

Lazaros Gallos, Ph.D.

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Research Interests

- Modeling of complex systems, with emphasis on:
 - Structure, dynamics, and modeling of complex networks
 - Interdisciplinary applications from Sociology and Technology to Physics and Biology
 - Percolation, scaling, self-similarity in networks and disordered systems
 - Agent-based models for interaction dynamics
 - Diffusion, Random Walks, and Reaction-Diffusion processes
- Large-scale computer simulation techniques:
 - Monte-Carlo, Molecular Dynamics, and Mesoscopic Dynamics
 - Numerical solutions of complicated physical systems

Education

- Ph.D. in Physics: *Trapping in Disordered Systems* 1998
Univ. of Thessaloniki, Greece
- Degree in Physics 1993
Univ. of Thessaloniki, Greece
- Student in Computer Science (successfully completed 40 courses) 1993-1997
Univ. of Thessaloniki, Greece

Employment

- Research Associate New Brunswick, NJ 2012-now
Department of Ecology, Rutgers University
Laboratory of Prof. Nina Fefferman
- Research Associate New York, NY 2008-2012,
Levich Institute at City College of NY 2006-2007
Laboratory of Prof. H. Makse
- Post-doctoral position Thessaloniki, Greece 2007,
Dept. of Physics, Univ. of Thessaloniki 2001-2005
Computational Physics group of Prof. Panos Argyrakis
- Post-doctoral position Thessaloniki, Greece 1999-2001
Dept. of Chemical Engineering,
Laboratory for Polymer Reaction Engineering of Prof. C. Kyparissides
- Visiting Scientist Juelich, Germany 1997
Institut fur Festkorperforschung, KFA
Theoretical Physics Group of Prof. Klaus Kehr
- Scientific Training Saclay, France 1994-1995
CEA, Centre d'Etudes Saclay
Laboratoire de Photophysique et Photochimie of Dr. D.Markovitsi

Awards-scholarships

- APS Outstanding Referee 2013
- 2 times (2009, 2011) Distinguished Referee, European Physical Society 2009,2011
- Research scholarship from the Univ. of Thessaloniki 2003-2004
- IKY-DAAD travel fellowship for research in Giessen, Germany
- EIE-CNRS fellowship for research in Saclay, France (Dr. D. Markovitsi) 2002-2003
- Scholarship from Ministere Affaires Etrangeres of France for 6-months research at CEA, Saclay, France. 2000-2001
1994
- Scholarship from the City of Heraklion for 1st place in advanced physics summer school 1993
- Valedictorian, Science Departments graduation, Univ. of Thessaloniki
- Greek government scholarship for First Year studies achievement. 1993
- Numerous scholarships (at least 12) for conferences participation 1990-

Teaching experience	<ul style="list-style-type: none"> • Adjunct Professor, graduate course 'Simulation methods' Dept of Physics, Univ. of Thessaloniki 2002-2005 • Part of the NAUSIKA group, developing an educational CD-ROM of virtual labs for teaching Thermodynamics in High-School students (funded by the Greek government) 1999-2001 • Teaching assistant, graduate course 'Simulation methods' (Dept of Physics, Univ. of Thessaloniki) 2000-2002 • Teaching assistant, 4th year course 'Advanced Statistical Physics' Dept of Physics, Univ. of Thessaloniki 1996-1998 	
Computer Skills	<p>Programming: Expert level in C, Fortran, and Unix shell script. Operating Systems: Linux, Windows, and MacOS. I have been developing my own code for all my research projects.</p>	
Publications	<p>Author of 40 papers in refereed journals and 9 papers in conference proceedings.</p>	
Citations	<p>Currently, there are more than 800 citations to my published work (recent rate ~90/year). H-index: 15</p>	
Conferences	<p>I have participated and presented my work in more than 30 conferences (5 invited talks).</p>	
Research Projects	<p>I have participated as a researcher in many research projects funded by NSF, ARL, the European Commission, the NATO, and the Greek Ministry of Research. In most of these projects I have been actively involved as a co-author of the grant proposals.</p>	
Press coverage	<p>My paper on obesity spreading was chosen by APS for a News Briefing at the APS March meeting 2012 in Boston. The work was covered by Physics World, US News, and by a large number of webpages.</p> <p>My papers a) on the tolerance of scale-free networks, and b) the identification of efficient spreaders were also widely covered by many homepages and newspapers.</p> <p>I was interviewed by Science News on the authenticity of Pollock paintings, based on their fractal structure.</p>	
Societies	<p>Member of the American Physical Society, the European Physical Society, and the New York Academy of Sciences.</p>	

Publications in refereed journals

1. L.K. Gallos, D. Rybski, F. Liljeros, S. Havlin, H.A. Makse, "How people interact in evolving online affiliation networks", *Physical Review X* 2, 031014 (2012).
2. L.K. Gallos, P. Barttfeld, S. Havlin, M. Sigman, H.A. Makse, "Collective behavior in the geographical spreading of obesity and diabetes", *Scientific Reports* 2, 454 (2012).
3. 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", *Proceedings of the National Academy of Sciences USA* 109, 2825 (2012).
4. L.K. Gallos, M. Sigman, and H.A. Makse, "The conundrum of functional brain networks: small-world efficiency or fractal modularity", *Frontiers in Fractal Physiology* 3, 123 (2012).
5. M. Kitsak, L.K. Gallos, S. Havlin, F. Liljeros, L. Muchnik, H.E. Stanley, and H.A. Makse, "Identifying influential spreaders in complex networks", *Nature Physics* 6, 888 (2010) [cover story].
6. H.D. Rozenfeld, L.K. Gallos, and H.A. Makse, "Explosive percolation in the human protein homology network", *European Physical Journal B* 75, 305 (2010).
7. V. Galvao, J.G.V. Miranda, R.F.S. Andrade, J.S. Andrade Jr, L.K. Gallos, and H.A. Makse, "Modularity map of the network of human cell differentiation", *Proceedings of the National Academy of Sciences USA* 107, 5750 (2010).
8. H.D. Rozenfeld, L.K. Gallos, C. Song, and H.A. Makse, "Fractal and Transfractal Scale-Free Networks", *Encyclopedia of Complexity and Systems Science*, 00611 (Springer, 2009).
9. L.K. Gallos, C. Song, and H.A. Makse, "Scaling of Degree Correlations and Its Influence on Diffusion in Scale-Free Networks", *Physical Review Letters* 100, 248701 (2008).
10. L.K. Gallos and P. Argyrakis, "Scale-free networks resistant to intentional attacks", *Europhysics Letters* 80, 58002 (2007).
11. L.K. Gallos, C. Song, S. Havlin, and H.A. Makse "Scaling theory of transport in complex biological networks" *Proceedings of the National Academy of Sciences USA* 104, 7746 (2007).
12. L.K. Gallos, C. Song and H.A. Makse, "A review of fractality and self-similarity in complex networks" *Physica A* 386, 686 (2007).
13. L.K. Gallos, F. Liljeros, P. Argyrakis, A. Bunde, and S. Havlin "Improving immunization strategies" *Physical Review E (R)* 75, 045104 (2007).
14. C. Song, L.K. Gallos, S. Havlin, and H.A. Makse "How to calculate the fractal dimension of a complex network: the box covering algorithm" *Journal of Statistical Mechanics*, P03006 (2007).
15. L.K. Gallos and P. Argyrakis "Influence of a complex network substrate on reaction-diffusion processes" *Journal of Physics: Condensed Matter* 19, 065123 (2007).
16. L.K. Gallos and P. Argyrakis "Characteristics of reaction-diffusion on scale-free networks" *Physical Review E* 74, 056107 (2006).
17. L.K. Gallos "Evolution of hierarchies on scale-free networks", *International Journal of Modern Physics C*, 16, 1329 (2005).
18. L.K. Gallos and P. Argyrakis "Reaction-diffusion processes on correlated and uncorrelated scale-free networks" *Physical Review E* 72, 017101 (2005).
19. L.K. Gallos, R. Cohen, P. Argyrakis, A. Bunde, and S. Havlin "Stability and topology of scale-free networks under attack and defense strategies" *Physical Review Letters* 94, 188701 (2005).
20. L.K. Gallos, P. Argyrakis, A. Lobanov, and A. Vitukhnovsky "Computational study of energy transfer in two-dimensional J-aggregates" *Journal of Luminescence* 110, 246 (2004).

21. L.K. Gallos, B. Movaghar, and L.D.A. Siebbeles "Temperature dependence of the mobility in quasi-one-dimensional systems: discotic liquid crystals" *Molecular Crystals and Liquid Crystals* 413, 2261 (2004).
22. L.K. Gallos, P. Argyrakis, A. Bunde, R. Cohen, and S. Havlin "Tolerance of scale-free networks: from friendly to intentional attack strategies" *Physica A* 344, 502 (2004).
23. L.K. Gallos "Random walk and trapping processes on scale-free networks" *Physical Review E* 70, 046116 (2004).
24. L.K. Gallos and P. Argyrakis "Absence of kinetic effects in reaction-diffusion processes in scale-free networks" *Physical Review Letters* 92, 138301 (2004).
25. I. Mastorakos, L.K. Gallos, and E.C. Aifantis "Computer simulation of discrete crack propagation" *Journal of Mechanical Behavior of Materials* 14, 9 (2003).
26. L.K. Gallos and P. Argyrakis "Distribution of infected mass in disease spreading in scale-free networks" *Physica A* 330, 117 (2003).
27. L.K. Gallos, B. Movaghar, and L.D.A. Siebbeles "Temperature dependence of the charge carrier mobility in gated quasi-one-dimensional systems" *Physical Review B* 67, 165417 (2003).
28. L.K. Gallos, D. Markovitsi, J.P. Lemaistre and P. Argyrakis "Effect of degeneracy on Frenkel excitons in ordered and orientationally disordered columnar aggregates" *Nonlinear Optics* 29, 543 (2002).
29. L.K. Gallos, E. Stathatos, P. Lianos and P. Argyrakis "Photophysical behavior of a homologous series of amphiphilic hemicyanine dyes in thin AOT films" *Chemical Physics* 275, 253 (2002).
30. L.K. Gallos and P. Argyrakis "Accurate estimation of the survival probability for trapping in two dimensions" *Physical Review E* 64, 051111 (2001).
31. D. Markovitsi, L.K. Gallos, J.P. Lemaistre and P. Argyrakis "Degeneracy, orientational disorder and chromophore size effects on Frenkel excitons in columnar mesophases" *Chemical Physics* 269, 147 (2001).
32. L.K. Gallos, P. Argyrakis, and K.W. Kehr "Trapping and survival probability in two dimensions" *Physical Review E* 63, 021104 (2001).
33. L.K. Gallos, A.V. Pimenov, I.G. Scheblykin, M. Van der Auweraer, G. Hungerford, O.P. Varnavsky, A.G. Vitukhnovsky, and P. Argyrakis "A kinetic model for J-aggregate dynamics" *Journal of Physical Chemistry B* 104, 3918 (2000).
34. K.G. Kyritsi, L.K. Gallos, A.N. Anagnostopoulos, A. Cenys, and G.L. Bleris "Chaotic photoconductivity" *Nonlinear Phenomena in Complex Systems* 2, 41 (1999).
35. D. Markovitsi, S. Marguet, L.K. Gallos, H. Sigal, P. Millie, P. Argyrakis, H. Ringsdorf and S. Kumar "Electronic coupling responsible for energy transfer in columnar liquid crystals" *Chemical Physics Letters* 306, 163 (1999).
36. K.P.N. Murthy, L.K. Gallos, P. Argyrakis, and K.W. Kehr "Multifractal character of the distribution of the number of distinct sites visited" *Physical Review E* 54, 6922 (1996).
37. H. Sigal, D. Markovitsi, L.K. Gallos, and P. Argyrakis "Singlet excitation transfer in columnar liquid crystals studied by Monte Carlo simulations" *Journal of Physical Chemistry* 100, 10999 (1996).
38. L.K. Gallos, P. Argyrakis, and K.W. Kehr "Distribution of the number of distinct sites visited by random walks in disordered lattices" *Physical Review E* 52, 1520 (1995).
39. D. Markovitsi, A. Germain, P. Millie, P. Lecuyer, L.K. Gallos, P. Argyrakis, H. Bengs, and H. Ringsdorf "Excited states and energy transfer in triphenylene columnar liquid crystals" *Journal of Physical Chemistry* 99, 1005 (1995).

40. L.K. Gallos, A.N. Anagnostopoulos, and P. Argyrakis "Conduction anisotropy in layered semiconductors" *Physical Review B* 50, 14643 (1994).

Publications in refereed conference proceedings

1. L. K. Gallos, R. Cohen, F. Liljeros, P. Argyrakis, A. Bunde and S. Havlin, "Attack Strategies on Complex Networks", workshop on "Networks: structure and dynamics" in ICCS 2006, *Lecture Notes in Computer Science* 3993, 1048-1055 (2006).
2. L.K. Gallos, "Prisoner's dilemma on scale-free networks". Modelling Cooperative Behavior in the Social Sciences, Granada, Spain, *AIP Conference Proceedings*, Vol. 779, 121-123 (2005).
3. L.K. Gallos and P. Argyrakis, "Reaction-diffusion processes in scale-free networks", Noise in Complex Systems and Stochastic Dynamics, *Proceedings of the SPIE*, L. Schimansky-Geier, D. Abbott, A. Neiman, C.P. van den Broeck (eds.) 5114, 118-125 (2003).
4. L.K. Gallos and C. Kiparissides, "An improved Gibbs Ensemble-Monte Carlo Method for Phase Equilibria Calculations in Polymer Mixtures", *DEHEMA Monographien* 137, 553 (2001).
5. I. Lefkos, I. Refanidis, L.K. Gallos, G. Bisdikian, E. Petridou, E. Hatzikraniotis, I. Vlahavas, P. Argyrakis, D. Psillos, "Virtual Lab-Environment for Thermal Phenomena", in *e-Proceedings of the 1st National Conference on Education and Informatics* (2000).
6. D. Psillos, P. Argyrakis, I. Vlahavas, E. Hatzikraniotis, G. Bisdikian, I. Refanidis, I. Lefkos, K. Korobilis, D. Vrakas, L.K. Gallos, E. Petridou, I. Nikolaidis, "Composite Virtual-Lab Environment for Teaching Heat and Thermodynamics", in *Proceedings of the 2nd National Conference on Information and Communication Technologies in Education* (2000).
7. L.K. Gallos, and P. Argyrakis, "Energy transport in liquid crystals", *Proceedings of the 13th Greek Conference on Solid State Physics*, ed. K. Paraskevopoulos, p.721 (1997).
8. L.K. Gallos and P. Argyrakis, "Trapping effects in surface diffusion", in *ASI conference on Surface diffusion: Atomistic and Collective Processes*, Plenum Press, ed. by M.C. Tringides, 667 (1996).
9. L.K. Gallos, A.N. Anagnostopoulos, and P. Argyrakis, "Conduction anisotropy on layered semiconductors", in *Proceedings of the 11th Greek Conference on Solid State Physics*, p. 237, (1995).