*, in IEEE Workshop on Environmental, Energy, and Structural Monitoring Systems (EESMS) (2016).
37. F. Morone, B. Min, L. Bo, R. Mari, H. A. Makse *Collective Influence Algorithm to find influencers via optimal percolation in massively large social media*, **Sci. Rep.** **6**, 30062 (2016).
38. X. Teng, S. Pei, F. Morone, H. A. Makse, *Collective influence of multiple spreaders evaluated by tracing real information flow in large-scale social networks*, **Sci. Rep.** **6**, 36043 (2016).
39. B. Min, F. Morone, H. A. Makse, *Searching for influencers in big-data complex networks*, Diffusive Spreading in Nature, Technology and Society, A. Bunde, J. Caro, J. Karger, G. Vogl (Edts), (Springer Verlag, 2016).
40. W. Liu, Y. Jin, S. Chen, H. A. Makse, S. Li, *Equation of state for random sphere packings with arbitrary adhesion and friction*, **Soft Matter** **13**, 421-427 (2017).
41. W. Liu, S. Li, S. Chen, Y. Jin, H. A. Makse, *Effect of friction on random adhesive loose packings of micron-sized particles*, **Soft Matter** (2017).

42. S. Chena, S. Li, W. Liu, H. A. Makse, *Effect of long-range repulsive Coulomb interactions on packing structure of adhesive particles*, **Soft Matter** **12**, 1836-1846 (2015).
43. B. Min, F. Liljeros, H. A. Makse, *Finding influential spreaders from human activity beyond network location*, **PLoS ONE** **10**, e0136831 (2015).
44. W. Liu, S. Li, A. Baule, H. A. Makse, *Adhesive loose packings of small dry particles*, **Soft Matter** **11**, 6492-6498 (2015).
45. D. L. Johnson, Y. Hu, H. A. Makse, *The density of states of granular media in the presence of damping*, **Phys. Rev. E** **91**, 062208 (2015).
46. S. Pei, L. Muchnik, S. Tang, Z. Zheng, H. A. Makse, *Exploring the complex pattern of information spreading in online blog communities*, **PLoS ONE** **10**, e0126894 (2015).
47. M. Ramos, J. Shao, S. D. S. Reis, C. Anteneodo, J. S. Andrade, Jr, S. Havlin, H. A. Makse, *How does public opinion become extreme?* **Sci. Rep.** **5**, 10032 (2015).
48. H. P. M. Melo, A. A. Moreira, H. A. Makse, J. S. Andrade Jr., *Statistical signs of social influence on suicides*, **Sci. Rep.** **4**, 6239 (2014).
49. S. Pei, L. Muchnik, J. S. Andrade, Jr., Z. Zheng, H. A. Makse, *Searching for superspreaders of information in real-world social media*, **Sci. Rep.** **4**, 5547 (2014).
50. Y. Hu, H. A. Makse, J. J. Valenza, D. L. Johnson, John J. Valenza, *Frequency-dependent attenuation and elasticity in unconsolidated earth materials: effect of damping*, **Geophysics** **79**, L41-L49 (2014).
51. L. Bo, R. Mari, C. Song, H. A. Makse. *Cavity method for force transmission in jammed disordered packings of hard particles*, **Soft Matter** **10**, 7379-7392 (2014).
52. Y. Hu, D. L. Johnson, J. J. Valenza, F. Santibáñez, H. A. Makse. *Stress-dependent normal mode frequencies from the effective mass of granular matter*, **Phys. Rev. E** **89**, 062202 (2014).
53. E. de Oliveira, J. S. Andrade Jr, H. A. Makse. *Large cities are less green*, **Sci. Rep.** **4**, 4235 (2014).
54. M. P. Viana, L. K. Gallos, H. A. Makse, M. E. Beletti, L. da F. Costa. *Fractality and universality of the bone channel network*, **J. Complex Networks** (2014).
55. B. A. Klumov, Y. Jin, H. A. Makse. *Structural properties of dense hard sphere packings*, **J. Phys. Chem. B** **118**, 10761-10766 (2014).
56. A. Baule, H. A. Makse, *Fundamental challenges in packing problems: from spherical to non-spherical particles*, **Soft Matter** **10**, 4415-4570 (2014).
57. Y. Jin, J. Puckett, H. A. Makse. *A statistical model of correlations in random packings of hard particles*, **Phys. Rev. E** **89**, 052207 (2014).
58. S. Pei, H. A. Makse, *Spreading dynamics in complex networks*, **J. Stat. Mech.** P12002 (2013).
59. L. Portal, M. Danisch, A. Baule, R. Mari, H. A. Makse. *Calculation of the Voronoi boundary for lens-shaped particles and spherocylinders*, **J. Stat. Mech.** P11009 (2013).

60. L. K. Gallos, F. Q. Potiguar, J. S. Andrade, H. A. Makse. *IMDB network revisited: Unveiling fractal and modular properties from a typical small-world network*. **PLoS ONE** **8**, e66443 (2013).
61. L. Muchnik, S. Pei, L. C. Parra, S. D. Reis, J. S. Andrade Jr, S. Havlin, and H. A. Makse, *Origins of power-law degree distribution in the heterogeneity of human activity in social networks*, **Sci. Rep.** **3**, 1783 (2013).
62. Y. Jin, D. Turaev, T. Weinmaier, T. Rattei, H. A. Makse, *The evolutionary dynamics of protein-protein interaction networks inferred from the reconstruction of ancient networks*, **PLoS ONE** **8**, e58134 (2013).
63. L. K. Gallos, P. Barttfeld, S. Havlin, M. Sigman, H. A. Makse, *Collective behavior in the spatial spreading of obesity*, **Sci. Rep.** **2**, 454 (2012).
64. D. Rybski, S. V. Buldyrev, S. Havlin, F. Liljeros, H. A. Makse. *Communication activity in a social network: relation between long-term correlations and inter-event clustering*, **Sci. Rep.** **2**, 560 (2012).
65. L. K. Gallos, H. A. Makse, M. Sigman, *The conundrum of functional brain networks: small-world efficiency or fractal modularity*, **Front. Physiol.** **3**, 123 (2012).
66. K. Wang, C. Song, P. Wang, H. A. Makse, *Edwards thermodynamics of the jamming transition for frictionless packings: Ergodicity test and role of angoricity and compactivity*, **Phys. Rev. E** **86**, 011305 (2012).
67. 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**, 147-159 (2011).
68. Y. Jin and H. A. Makse, *A first-order phase transition defines the random close packing of hard spheres*, **Physica A** **389**, 5362 (2010).
69. K. Wang, C. Song, P. Wang, H. A. Makse, *Angoricity and compactivity describe the jamming transition in soft particulate matter*, **Europhys. Lett.** **91**, 68001 (2010). EPL Best 100 papers of 2010.
70. M. Danisch, Y. Jin, and H. A. Makse, *Model of random packings of different size balls*, **Phys. Rev. E** **81**, 051303 (2010).
71. H. D. Rozenfeld, L. K. Gallos, and H. A. Makse, *Explosive percolation in the human protein homology network*, **Eur. Phys. J. B** **75**, 305-310 (2010).
72. 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).
73. C. Song, P. Wang, Y. Jin, H. A. Makse, *Jamming I: A volume function for jammed matter*, **Physica A** **389**, 4497-4509 (2010).
74. 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).
75. 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).

76. S. Meyer, C. Song, Y. Jin, H. A. Makse, *Jamming in two-dimensional packings*, **Physica A** **389**, 5137-5144 (2010).
77. 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).
78. 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).
79. 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).
80. 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).
81. H. D. Rozenfeld, and H. A. Makse, *Fractality and the percolation transition in complex networks*, **Chem. Eng. Sci.** **64**, 4572-4575 (2009).
82. 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).
83. C. Briscoe, C. Song, P. Wang, H. A. Makse. *Entropy of jammed matter*, **Phys. Rev. Lett.** **101**, 188001 (2008).
84. 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).
85. 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).
86. 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).
87. 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).
88. 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).
89. 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).
90. 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).
91. 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).
92. 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).

93. H. Zhang and H. A. Makse, *Jamming transition in emulsions and granular materials*, **Phys. Rev. E** **72** 011301 (2005).
94. C. Song, P. Wang, F. Potiguar, H. A. Makse, *Experimental and computational studies of jamming*, **J. Phys.: Condens. Matter** **17** S2755-S2770 (2005).
95. 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).
96. 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).
97. 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).
98. 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).
99. B. Jin, F. Xu, and H. A. Makse, *Surface shape of two-dimensional granular piles*, **J. Stat. Mech.** **3** 1-8 (2004).
100. 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).
101. 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).
102. 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).
103. H. A. Makse, D. L. Johnson, and L. M. Schwartz, *Packing of compressible granular materials*, **Phys. Rev. Lett.** **84**, 4160-4163 (2000).
104. H. A. Makse, *Grain segregation mechanism in aeolian sand ripples*, **Eur. Phys. J.-E** **1**, 127-135 (2000).
105. 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).
106. 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).
107. H. A. Makse, *Continuous avalanche segregation of granular mixtures in thin rotating drums*, **Phys. Rev. Lett.** **83**, 3186-3189 (1999).
108. H. A. Makse, *Kinematic segregation of flowing grains in sandpiles*, **Eur. Phys. J.-B** **7**, 271-276 (1999).
109. 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).

110. 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).
111. H. A. Makse and H. J. Herrmann, *Microscopic model for granular stratification and segregation*, **Europhys. Lett.** **43**, 1-6 (1998).
112. L. A. N. Amaral and H. A. Makse, *Comment on: Kinetic roughening in slow combustion of paper*, **Phys. Rev. Lett.** **80**, 5706 (1998).
113. H. A. Makse, R. C. Ball, H. E. Stanley, and S. Warr, *Dynamics of granular stratification*, **Phys. Rev. E** **58**, 3357-3367 (1998).
114. 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).
115. H. A. Makse, S. Buldyrev, H. Leschhorn and H. E. Stanley, *The pinning paths of an elastic interface*, **Europhys. Lett.** **41**, 251-256 (1998).
116. 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).
117. H. A. Makse, P. Cizeau, and H. E. Stanley, *Possible stratification mechanism in granular mixtures*, **Phys. Rev. Lett.** **78**, 3298-3301 (1997).
118. 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.
119. H. A. Makse, H. E. Stanley, and S. Havlin, *Power laws for cities*, *Physics World* **10**, 22-23 (October 1997).
120. H. A. Makse, *Stratification instability in granular flows*, **Phys. Rev. E** **56**, 7008-7016 (1997).
121. K. L. Lauritsen, R. Cuerno, and H. A. Makse, *Noisy Kuramoto-Sivashinsky equation for an erosion model*, **Phys. Rev. E** **54**, 3577-3580 (1996).
122. H. A. Makse, A.-L. Barabási, and H. E. Stanley, *Elastic string in a random medium*, **Phys. Rev. E** **53**, 6573-6576 (1996).
123. 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).
124. 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).
125. 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).
126. H. A. Makse and L. A. N. Amaral, *Scaling behavior of driven interfaces above the depinning transition*, **Europhys. Lett.** **31**, 379-384 (1995).

127. 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).
128. H. A. Makse, *Singularities and avalanches in interface growth with quenched disorder*, **Phys. Rev. E** **52**, 4080-4086 (1995).
129. 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).
130. 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).
131. H. A. Makse and R. P. J. Perazzo, *The thermodynamics of dyslexic learning*, **Inter. J. Neural Sys** **4**, 351-360 (1992).

C. Conference Proceedings

132. 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).
133. 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.
134. 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.
135. 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).
136. 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).
137. 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).
138. 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).

139. 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).
140. 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.
141. 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).
142. 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).
143. 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).
144. 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).
145. 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).
146. 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).
147. 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).
148. 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).
149. H. A. Makse, *Thermodynamics and effective temperatures in sheared granular matter and emulsions*, Eur. Phys. J.-E **9** 265-270 (2002).
150. 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).
151. L. K. Gallos, C. Song and H. A. Makse, *A review of fractality and self-similarity in complex networks*, Physica A **386**, 686 (2007).

152. C. Song, P. Wang, H. A. Makse, *Theory of random packings*, AIP Workshop on Granular Matter, Regio Calabria (2010).

Teaching and Advising

A. Teaching

- 2001-2007. PHY 203 and PHY 204, Physics Department, CCNY.
- Spring 2004. Granular Mater, Advanced graduate course, Graduate Center, City University of New York.
- Fall 2007. PHY 321, Modern Physics, Physics Department, CCNY.
- Spring 2008. PHY 321, Modern Physics, Physics Department, CCNY.
- Fall 2008. PHY 204, Physics Department, CCNY.
- 2009-2010. PHY 208, General Physics for Engineering, Physics Department, CCNY.
- 2010-2015. PHY 203 and PHY 204, Physics Department, CCNY.
- Fall 2012. Graph Theory, Advanced graduate course. Visiting Professor, Physics Department, University of Buenos Aires.
- Spring 2013. Topics in Theoretical Physics I, Graduate course. Visiting Professor, Department of Physics, University Federal of Ceara, Brazil.
- Fall 2013. Granular Materials, Graduate course. Visiting Professor, Department of Thermal Engineering, Tsinghua University, Beijing.
- Spring 2014. Complex Networks, Advanced graduate course. Graduate Center, City University of New York.
- Fall 2014. Topics in Theoretical Physics II, Graduate course. Visiting Professor, Department of Physics, University Federal of Ceara, Brazil.
- Spring 2015, PHY 203 and PHY 204, Physics Department, CCNY
- Spring 2017. PHY 204, Physics Department, CCNY.
- Spring 2017. Complex Networks, Advanced graduate course. Graduate Center, City University of New York.
- Spring 2018. PHY 204, Physics Department, CCNY.

B. Service on Committees - CCNY

- 2003-2004. Physics Department Web Page Committee, CCNY
- 2005. Levich Institute Faculty Search Committee, CCNY
- 2007. Condensed Matter Faculty Search Committee, CCNY
- 2012-2014. Pre-medical Health Studies Recommendation Committee, CCNY
- 2014. Uniformization Curriculum for General Physics Committee, CCNY
- 2015. Levich Fellow Search Committee, CCNY
- 2015-2016. Initiative for Theoretical Physics, CUNY Faculty Search Committee
- 2017. Levich Faculty Search Committee, CCNY
- 2017. ASRC Neuroscience Initiative Faculty Search Committee, CUNY

C. Graduate Students

Name	Term	Current Position
Chaoming Song	2002-2007	Assistant Professor, University of Miami, Erdős-Rényi Prize
Ping Wang	2002-2007	Postdoc, Virginia State University
Fabricio Potiguar, UFC	2004-2008	Assistant Professor, Universidade Federal do Pará, Brasil
Chris Briscoe	2004-2009	Physical Security Consultant at Stroz Friedberg, LLC
Kun Wang	2006-2011	Analytics Consultant at Wells Fargo
Yuliang Jin	2007-2012	Assistant Professor, Institute of Theoretical Physics at Chinese Academy of Sciences
Lin Bo	2010-2014	Software Engineer at Zenefits, San Francisco
Marlon Ramos, PUC	2011-2015	Postdoc, PUC
Sen Pei, CSC, Beihang U.	2011-2015	Postdoc, Mailman School of Public Health, Columbia U.
Weiwen Liu, Tsinghua U.	2014-2015	Tsinghua University
Xian Teng, CSC, Beihang U.	2015-2016	Virginia University
Kevin Roth, ETH	2015-2016	ETH
Muhua Zheng, CSC	2015-2016	University of Barcelona
Eru Kyeyune-Nyombi, ChemE	2012-2017	Brooklyn College, Postdoc
Andrés Babino, UBA	2013-	
Shaojun Luo	2013-	
Zhuo Yin	2014-	
Kate Burleson-Lesser	2015-	
Qiongge Li	2015-	
George Furbish	2015-	
Francesca Lucini	2016-	
Ian Leifer	2017-	
Rafael Bonfim (UFC)	2017-	
Tianyu Wang, CSC	2017-	
Zhenhua Wang, CSC	2017-	
Jinjun Jiang, CSC	2017-	
Jiannan Wang, CSC	2017-	

D. Notable Undergraduates

Name	Term	Current Position
Shai Carmi	2006	Postdoc, Columbia University
Vanessa Magnanimo	2007	Assistant Professor, University of Twente
Sam Meyer	2008	Assistant Professor, Institut National des Sciences Appliqués de Lyon
Max Danisch	2010-2011	PhD student, Université Pierre et Marie Curie
Taishan Zhu	2012	PhD student, UIUC
Louis Portal	2013	PhD student, ETH Zürich
Angello Maggio	2014-2015	PhD student
Thomas Aubry	2015-2016	PhD student, Supméca - Institut Supérieure de Mécanique de Paris
Edouard Viollet	2015-2016	PhD student, Supméca - Institut Supérieure de Mécanique de Paris

E. Postdoctoral Fellows

Name	Term	Current Position
Nicolas Gland	2002-2005	Senior Acoustic and Geomechanics Engineer, Schlumberger
Guillaume Marty	2005-2006	Research Engineer, L'Oréal
Shomeek Mukhopadhyay	2006-2008	Associate Research Scientist, Yale University
Diego Rybski	2006-2009	Research Professor, Potsdam Institute Climate Impact Research
Hernán Rozenfeld	2007-2010	Assistant Editor, Physical Review E
Lazaros Gallos	2008-2012	Research Professor, Rutgers. Assistant Editor, Physical Review X
Adrian Baule	2010-2011	Lecturer, Queen Mary University of London
Yanqing Hu	2011-2013	Assistant Professor, Sun Yat-Sen University
Saulo Reis	2012-2014	Assistant Professor, Universidade Federal do Ceará, Brazil
Romain Mari	2012-2015	Postdoc, Cambridge University
Faraz Zaidi	2014-2015	Data Scientist, MetricAid Inc, Canada
Byungjoon Min	2014-2016	Assistant Professor, Physics Department, Chungbuk National University
Flaviano Morone	2014-	
Alexandre Bovet	2016-2017	Université Catholique de Louvain
Gino del Ferraro	2016-	

Entrepreneurial Activities

- 2016. Patent Pending, Application Serial No: 14/992,369. Title: *Method to maximize message spreading in social networks and find the most influential people in social media.* Inventors: Hernán Makse and Flaviano Morone.
- 2016. Co-founder. kcore-analytics.com. Kcore-analytics is an influencer platform to identify Top Influencers in Social Media using proprietary cutting-edge optimization algorithms.

Talks

A. Invited Talks, Plenary Talks and Keynote Talks

1. European Physical Society, Annual Meeting (Condensed Matter Physics), York, UK, 16–19 December 1996, *Segregation phenomena*
2. Minerva Workshop on Mesoscopics, Fractals, and Neural Networks, Eilat, Israel, 24-28 March 1997, *Stratification instability in granular flows*
3. Workshop on Complex Systems, Brasilia, May 04-08, 1998, *Granular flow*
4. Tohwa University Symposium, Fukuoka, Japan, Nov 9-13, 1998, *Dynamics of stratification and segregation in granular mixtures*
5. Sixth 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*, Plenary talk
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 for Mathematical Sciences, 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, Gaithsburg, VA, 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*
39. Emergence in Geographic Space: Concepts, Methods and Models, European Network S4 - Spatial Simulation for Social Sciences, November 23-25 2009, Paris, *Urban growth models*, Keynote presentation

40. Perspectives and Challenges in Statistical Physics and Complex Systems, November 2011, Natal, Brasil, *Collective behavior in human activity: from population growth to the obesity epidemic and the human brain*
41. Complexity in Oil Industry, November 2011. International Center of Theoretical Physics, Natal, Brazil, *Nonlinear elasticity of granular materials*
42. Frontier in Statistical Physics and Complex Systems, June 2-5, 2012, Catania, Italy, *Theory of packings*
43. Wolfram Data Summit September 6-7, 2012, Washington, DC, *Statistical Physics for non-Physics problems: obesity epidemics and information flow in society*
44. International School on Biological Complex Networks, July 8-12, 2013, Natal, Brazil, *Modularity and evolution in protein interaction networks*
45. Yukawa Workshop on Glasses, July 16-19, 2013, Kyoto, Japan, *From Kepler to Ulam: searching for the optimal packing*
46. STATPHYS 25, July 22-26, 2013, Seoul, South Korea, *Statistical mechanics of jammed matter*
47. Mechanics of Particulates, February 12, 2014, NYU School of Engineering, New York, *Packings on nonspherical particles*
48. Jam Packed - Packing and Jamming of Particulate Systems, September 15-18, 2014, Erlangen, Germany, *Packings of spherical and nonspherical hard particles*, Plenary lecture
49. III Dynamics days South America, November 3-7, 2014, Viña del Mar, Chile, *The emerging science of superspreaders and success*
50. Unifying Concepts in Glass Physics VI, Aspen Institute, Aspen, February 1-7, 2015, *Unifying statistical mechanics framework for packings: from spherical to non-spherical particles with adhesion, friction, polydispersivity, and for any dimension*
51. CompleNet: 6th Workshop on Complex Networks, Queens, New York, March 25-27, 2015, *Searching for superspreaders in networks: from Twitter to the brain*, Keynote speaker
52. Brain Networks Satellite, NetSci 2015, Zaragoza, June 1-2, 2015, *Percolation and cascading in a brain network of networks*
53. NetSci 2015, Zaragoza, June 3-5, 2015, *Collective optimization of influence makes visible the invisible*
54. Diffusion Fundamentals VI, Dresden, August 23-26, 2015, *A new class of superspreader: From Twitter, cities and the brain*
55. IV International Workshop on Complex Collective Dynamics: Brains and beyond, Capri, August 31 - September 4, 2015, *Percolation and cascading in a brain Network of Networks*
56. NetSci2016 Satellite Brain Networks, Seoul, Korea, May 31, 2016, *Influencers in the Brain*
57. NetSci2016, Seoul, Korea, June 1-3, 2016, *Searching for superspreaders via optimal percolation: from Twitter to the Brain*

58. Workshop on Jamming and Granular Matter, QMUL, London, July 13-15, 2016, *Searching for optimal packings*
59. CORBI Course, Mathematical approaches to brain structure and function in health and disease. From early childhood development to adulthood, La Coruña, Spain, July 26 - August 5, 2016, *Superspreaders in the brain*
60. Gordon Research Conference, Granular Matter, Easton, MA, July 24-19, 2016, *Searching for the perfect packing*
61. 11th International School on Mind, Brain and Education: From Brain-to-Brain to Social Interaction, Ettore Majorana Centre for Scientific Culture, Erice, Italy, September 7-13, 2016, *Essential nodes in the Brain*
62. Collaborative Research in Computational Neuroscience (CRCNS) PI meeting, Brown University, June 14-16, 2017, *Finding essential nodes for integration in the brain using network optimization theory*
63. Santa Fe Institute 2017 Short Course on Networks and Big Data, New York, July 26-28, 2017, *Networks, Machine Learning and Big Data: from predicting elections to understanding the brain*
64. Workshop on Complex networks: from socio-economic systems to biology and brain, Lipari, Italy, Sep 9-13, 2017, *Finding essential nodes for integration in the brain using network optimization theory*
65. Mapping Complexity Foundations and Applications of Network Geometry, BCN 2017 Workshop on Network Geometry, Barcelona, Nov 6-8, 2017, *Essential nodes and keystone species in the brain and ecosystems*
66. Scientific Seminars on Computational Neuroscience, Instituto Cajal, Madrid, February 14, 2018, *Cracking the locomotion code in C. elegans*

B. Invited Talks to Universities

67. Harvard University, Materials Science Seminar, February 1996, *Scaling of rough surfaces*, invited talk with Prof. H. E. Stanley.
68. Princeton University, Materials Science Institute Seminar, February 1996, *A Model for erosion via ion-sputtering: from pattern formation to rough surfaces*
69. University of Massachusetts at Amherst, Physics Department Colloquium, April 1996, *Size segregation and layering in a sandpile: Experiment and model*
70. Lehman College, CUNY, Physics Department Colloquium, May 22, 1997, *Granular matter*
71. Schlumberger-Doll Research, Ridgefield, Connecticut, Colloquium, May 29, 1997, *Pattern formation in sandstone*
72. Universidade de Ceará, Fortaleza, Brazil, Physics Department Colloquium, July 24, 1997, *Granular segregation and stratification*
73. LASSP Seminar, Cornell University, Jan. 18, 1999, *Granular matter*

74. Clark University, Physics Colloquium, February 18, 1999, *Patterns in Nature*
75. California State University at Northridge, Physics Colloquium, March 5, 1999, *Pattern formation in Nature: Growing order out of disorder*
76. State University of New York at Stony Brook, Physics Colloquium, April 16, 1999, *The unusual properties of granular materials*
77. NIST, Inorganic Building Materials Group Seminar, November 5, 1999, *Granular Matter: a liquid, a fragile solid, a nonlinear elastic solid?*
78. MIT, Physics Department Seminar, January 25, 2000, *Granular matter*
79. Cornell University, Applied Mechanics Seminar, February 9, 2000, *Segregation in rapid granular flows*
80. Levich Institute, Fluid Mechanics Series, City College of New York, February 15, 2000, *Pattern formation in granular flows*
81. NEC Research Institute, Princeton, February 18, 2000, *Pattern formation in sandpiles*
82. Michigan Technological University, Physics Department Colloquium, February 22, 2000, *Granular flows*
83. University of Missouri-Rolla, Physics Department Colloquium, March 1, 2000, *Packing of compressible granular materials*
84. University of Central Florida, Physics Department Seminar, March 30, 2000, *Pattern formation in granular flows*
85. George Washington University, Physics Department Seminar, April 3, 2000, *Granular flows*
86. Stanford University, Geophysics Department, April 27, 2000, *Granular flows*
87. City College of New York, Chemical Engineering Seminar, September 18, 2000, *Solid and liquid-like properties of granular materials*
88. Rutgers University, Pharmaceutical Engineering Seminar, October 9, 2000, *Segregation of granular materials in 2D cascades*
89. PMMH-ESPCI, Paris, November 24, 2000, *Numerical granular simulations and amazing Poisson's ratios in sands*
90. ExxonMobil Research and Engineering Co, New Jersey, Colloquium, June 5, 2001, *Non-linear elasticity of granular materials*
91. Universidade Federal de Ceará, Physics Department Colloquium, July 21, 2001, *Thermodynamics of granular materials*
92. City College of New York, Physics Department Colloquium, December 12, 2001, *Thermodynamics, jamming, and effective temperatures in granular matter and glasses*
93. University of Massachusetts at Amherst, Physics Department Colloquium, May 2, 2002, *Thermodynamics of Granular Materials*
94. Yale University, Mechanical Engineering Seminar, October 23, 2002, *Granular matter needs a new statistical mechanics*

95. New York University, Courant Institute, Applied Mathematics Seminar, February, 27, 2003, *Jamming and thermodynamics in soft-matter systems*
96. Northwestern University, Nonlinear Seminar, October 25, 2003, *Jamming is even cooler than you thought*
97. Universidade de Ceará, Fortaleza, Brasil, Physics Department Seminar, December 2, 2004, *From grains to proteins: the physics of energy landscapes and complex networks*
98. City College of New York, Physics Department Colloquium, March 9, 2005, *Complex Networks*
99. Emory University, Physics Department Colloquium, March 11, 2005, *The physics of energy landscapes and complex networks*
100. Princeton University, Condensed Matter Seminar, April 4, 2005, *The physics of energy landscapes and complex networks*
101. Columbia University, Biological Sciences Colloquium, April 27, 2005, *Principles of self-organization in complex networks: from sand to proteins*
102. Yeshiva University, Physics Department Colloquium, May 4th, 2005, *From the grains to the WWW: the physics of energy landscapes and complexity*
103. University of Maryland, Applied Mathematics Seminar, November 12, 2005, *Complex Networks*
104. Queens College, Physics Department Colloquium, December 12, 2005, *Complexity*
105. New York University, Biology Department, September 23, 2006, *Emergence of modularity in protein interaction networks*
106. ETH, Zurich, January 10, 2007, *Scaling, renormalization and self-similarity in complex networks*
107. Universidad de Amazonas, Manaus, Brasil, February 26, 2007, *Scaling, renormalization and self-similarity in complex networks*
108. Levich Institute, CCNY. December 4, 2007, *Statistical mechanics of jammed matter*
109. NJIT, Mechanical Engineering Dept. December 11, 2007, *Phase diagram for jamming*
110. Physics Department Colloquium, CCNY. September 10, 2008, *Statistical mechanics of jammed matter and the nature of fruit packings*
111. Mathematical Sciences, NJIT Colloquium, Feb 23, 2009, *Theory of random packings*
112. Physics Department Colloquium, Fudan University, June 26, 2009, *Renormalization group in complex networks*
113. ETH, Zurich. September 12, 2009, *Renormalization group analysis of complex networks, modularity and information flow*
114. City College of New York. March 7, 2012, *Collective behavior in human activity: from population growth and the economy, to the obesity epidemic and the human brain*

115. University College London, CASA. April 2, 2012, *Collective behavior in human activity: from population growth, the economy to the obesity epidemic*
116. Tsinghua University. Particle and Combustion Engineering Research Group, Department of Thermal Engineering. October 14, 2013, *From avalanches to packings: the physics of granular matter*
117. Beijing Normal University. Systems Science School. October 15, 2013, *Viral influence spreading in social networks*
118. City College of New York. Physics Department. October 8, 2014, *The emergent science of superspreaders*
119. Institute of Neuroscience. Alicante, Spain. July 23, 2015, *Percolation and cascading in a Brain Network of Networks*