Hawoong Jeong

Personal Information

Place and Date of Birth:	Seoul, Korea, 13 September 1968
Address:	Department of Physics Korea Advanced Institute of Science and Technology Taejeon, 305-701 Korea Tel: +82-42-869-2543 Fax: +82-42-869-2510 Email: hjeong@kaist.ac.kr Homepage : http://www.nd.edu/~hjeong
Nationality:	South Korea

Education

Doctor of Philosophy in Physics Supervisor : Prof. Doochul Kim	2/1998
Master of Science in Physics Supervisor : Prof. Doochul Kim	2/1993
Graduate studies at Seoul National University	3/1991 – 2/1998
Undergraduate studies at Seoul National University	3/1987 – 2/1991

Employment and Teaching experience

Seoul National University: Teaching Assistant	3/1991 – 2/1995
Seoul National University: Research Assistant	3/1993 – 2/1998
KFA HLRZ, Jülich, Germany: Visiting Researcher	7/1997 – 9/1997
CTP, Seoul National University: Postdoctoral Researcher	3/1998 – 7/1998
University of Notre Dame: Postdoctoral Researcher	8/1998 – 1/2001
University of Notre Dame: Research Assistant Professor	2/2001 – 8/2001
KAIST : Assistant Professor	9/2001 – 8/2003
KAIST : Associate Professor	9/2003 – present

Honors and Awards

Science Award from the Prime Minister of Korea	2004
KAIST Scientific Award	2003
AKPA Outstanding Young Researcher Award, *Honorable Mention*	2001
Scholarship from DAAD(Germany) and KOSEF(Korea)	7/1997 – 9/1997
Predoctoral Fellowship, DaeWoo Foundation	3/1996 – 2/1997
Research Assistantship, Seoul National University	3/1993 – 2/1998
Teaching Assistantship, Seoul National University	3/1991 – 2/1995

Refereed publications

(Available at http://www.nd.edu/~hjeong/paper.html)

[1] S. H. Lee, and H. Jeong, *Effects of substrate network topologies on competition dynamics*, (accepted for publicatioin in Phys. Rev. E).

[2] S. H. Lee, H. Jeong and J. D. Noh, *Random field Ising model on networks with inhomogeneous connections*, (accepted for publicatioin in Phys. Rev. E).

[3] Y.-H. Eom, S. Lee, H. Jeong, *Exploring local structural organization of metabolic networks using subgraph patterns*, J. Theo. Biology **241**, 823 (2006).

[4] K.-I. Goh, Y.-H. Eom, H. Jeong, B. Kahng, and D. Kim, *Structure and evolution of online social relationships: Heterogeneity in unrestricted discussions*, Phys. Rev. E **73**, 066123 (2006).

[5] D.-H. Kim, H. Jeong, E. Shapir, D. Porath, and J. Yi, *Complex ion-distribution Induced Contrast Inversion in STM Imaging of DNA*, Phys. Rev. B **73**, 235416 (2006).

[6] S. Han, Y.-Y. Ahn, S. Moon, and H. Jeong, *Collaborative Blog Spam Filtering Using Adaptive Percolation Search* 15th International World Wide Web Conference(WWW2006), Workshop on the Weblogging Ecosystem (2006).

[7] D.-H. Kim, H. Jeong, *Inhomogeneous substructures hidden in random networks*, Phys. Rev. E **73**, 037102 (2006).

[8] Y.-Y. Ahn, H. Jeong, B. J. Kim, *Wiring cost in the organization of a biological neuronal network*, Physica A **367**, 531 (2006).

[9] S.-W. Son, H. Jeong, J.-D. Noh, *Random field Ising model and community structure in complex networks*, Eur. Phys. J. B **50**, 431 (2006).

[10] K. Rho, H. Jeong and B. Kahng, *Identification of lethal cluster of genes through the microarray assay*, Physica A **364**, 557 (2006).

[11] S. H. Lee, P.-J. Kim, and H. Jeong, *Statistical properties of sampled networks*, Phys. Rev. E **73**, 016102 (2006).

[12] D.-H. Kim and H. Jeong, *Systematic analysis of group identification in stock markets*, Phys. Rev. E **72**, 046133 (2005).

[13] P.-J. Kim, H. Jeong, *Spatio-temporal Dynamics in the Origin of Genetic Information*, Physica D **203**, 88 (2005).

[14] D.-H. Kim, S.-W. Son, Y.-Y. Ahn, P.-J. Kim, Y.-H. Eom, and H. Jeong, *Underlying scale-free trees in complex networks*, Progress of Theoretical Physics Supplement **157**, 213 (2005).

[15] J.-D. Noh, H.-C. Jeong, Y.-Y. Ahn, H. Jeong, *Growing network model for community with group structure*, Phys. Rev. E **71**, 036131 (2005).

[16] D.-H. Kim, B. J. Kim, H. Jeong, *Universality Class of Fiber Bundle Model on Complex Networks*, Phys. Rev. Lett. **94**, 025501 (2005).

[17] P.-J. Kim, T.-W. Ko, H. Jeong, H.-T. Moon, *Pattern formation in a two-dimensional array of oscillators with phase-shifted coupling*, Phys. Rev. E **70**, 065201(R) (2004).

[18] D.-H. Kim, J.-D. Noh, H. Jeong, *Scale-free trees: The skeletons of complex networks*, Phys. Rev. E **70**, 046126 (2004).

[19] G. Forgacs, S.-H. Yook, .A. Janmey, H. Jeong, C.G. Burd, *Role of the cytoskeleton in signaling networks*, J. of Cell Science **117**, 2769 (2004). [Issue Cover]

[20] I. Yang, H. Jeong, B. Kahng, and A.-L. Barabasi, *Emerging behavior in electronic bidding*, Phys. Rev. E **68**, 016102 (2003).

[21] P. Holme, M. Huss, H. Jeong, *Subnetwork hierarchies of biochemical pathways*, Bioinformatics **19**, 532 (2003).

[22] H. Jeong, Z. Neda and A.-L. Barabasi, *Measuring preferential attachment for evolving networks*, Euro. Phys. Lett. **61 567**, (2003).

[23] I.J. Farkas, H. Jeong, T. Vicsek, A.-L. Barabasi and Z.N. Oltvai, *The topology of the transcriptional regulatory network in the yeast, S. cerevisiae*, Physica A **318**, 601 (2003).

[24] H. Jeong, Z.N. Oltvai, A.-L. Barabasi, *Integrated drug target identification based on genomic data*, ComPlexUs **1**, 19 (2003).

[25] H. Jeong, *Complex Scale-Free Networks*, Physica A **321**, 226 (2003).

[26] S. Yook, H. Jeong, and A.-L. Barabasi, *Modeling the Internet's large-scale topology*, Proc. Natl. Acad. Sci. **99**, 13382 (2002).

[27] K.-I. Goh, E.S. Oh, H. Jeong, B. Kahng, and D. Kim, *Classification of scale-free network*, Proc. Natl. Acad. Sci. **99**, 12583 (2002).

[28] B.J. Kim, C.N. Yoon, S.K. Han, and H. Jeong, *Pathfinding strategies in scale-free networks*, Phys. Rev. E **65**, 027103 (2002).

[29] H. Jeong, B. Kahng, S. Lee, C.Y. Kwak, A.-L. Barabasi, and J.K. Furdyna, *Monte Carlo Studies of Sinusoidally Modulated Superlattice*, Phys. Rev. E **65**, 031602 (2002).

[30] I.J. Farkas, H. Jeong, T. Vicsek, A.-L. Barabasi and Z.N. Oltvai, The topology of the transcriptional regulatory network in the yeast, S. cerevisiae, PHYSICA A (2002).

[31] I. Farkas, I. Derenyi, H. Jeong, Z. Neda, Z.N. Oltvai, E. Ravasz, A. Schubert, A.-L. Barabasi, and T. Vicsek, *Networks in life: Scaling properties and eigenvalue spectra*, PHYSICA A (2002)

[32] A.-L. Barabasi, V.W. Freeh, H. Jeong, J.B. Brockman, *Parasitic computing*, Nature **412**, 894 (2001).

[33] B. Kahng, H. Jeong, A.-L. Barabasi, *Nanoscale Structure Formation on Sputter Eroded Surface*, J. Korean Phys. Soc. **39**, 421 (2001).

[34] J. Podani, Z.N. Oltvai, H. Jeong, B. Tombor, A.-L. Barabasi, E. Szathmary, *Comparable system-level organization of Archaea and Eukaryotes*, Nature Genetics **29**, 54 (2001).

[35] H. Jeong, S.P. Mason, and A.-L. Barabasi and Z.N. Oltvai, *Lethality and centrality in protein networks*, Nature **411**, 41 (2001).

[36] S. Yook, H. Jeong, Y. Tu, and A.-L. Barabasi, *Weighted evolution networks*, Phys. Rev. Lett. **86**, 5835 (2001).

[37] H. Jeong, B. Tomber, R. Albert, Z.N. Oltvai, and A.-L. Barabasi, *The large-scale organization of metabolic networks*, Nature **407**, 651 (2000)

[38] R. Albert, H. Jeong, and A.-L. Barabasi, *Error and attack tolerance of complex networks*, Nature **406**, 378 (2000).[Cover Story]

[39] B. Kahng, H. Jeong, and A.-L. Barabasi, *Quantum Dot and Hole formation in Sputter Erosion*, Appl. Phys. Lett. **78**, 805 (2001).

[40] A.-L. Barabasi, R. Albert, H. Jeong, and G. Bianconi, *Power-Law Distribution of the World Wide Web*, Science **287**, 2115a (2000).

[41] K.-I. Goh, H. Jeong, B. Kahng and D. Kim, *Depinning of an anisotropic interface in random media: The tilt effect*, Phys. Rev. E **62**, 2955 (2000).

[42] A.-L. Barabasi, R. Albert and H. Jeong, *Scale-free characteristics of random networks: The topology of the World Wide Web*, Physica A **281**, 69-77 (2000).

[43] R. Albert, H. Jeong, and A.-L. Barabasi, *The diameter of the World Wide Web*, Nature **401**, 130-131(1999).

[44] A.-L. Barabasi, R. Albert, and H. Jeong, *Mean-field theory for scale-free random networks*, Physica A **272**, 173-187 (1999).

[45] S. Park, B. Kahng, H. Jeong, and A.-L. Barabasi, *Dynamics of ripple formation in sputter erosion: nonlinear phenomena*, Phys. Rev. Lett. **83**, 3486 (1999).

[46] S. Park, H. Jeong, and B. Kahng, *Numerical test of the damping time of layer-by-layer growth on stochastic mode*, Phys. Rev. E **59**, 6184 (1999).

[47] H. Jeong, B. Kahng, and D. Kim, *Facet formation in the negative quenched Kardar-Parisi-Zhang equation*, Phys. Rev. E **59**, 1570 (1999).

[48] H. Jeong, B. Kahng, and D.E. Wolf, *Island Density in Homoepitaxial Growth: Improved Monte Carlo Results*, Physica A **245**, 355 (1997).

[49] H. Jeong, B. Kahng, and D. Kim, *Anisotropic surface growth model in disordered media*, Phys. Rev. Lett. **77**, 5094 (1996).

[50] H. Jeong, B. Kahng, and D. Kim, *Renormalization group analysis of the anisotropic Kardar-Parisi-Zhang equation with spatially correlated noise*, Phys. Rev. E **52**, R1292 (1995).

[51] H. Jeong, B. Kahng, and D. Kim, *Avalanche size distribution in the Toom interface*, J. Korean Phys. Soc. **27**, 124 (1994).

[52] H. Jeong, B. Kahng, and S. Kim, *Current Distribution and Moments of the Logarithm of the Currents in Percolating Resistor Networks*, J. Korean Phys. Soc. **27**, 80 (1994).

[53] H. Jeong, B. Kahng, and S. Kim, *Growth Probability Distribution and Moments of Log-Probability in Diffusion-Limited Aggregation*, J. Korean Phys. Soc. **27**, 168 (1994).

[54] H. Jeong, B. Kahng, and D. Kim, *Dynamics of Toom interface in three dimensions*, Phys. Rev. Lett. **71**, 747 (1993).

Other Publications

[1] H. Jeong, B. Tombor, A.-L. Barabasi, and Z.N. Oltvai, *The global organization of cellular networks*, Computation of biochemical pathways and genetic networks workshop proceeding, Heidelberg, Germany (2001).

[2] A.-L. Barabasi, B. Kahng, H. Jeong and S. Park, *Nonlinear ripple formation in spuuter erosion*, (MRS 1999).

Invited lectures and talks (after 1999)

- 2006/8 Conference on Computational Physics, "Price of Anarchy in Complex Networks"
- 2006/7 The 2nd KIAS Conference on Statistical Physics, "Price of Anarchy in Complex Networks"
- 2006/6 Sweden Umea University Faculty Oppoment presentation "Complex Networks"
- 2005/12 Hayashibara Forum on "Strategy of Life", Japan, "Topology of biological networks and beyond..."
- 2005/11 APCTP-KU Joint Conference on Bio-Complexity "Understanding the robustness of metabolic networks"
- 2005/7 STAT-PHYS-Taiwan, Academia Sinica, Taiwan, "From topology to dynamics of metabolic networks: Flux Balance Analysis"
- 2005/3 APS March Meeting, "Robustness of metabolic networks: Flux Balance Analysis", Los Angeles, USA
- 2005/1 RIKEN Kobe Institute CDB, "Complex networks and Biology", Kobe, Japan
- 4th Conference of the International Society of Ecological Information (ISEI), "Complex networks: from topology to dynamics" (keynote speech)
- 2004/10 Japanes Biochemical Society Bio-Symposium, "Complex Bionetworks: from topology to dynamics", Yokohama, Japan

- 2004/10 International meeting of the Federation of Korean Microbiological Science, Seoul, Korea
- 2004/07 STATPHYS22 Satellite meeting in Japan, "Skeleton of Scale-Free Networks"
- 2004/06 STATPHYS22 Satellite meeting in Seoul, "Skeleton of Scale-Free Networks"
- 2004/02 The 49th Systems Biotechnology Symposium, "A link between Biology and Complex Networks"
- 2003/10 Emory Univ.-KAIST joint workshop "dynamics in complex system"
- 2003/2 2nd Asian Joint workshop on protein research, Osaka Univ., Japan
- 2002/9 KIAS Conference on Protein Structure and Function
- 2002/5 STAT-PHYS-Taiwan, Academia Sinica, Taiwan, "Complex Networks"
- 2002/4 Symposium for Complex Systems, KAIST, "Understanding Complex Systems"
- 2002/2 International Workshop on Complex Networks, POSTECH, "Complex Networks"
- 2001/8 International School on Computational Physics, University of Brasilia, "Complex Systems"
- 2001/5 Lehigh University, "Architecture of the complexity"
- 2001/3 Biocomplexity workshop, Duke Marine Lab, "Architecture of the complexity"
- 2001/2 Dagstuhl Seminar, Germany "Architecture of the complexity"
- 2000/10 KPS Meeting Special Session: "Architecture of complexity"
- 2000/1 DARPA QNET workshop "Achilles' Heel of the Internet"
- 1999/7 Stat. Mech. workshop at Korea Univ. "Ripple formation by sputtering"

Other notable contributions

- The paper R. Albert, H. Jeong and A.-L. Barabasi, "The Diameter of World Wide Web" [**Nature 401**, 130 (1999)] drew a number of media attentions including: MSNBC, ABC, CBS, FOX, BBC, USA Today, Washington Post, Le Monde, AP, HanKyoRye, Chosun-Ilbo, Kookmin-Ilbo, Science, Business 2.0 magazine etc., which brought world-wide attention. [http://www.nd.edu/~networks/press.htm for details.]
- The paper R. Albert, H. Jeong and A.-L. Barabasi, "Error and attack tolerance of complex networks", [**Nature 406**, 378 (2000)] was featured on the cover of the journal **Nature** (issue of July 27, 2000). The findings of the paper were discussed in a number of publications including: CNN, MSNBC, BBC, Discovery, National Geographic, Dong-A-Ilbo (Korean newspaper), KBS Radio, etc. [http://www.nd.edu/~networks/press.htm for details.]
- For more information, please visit http://www.nd.edu/~hjeong/media.html

Research Interests

- Complexity (complex system)
- Networks (http://www.nd.edu/~networks)
- Bio-Physics (http://www.nd.edu/~networks/cell)
- Quantum Dots (http://www.nd.edu/~qd)
- Dynamics of fluctuating interfaces and growing surfaces
- Molecular Beam Epitaxial (MBE) Growth
- Physical properties of fractal objects
- Self Organized Criticality problems
- Computational methods in statistical physics
- Statistical mechanics of disordered systems