106th Statistical Mechanics Conference
Rutgers University, Busch Campus, Hill Center, Room 114, Sunday, Tuesday, December 18–20, 2011

1 Conference Program

Copies of the presentations of some of the invited talks as well as information about past meetings, positions wanted and available, can be obtained at: http://www.math.rutgers.edu/events/smm.

The next Statistical Mechanics Conferences the 107th and 108th will be on May 6–8, 2012 and December 16–18, 2012 at Rutgers University.

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2 Invited Talks

James Langer, University of California, Santa Barbara
Shear-transformation-zone theory of glassy diffusion, stretched exponentials, and the Stokes-Einstein relation

Neil Ashcroft, Cornell University
The statistical physics of dense hydrogen at the three-quarter century mark

Gunduz Caginalp, University of Pittsburg
Phase field models with anisotropy and non-local interactions

Salvatore Torquato, Princeton University
Geometry and physics in high-dimensional Euclidean spaces
Elliot Lieb*, R. Frank, Princeton University
Possible lattice distortion in the Hubbard model for graphene

Amnon Aharony*, O. Entin-Wohlman, H. Barry-Soroker, Y. Imry and J.G.E. Harris, Tel Aviv University
Superconducting fluctuations in proximity bilayers

Eytan Domany, Weizmann Institute
Complex dynamics of transcriptional response: how do cells get on the fast lane?

Harold Scheraga, Cornell University
The protein folding problem: structure, dynamics, thermodynamics, and folding pathways

Eric Siggia, Rockefeller University
Geometry, epistasis and developmental patterning

Daniel S. Fisher, Stanford University
Genomic redundancy and evolutionary dynamics

David R. Nelson, Harvard University
Dislocation mediated elongation of bacteria

Charles S. Peskin*, J. Percus and A. Stinchombe, New York University
A cell migration model with shock-like discontinuities

Alexander Grosberg*, S. Nachaev, E. Shakhnovich, Y. Rabin, S. Havlin, A. Neer, K. Kremer and G. Grest, New York University
From topology to statistical mechanics of ring polymers to genome folding

Michael Widom* and W. Huhn, Carnegie Mellon University
Thermodynamics from first principles

Elisabeth Widom*, D. Snyder, S. Watanabe, E. Conte, A. Pietruszka, R. Carlson, N. Wallenstein and Z. Fran, Miami University
Timescales of magmatic processes

Allon Percus, Claremont Graduate University
The peculiar phase structure of random graph bisection

Sidney Redner, Boston University
Fate of the kinetic Ising model in three dimensions

Matthew P.A. Fisher, University of California, Santa Barbara
Non-Fermi liquid phases for 2d itinerant electrons

David Huse, Princeton University
Spin transport in an ultracold atomic Fermi gas

Jorge Kurchan*, C. Perez-Espigares and A. Kolton, Ecole Superieure de Physique
An infinite family of generalizations of the second law
HR session with Martin J. Fisher, KickStart International

Michael Kiessling, Rutgers University
Order and chaos in some trigonometric series

Michael Schick, University of Washington
Rafts in the plasma membrane: a curvature-induced microemulsion

William Gelbart*, C. Nobler, A. Gopal, R. Cadena, M. Comas, R. Garmann, O. Azizgolshani and A. Ben-Shaul, University of California, Los Angeles
Self-assembly of RNA viruses

David Mukamel, The Weizmann Institute
On the steady state of particle-nonconserving driven models

Satya Majumdar*, A. Comtet, P.J. Forrester, C. Nadal, J. Randon-Furling and G. Schehr, CNRS/Universite Paris-Sud
Vicious walkers, random matrices and 2-d Yang-Mills theory

Craig A. Tracy* and H. Widom, University of California, Davis
Recent progress and open problems for the asymmetric simple exclusion process

Jeremy Quastel, University of Toronto
Exact formulas for KPZ and directed polymers in $1 + 1$ dimensions

Andrea J. Liu, University of Pennsylvania
Criticality and the jamming transition

Rajarshi Roy, University of Maryland
Synchronization in real optical networks

Michael E. Fisher, University of Maryland
Counter-examples: charms, cautions, and cognition

Jerome Percus, New York University
A random walk to fundamental measure theory

Benjamin Widom, Cornell University
Tales of an obsession: solvophobia and solvophilia

Kevin Jensen, Naval Research Laboratory
A comprehensive approach to electron emission theory

Yan Levin, Instituto de Fisica UFRGS, Brazil
Statistical mechanics of systems with long-range interactions

Douglas Abraham, University of Oxford
Strips, bubbles and interface structure
Alex Neimark, Rutgers University
Breathing crystals: adsorption-induced deformation and structural transitions in metal-organic frameworks

Paul Federbush, University of Michigan
Asymptotic expansions for $\lambda d(p)$ of the monomer-dimer problem

David Brydges, University of British Columbia, Canada
The mayer and virial expansions

Martin Fraas*, R. Avron, M.E. Fisher and G.M. Graf, Technion
On a definition of current in Markovian open quantum systems

Leonid Koralov, University of Maryland
Polymer measures and branching diffusions

Charles Radin* and D. Aristoff, University of Texas
Rigidity in solids

Giambattista Giacomin, Universite Paris 7
Synchronization of active and inactive rotators

3 Short Talks

Ricky Chachra*, B. Machta and James P. Sethna, Cornell University
Parameter sensitivities and coarse-graining in the 2D Ising model: is Ising sloppy?

Suriyanarayanan Vaikuntanathan*, Patrick Shaffer and Phillip Geissler, Lawrence Berkeley National Lab
Investigating the adsorption of ions to liquid vapor interfaces: insights from lattice gas models

Kirill Korolev*, Christopher McFarland and Leonid A. Mirny, Massachusetts Institute of Technology
Drift, draft, waves, and ratcheting: evolutionary models of cancer progression

Benjamin Machta*, S.L. Veatch and J.P. Sethna, Cornell University
Critical Casimir forces in cellular membranes

Micah Hawkins* and T.L. Einstein, University of Maryland, College Park
Simulations of steps on a vicinal (001) surface with and without step touching: going beyond spinless fermions

Vladyslav Golyk*, M. Kruger and M. Kardar, Massachusetts Institute of Technology
Non-equilibrium Casimir forces between conducting nanowires

Hsiang-Ku Lin*, H.-K. Lin, R. Zandi, U. Mohideen and L.P. Pryadko, University of California at Riverside
The Casimir force between inclusions in a fluid membrane under tension
Matthias Kruger*, T. Emig, G. Bimonte and M. Kardar, Massachusetts Institute of Technology
Casimir levitation in thermal non-equilibrium

Mohammad F. Maghrebi*, Y. Kantor and M. Kardar, Massachusetts Institute of Technology
Entropic force of polymer on a tip cone

Sebastian Deffner* and C. Jarzynski, University of Maryland
Information, entropy, and heat far from equilibrium

Andrew Mugler*, A.G. Bailey, K. Takahashi and P. Rein ten Wolde, FOM Institute AMOLF
Membrane clustering and the role of rebinding in biochemical signaling

Yan Xu* and R. Shrock, C.N. Yang Institute for Theoretical Physics, Stony Brook University
Exact results on potts/tutte and chromatic polynomials

Emre Esenturk, Brown University
Interfacial free energy of equilibrium systems via phase field method

Anna Vershynina* and B. Nachtergaele, University of California, Davis
Non-equilibrium state of leaking photon cavity pumped by a random atomic beam

Sateesh Mane, Convergent Computing Inc
Radiative spin polarization in electron-positron storage rings

Adam Hopkins, Princeton University
Phase diagram and structural diversity of the densest binary sphere packings

Lan Gong and D. Stein, New York University
Noisy classical field theories with two coupled fields and its application to monovalent metallic nanowires

Qiang Zhang, City University of Hong Kong
Will particles fall through a steeper funnel faster?

John Barton, Rutgers University
Phase diagram of a generalized ABC model on the interval

Paata Kakashvili* and E. Ardonne, Rutgers University
Integrability in anyonic quantum spin chains via a composite height model

Weronika Szafran*, K. Bailoor and S. Ji, Rutgers University
Three levels of metabolic control in living cells: a category-theoretical representation

Shivani Patel*, K. Carmona, K. Bailoor and S. Ji, Rutgers University
Pathway-specific responses to environmental stresses: evidence for SOWAWN machines in living cells

Brooks Harris, University of Pennsylvania
Landau theory of octahedral tilting in perovskites
Fereydoon Family*, G. Hentschel, Z. Zhang, J. Pan and Y. Song, Emory University
The effect of social cues on marketing decisions

Christopher Henley, Cornell University
Possible origins of macroscopic chiral asymmetry in animals and plants

Christopher Jarzynski* and D. Mandal, University of Maryland, College Park
Minimal model of a stochastic Maxwell demon

Sungchul Ji, Rutgers University
A category-theoretical framework for integrating physics, biology and informatics based on complementarity and supplementarity principles

Vadim Tkechenko, Ben-Gurion University of the Negev, Israel
On Hill operators with complex-valued potentials

Xiaming Mao* and W. Ellenbroek, University of Pennsylvania
Rigidity percolation and mixed first-order-second-order transition in the square lattice

Robin Underwood*, K. Koga and B. Widom, Cornell University
Exploring a closed loop solubility curve

Trent Brunson and S. Boettcher, Emory University
Phase transitions of the Ising model on small-world hierarchical Hanoi networks

Dibyendu Mandal* and C. Jarzynski, University of Maryland
A proof by graphical construction of the no-pumping theorem of stochastic pumps

Haitao Quan, University of Maryland
On the validity of Jarzynski equality for the rapidly expanding quantum piston

S. Jamal Rahi, Rockefeller University
Biochemical “FM radio” receivers

Shamik Gupta*, A. Pateli, C. Nardini and S. Ruffo, Ecole Normale Superieure de Lyon, France
Linear response theory for quasistationary states in long-range interacting systems

Bruce Miller*, A. Hartl, A. Mazzoleni and J. Olafsen, Texas Christian University
Chaos in the wedge billiard: recent developments

Eric DeGiuli, University of British Columbia
Statistical mechanics of granular materials

Ashivni Shekhawat*, C. Manzato, Phani K.V.V. Nukala, M. Alava, S. Zapperi and J. Sethna, Cornell University
Statistics of fracture: renormalization group and universality versus nucleation theory

Braden Brinkman*, M. LeBlanc, J.T. Uhl, Y. Ben-Zion and K.A. Dahmen, University of Illinois at Urbana-Champaign
Do tidal stresses trigger large earthquakes early?
Navin Singh* and S. Srivastava, Birla Institute of Technology & Science, India
The probability analysis of opening of dsDNA

Andrej Kosmrlj and D. Nelson, Harvard University
Elastic free energy of deformations for warped membranes

Etienne Marcotte, S. Torquato and F.H. Stillinger, Princeton University
Exploring collective coordinates in high dimensions

Maxim Lavrentovich*, K.S. Korolev and D.R. Nelson, Harvard University
Directed percolation with inflation and range expansions with curved fronts

Evgeniy Khain*, C.M. Schneider-Mizell, M.O. Nowicki, E.A. Chiocca, S.E. Lawler and L.M. Sander, Oakland University
Clustering of brain tumor cells: theory and experiment

Andrew Ferguson* and A.K. Chakraborty, Massachusetts Institute of Technology
Spin glass models of HIV fitness landscapes

Robert Ziff*, C. Knecht, W. Trump and D. Ben-Avraham, University of Michigan
Retention of water poured on random surfaces

Yang Jiao* and S. Torquato, Princeton University
A dense packing of truncated tetrahedra that nearly fills all space

Thomas Butler* and A. Chakraborty, Massachusetts Institute of Technology
Random energy models of T cell receptor interactions

Andre Toom* and A.D. Ramos, Federal University of Pernambuco
Phase transitions in the dynamics of slow random monads