

David Jason Schwab

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*Temporary

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Education

University of California, Los Angeles. Fall 2003-present

Ph.D. in Physics (expected June, 2009)

GPA: 3.88

Cornell University, Ithaca, NY. Fall 1999-Spring 2003

BA, Majors: cum laude in Physics & Mathematics

GPA: 3.64

Research

- Department of Physics, UCLA. With Profs. Robijn Bruinsma and Alex Levine, researching role of network structure on synchronization of pre-Botzinger complex burst oscillations.
- Department of Physics, UCLA. With Prof. Sudip Chakravarty, researched glassy states in fermionic systems with strong interactions and disorder in two-dimensions.
- Department of Physics, UCLA. With Profs. Robijn Bruinsma and Joseph Rudnick, researched nucleosome positioning as a 1D statistical mechanics problem. Uncovered substantial degeneracy in positioning potential, resulting in “micro” first order transitions.
- Department of Physics, UCLA. With Prof. Sudip Chakravarty and Pallab Goswami, researched effects of disorder on quantum first order transitions using weak and strong disorder renormalization group.
- Department of Physics, UCLA. With Prof. Robijn Bruinsma and Karim Wahba, researched stability of transmembrane protein folding. Analyzed ground state degeneracy as a metric for kinetic folding traps.
- Department of Physics, UCLA. With Aaron Clauset and Sidney Redner, constructed diffusion-reaction model that predicts species mass distributions of mammals and birds.
- Department of Physics, UCLA. With Prof. Robijn Bruinsma, researched effects of tension and excluded volume on RNA folding. Constructed Landau free energy for tertiary interactions.
- Institute for Quantum Information, Caltech. With Prof. David Bacon, researched non-Abelian Hidden Subgroup Problem and its generalizations to quantum algorithms. Summer 2003
- Cornell University. With Professor David Mermin, researched Bell Inequalities with classical communication. Fall 2002

- Institute for Quantum Information, Caltech. With Dr. Barbara Terhal, researched Bell Inequalities, symmetric quasi-extensions and their relation to bound entangled states. Summer 2002
- National Institute of Standards and Technology (NIST). Worked in Fundamental Constants Data Center and Office of Electronic Commerce of Scientific and Engineering Data (ECSED), constructing Physical Reference databases. Summer 2000-Summer 2003.

Honors

- Graduate Research Mentorship Fellowship (GRMF) – UCLA, 2007
- Vice-Provost's Recognition Award – UCLA, 2006
- Outstanding TA Award, Dept. of Physics – UCLA, 2006, 2007 (honorary)
- Edwin F. Pauley Fellowship – UCLA, 2003
- Dean's List – Cornell University
- Cum laude in Physics – Cornell University

Publications

Nucleosome Switching

Authors: David J. Schwab, Robijn Bruinsma, Joseph Rudnick, Jonathan Widom
 Phys. Rev. Lett. **100**, 228105 (2008)

Rounding by Disorder of First-Order Quantum Phase Transitions: Emergence of Quantum Critical Points

Authors: Pallab Goswami, David J. Schwab, Sudip Chakravarty
 Phys. Rev. Lett. **100**, 015703 (2008)

Glassy States In Fermionic Systems With Strong Disorder and Interactions

Authors: David J. Schwab, Sudip Chakravarty
 (submitted to Phys. Rev. Lett.)

Landau Theory of RNA Folding

Authors: David J. Schwab and Robijn Bruinsma
 (submitted to J. Phys. Chem.)

How Many Species Have Mass M?

Authors: Aaron Clauset, David J. Schwab, Sidney Redner
<http://arxiv.org/abs/0808.3433>
 (accepted by The American Naturalist)

Positioning Ambiguity In Disordered 1D Hard Core Lattices

Authors: David J. Schwab Robijn Bruinsma
 (in preparation, to be submitted to Phys. Rev. E)

A Computational Model for the Robustness of Membrane Proteins

Authors: Karim Wahba, David J. Schwab Robijn Bruinsma
(in preparation, to be submitted to PNAS)

Endogenous versus Exogenous Origins of Diseases

Authors: D. Sornette, V.I. Yukalov, E.P. Yukalova, J.Y. Henry, D.J. Schwab, J.P. Cobb
<http://arxiv.org/abs/0710.3859>
(submitted to J. Theor. Bio.)

Local Hidden Variable Theories for Quantum States

Authors: Barbara M. Terhal, Andrew C. Doherty, David Schwab
Phys. Rev. Lett. **90**, 157903 (2003)

Vibrational branching ratios and asymmetry parameters in the photoionization of CO₂ in the region between 650 Å and 840 Å

Web database developer
<http://www.physics.nist.gov/PhysRefData/CO2/Html/contents.html>

X-Ray Transition Energies Database

Web database developer
<http://www.physics.nist.gov/PhysRefData/XrayTrans/index.html>

Atomic Weights and Isotopic Compositions Database

Web database developer
<http://www.physics.nist.gov/PhysRefData/Compositions/index.html>

Talks/Conferences/Other Activities

Emergent Pacemakers, Jack Feldman Group, September 2008

Co-supervised (with R. Bruinsma) undergraduate student researcher, Summer 2008

Gordon Conference on Strongly Correlated Electrons, June, 2008

Poster on Glassy States in 2D, Gordon Conference on Strongly Correlated Electrons, June, 2008

Nucleosome Dynamics, APS March Meeting, March, 2008

Biophysics Bootcamp, Rob Phillips Group, Caltech, September, 2007

Boulder School in Condensed Matter Physics, July, 2007

Poster on Nucleosome Switching, Boulder School in Condensed Matter Physics, July, 2007

Nucleosome Positioning, Jonathan Widom Group, Northwestern University, March, 2007

Nucleosome Positioning, APS March Meeting, March, 2007

RNA Folding, APS March Meeting, March, 2006