

Andrew R. Missel

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Research Interests

Broadly speaking, I am interested in systems which are noisy and out of equilibrium, especially systems which exhibit nonequilibrium phase transitions. I have a particular interest in models with potential applications to biological systems, especially those systems which can be studied under laboratory conditions. My research to date has involved the use of both analytical methods and computer simulations, and I hope to continue to employ both sets of tools in the future.

Education

Ph.D. Physics, University of Illinois, Urbana-Champaign, 2008

M.S. Physics, University of Illinois, Urbana-Champaign, 2005

A.B. Physics, Cornell University, 2003, *cum laude*

Research Experience

Postdoctoral Researcher 2009–Present
Advisors: Professor Alex Levine UCLA
I am currently studying the dynamics of semiflexible gels (such as actin networks) both in and out of equilibrium. I am using both analytical tools and simulations to try to understand the effects of molecular motors such as myosin on the mechanical properties of semiflexible networks.

Graduate Research Assistant 2004–2008
Advisor: Professor Karin Dahmen UIUC
In my graduate research, I studied noise-induced transport in disordered reaction-diffusion systems using both simulations and a variety of analytical tools drawn from percolation theory, the theory of first-passage processes, and the theory of front propagation in disordered materials.

Undergraduate Research Assistant (through NSF Summer 2002
REU program)
Advisor: Professor Jonathan Arnold University of Georgia
In this summer research project, I studied a bistable genetic regulatory network using both computational and analytical tools.

Undergraduate Research Assistant Spring 2002
Advisor: Professor Albert Sievers Cornell University
While working in Professor Sievers' lab for one semester in college, I wrote code in LabView to create a lock-in amplifier for use in double-modulated infrared Fourier Transform spectroscopy.

Undergraduate Research Assistant (through NSF Summer 2001
REU program)
Advisor: Eric Smith Cornell University
In this summer research project, I tested the properties of thick-film resistors to determine whether they could be used as thermometers for the new “wigglers” then being planned for the Cornell Electron Storage Ring.

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Teaching Experience

Graduate Teaching Assistant Fall 2003–Fall 2008 (9 terms)
Physics Department UIUC

I taught both lab and discussion sections for thermal/statistical physics, quantum physics, and classical mechanics while enrolled in the Ph.D. program at UIUC.

Physics Tutor Spring 2002–Spring 2003
Learning Strategies Center Cornell University

As a tutor for the LSC's walk-in physics tutoring service, I was expected to be able to help students taking a wide variety of physics classes at many levels of mathematical sophistication.

Honors and Awards

L.S. Edelheit Family Biological Physics Fellowship, Physics Department, UIUC, 2008

Finalist for the APS Group for Statistical and Nonlinear Physics (GSNP) Student Speaker Award at the APS March Meeting, 2008

“Incomplete List of Teachers Ranked as Excellent by Their Students” at UIUC (5 times)

GAANN Fellowship, Physics Department, UIUC, 2003-2004

Publications

A. Missel and K. Dahmen, “Hopping Transport in Hostile Reaction-Diffusion Systems,” *Phys. Rev. E* **79**, 021126 (2009)

A. Missel and K. Dahmen, “Hopping Conduction and Bacteria: Transport in Disordered Reaction-Diffusion Systems,” *Phys. Rev. Lett.* **100**, 058301 (2008)

Conference Presentations

“Noisy Transport in Reaction-Diffusion Systems with Quenched Disorder,” Session L9 at the APS March Meeting, Pittsburgh, PA, March 17, 2009.

“Bacteria, Hopping Conduction, and First-Passage Percolation,” 8th Understanding Complex Systems Symposium, UIUC, May 15, 2008.

“Hopping Conduction and Bacteria: Transport in Disordered Reaction-Diffusion Systems,” Sessions B9 and H29 at the APS March Meeting, New Orleans, LA, March 2008.

“Hopping Conduction and Bacteria: Transport in Hostile Reaction-Diffusion Systems,” 7th Understanding Complex Systems Symposium, UIUC, May 16, 2007.

“Transport in Disordered Reaction-Diffusion Systems,” Session H29 at the APS March Meeting, Denver, CO, March 6, 2007.

Posters

“Population Dynamics in Inhomogeneous Media,” Institute for Genomic Biology (IGB) Symposium, UIUC, April 2007.

“Population Dynamics in Disordered Media,” 6th Understanding Complex Systems Symposium, UIUC, May 15, 2006.