

# Kay Kirkpatrick

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*Courant Institute, 251 Mercer St., New York, NY 10012*

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## Research Interests

Statistical mechanics, PDEs, stochastic processes, physics, and computational biology.

## Education

Massachusetts Institute of Technology    Visiting doctoral student, 2005-2007

University of California, Berkeley    Ph.D. in math, 2007

Thesis Title: "Rigorously deriving the Landau equation in the weak coupling limit"

Advisor: Fraydoun Rezakhanlou

Montana State University, Bozeman    B.S. in Mathematics, 2002

## Academic Appointments

New York University, Courant Instructor/PIRE Fellow, since 2009

Massachusetts Institute of Technology, NSF postdoctoral fellow, 2007 - 2009

## Fellowships and Scholarships

Courant/NSF PIRE Fellowship, dates to be determined

National Science Foundation Mathematical Sciences Postdoctoral Fellowship, 2007 - 2009

AAUW American Dissertation Fellowship, 2006 - 2007

National Science Foundation Graduate Research Fellowship, 2002 - 2005

Phi Kappa Phi, Kathleen Greey Graduate Fellowship, 2002 - 2003

Barry Goldwater Math and Science Scholarship, 2001 - 2002

Montana Space Grant Consortium Scholarship, 2000 - 2001

Robert Byrd Memorial Scholarship, 1998 - 2002

MSU-Bozeman Presidential Scholarship, 1998 - 2002

Mares Foundation Piano Scholarship, 1998 - 2002

## Prizes and Awards

Alice T. Schafer Prize (awarded to top undergraduate woman in math nationwide), 2002

USA Today All-American Academic Third Team Member, 2002

Dean's Award for Academic Excellence in the College of Letters and Science, MSU, 2002

## Academic Talks

Pacific Institute for the Mathematical Sciences, Workshop on nonlinear dispersive and geometric evolution problems, Aug. 21, 2009.

Centre de Recherches Mathematiques, Workshop on Spin Glasses, June 12, 2009.

Centre de Recherches Mathematiques, Workshop on Interacting Stochastic Particle Systems, May 21, 2009.

Montana State University special colloquium, Apr. 16, 2009.

- Courant Institute, NYU, probability seminar, Mar. 27, 2009.  
 Case Western Reserve University Applied Math seminar, Mar. 16, 2009.  
 MIT PDE/analysis seminar, Feb. 25, 2009.  
 Boston University Dynamical Systems seminar, Jan. 29, 2009.  
 University of Rochester colloquium, Jan. 27, 2009.  
 UC Berkeley Analysis and Partial Differential Equations seminar, Sept. 22, 2008.  
 Clay Math Summer School in Zürich on Evolution Equations talk, July 16, 2008.  
 Case Western Reserve University math department colloquium, Oct. 19, 2007.  
 MIT Partial Differential Equations and Analysis seminar, Dec. 6, 2006.  
 UC Berkeley partial differential equations and probability seminars, April - May, 2005.  
 American Mathematical Society special session at the Joint Meetings, January 2002.  
 University of Houston Math Research Experience for Undergraduates:  
 “The Shilov boundary of operator spaces,” July 2001.  
 North Carolina State University Mathematics Modeling Workshop for Graduate Students:  
 “Modeling HIV infection dynamics using delay differential equations,” July 2000.

## Publications

- Kirkpatrick, K.; Lenzmann, E.; and Staffilani, G. “Quantum lattice systems and fractional nonlinear Schrödinger equations.” Preprint.  
 Kirkpatrick, K.; Schlein, B.; and Staffilani, G. “Derivation of the two dimensional nonlinear Schrodinger equation from many body quantum dynamics.” To appear, AJM.  
 Kirkpatrick, K. “Rigorous derivation of the Landau equation in the weak coupling limit.” To appear, CPAA.  
 Blecher, D.; Kirkpatrick, K.; Neal, M.; and Werner, W. “Ordered involutive operator spaces.” Positivity, vol. 11, 2007, 497-509.  
 Teppo, Anne R., Esty, Warren W., and Kirkpatrick, Kay. “The Assessment of Mathematical Logic: Abstract Patterns and Familiar Contexts,” Psychology in Mathematics Education, Proceedings of the 25th Annual Meeting, July 2003, 283-290.  
 Kirkpatrick, K. “The Shilov Boundary and  $M$ -structure of Operator Spaces.” University of Houston mathematics preprint journal, August 2001.  
 Bortz, D.; Guy, B.; Hood, J.; Kirkpatrick, K.; Nguyen, V.; and Shimanovich, V. “Modeling HIV infection dynamics using delay differential equations.” CRSC Technical Report (Pierre A. Gremaud, Zhilin Li, Ralph C. Smith, and Hien T. Tran, eds.) CRSC-TR00-24, October 2000.

## Articles in Preparation

- Ben Arous, G. and Kirkpatrick, K. “Large deviations in mean-field boson systems.”  
 Blanchet, J. and Kirkpatrick, K. “A large deviations algorithm for mean-field bosons.”  
 Chatterjee, S. and Kirkpatrick, K. “A phase transition in invariant measures for the nonlinear Schrödinger equation.”  
 Kirkpatrick, K. and Meckes, E. “Asymptotic distribution of the average spin in the spherical Ising model.”  
 Kirkpatrick, K. and Rezakhanlou, F. “Evolution of a tagged particle in the Boltzmann-Grad limit.”

## Conferences Attended

Clay Math Summer School on Evolution Equations in Zürich; June 22 - July 18, 2008  
 IAS/Park City Math Institute Research Program on Statistical Mechanics; July 1-21, 2007  
 MSRI Connections for Women: Dynamical Systems; January 18-19, 2007  
 International Conference on Stochastic Analysis and PDEs; Northwestern University; June 2005  
 Geometric and Nonlinear Analysis Conference; University of Notre Dame; September 2004  
 Analysis on Manifolds; Swiss Mathematical Society; Fribourg, Switzerland; June 2004  
 Conference on Spectral Analysis in Geometry and Physics; University of California, San Diego; January 2003

## Teaching

New York University, Calculus II, fall 2009  
 Stanford University Educational Program for Gifted Youth instructor, math, summer 2007  
 Stanford University instructor, Ordinary Differential Equations, summer 2006  
 Stanford University Mathematics Camp counselor, summers 2003 - 2006  
 Montana State University instructor, Language of Mathematics, 2001 - 2002

## Employment

Center for Computational Biology, MSU, research assistant, 1999 - 2002  
 Complex Biological Systems, MSU, summer research assistant, 2000

## Other Activities

Girls' Angle mentor, Bulletin editor, member of advisory board, Fall 2008 to present  
 Stanford University Mathematics Camp guest lecture: "A random walk through statistical mechanics," July 27, 2007.  
 MIT's women mathematicians group, August 2005 to present  
 Noetherian Ring, Berkeley's female mathematicians' group, 2002 - 2007  
 Expanding Your Horizons group leader, panel member, and program presenter, 2001 - 2002  
 Languages: French, Spanish, ancient Greek, and German

## References

Fraydoun Rezakhanlou, UC Berkeley  
 Gigliola Staffilani, MIT  
 Sourav Chatterjee, UC Berkeley/Courant  
 Horng-Tzer Yau, Harvard  
 Lawrence Craig Evans, UC Berkeley  
 Rafe Mazzeo, Stanford  
 Ravi Vakil, Stanford (teaching)