

Department of Applied Physics

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Daniel S. Fisher

Professor of Applied Physics

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Research areas:

Biophysics, Condensed Matter, Statistical Physics

Description

Biophysics

Primary research interests are the dynamics of evolutionary processes. These include theoretical work on general issues and models in evolutionary dynamics, especially quantitative aspects, collaborations with experimental groups on laboratory evolution of microbes and on field studies of microbial diversity, improved methods for analysis of DNA sequence data to understand variations, and repertoire and dynamics of the immune system. Dynamics of cellular processes is also an active interest. Some collaborations with experimental neuroscience groups are being carried out.

Condensed Matter Physics

Research in theoretical condensed matter physics in recent years has included: dynamics of glasses, phase transitions and dynamics of quantum and classical disordered materials, and quantum dissipation in superconductors.

Courses Taught

Physical Biology of Macromolecules
Biology by the Numbers
Stochastic and Nonlinear Dynamics
Cellular Biophysics
Randomness in the Physical World

Selected Publications

High-Throughput Sequencing of the Zebrafish Antibody Repertoire
Rate of Adaptation in Large Sexual Populations
The Rate at Which Asexual Populations Cross Fitness Valleys
Evolutionary Dynamics
The Speed of Evolution and Maintenance of Variation in Asexual Populations
Ordered Phosphorylation Governs Oscillation of a Three-Protein Circadian Clock
Slide-and-cluster models for spindle assembly
Superconductor-to-Metal Transitions in Dissipative Chains of Mesoscopic Grains and Nanowires
Scenario for Spin Glass Phase with Infinitely Many States
Jamming Percolation and Glass Transitions in Lattice Models

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