

Cristopher Moore

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April 30, 2008

1 Education

Born March 12, 1968 in New Brunswick, New Jersey.

Northwestern University, B.A. in Physics, Mathematics, and the Integrated Science Program, with departmental honors in all three departments, 1986.

Cornell University, Ph.D. in Physics, 1991. Philip Holmes, advisor. Thesis: “Undecidability and Unpredictability in Dynamical Systems.”

2 Employment

Research Professor, Santa Fe Institute	Fall 2007
Associate Professor, Computer Science Department with a joint appointment in the Department of Physics and Astronomy. University of New Mexico, Albuquerque	2005-present
Assistant Professor, University of New Mexico	2000-2005
Research Professor, Santa Fe Institute	1998-1999
City Councilor, District 2, Santa Fe	1994-2002
Postdoctoral Fellow, Santa Fe Institute	1992-1998
Lecturer, Cornell University	Spring 1991
Graduate Intern, Niels Bohr Institute/NORDITA, Copenhagen	Summers 1988 and 1989
Teaching Assistant, Cornell University Physics Department	Fall 1986-Spring 1990
Computer programmer, Bio-Imaging Research, Lincolnshire, Illinois	Summers 1984-1986

3 Appointments

Visiting Professor, University of Michigan, Ann Arbor	September-October 2005
Visiting Professor, École Normale Supérieure du Lyon	June 2004
Visiting Professor, Institut Universitaire de France	June 2003
Visiting Professor, Université Paris 7 (Denis Diderot)	June 2001 and 2002
External Faculty, Santa Fe Institute	2000-present
Visiting Professor, École Polytechnique	September 1999

4 Fellowships and awards

University of New Mexico School of Engineering Outstanding Senior Faculty Award for Excellence in Research, 2007

University of New Mexico School of Engineering Outstanding Junior Faculty Award for Excellence in Teaching, 2002

University of New Mexico School of Engineering Outstanding Junior Faculty Award for Excellence in Research, 2002

National Science Foundation Graduate Fellowship, 1986-1989

Clark Award for Best Teaching Assistant, 1987

Marcy Award for Undergraduate Independent Study, 1986

Richter Fellowship for Undergraduate Independent Study, 1985

Phi Beta Kappa, 1985

5 Publications

5.1 Books and book chapters

S. Mertens and C. Moore, *The Nature of Computation*. Oxford University Press, in progress.

A. Percus, G. Istrate, and C. Moore, Eds., *Computational Complexity and Statistical Physics*. Oxford University Press, 2005.

D. Griffeath and C. Moore, Eds., *New Constructions in Cellular Automata*. Oxford University Press, 2003.

“Limiting the Computational Power of Recurrent Neural Networks: VC Dimension and Noise.” In J. Kolen and S. Kremer, Eds., *A Field Guide to Dynamical Recurrent Networks*. IEEE Press, 2001.

5.2 Journal articles

Please note that author order in theoretical computer science is almost always alphabetical.

A. Clauset, C. Moore, and M. E. J. Newman, “Hierarchical structure and the prediction of missing links in networks.” *Nature*, to appear.

D. Achlioptas, A. Clauset, D. Kempe, and C. Moore, “On the bias of traceroute sampling: or, power-law degree distributions in regular graphs.” *Journal of the ACM*, to appear.

C. Moore, A. Russell, and L.J. Schulman, “The symmetric group defies strong Fourier sampling.” *SIAM Journal on Computing* **37** 1842–1864 (2008). Invited paper in special issue for FOCS 2005.

R.M. D’Souza, P.L. Krapisky, and C. Moore, “The power of choice in growing trees.” *European Journal of Physics B* **59** 535–543 (2007).

C. Moore and A. Russell, “For distinguishing conjugate hidden subgroups, the Pretty Good Measurement is as good as it gets.” *Quantum Information and Computation* **7** 752–765 (2007).

C. Moore, D. Rockmore, A. Russell, and L.J. Schulman, “The value of strong Fourier sampling: quantum algorithms for affine groups and hidden shifts.” *SIAM Journal on Computing* **37** 938–958 (2007).

C. Moore, G. Istrate, D. Demopoulos, and M.Y. Vardi, “A continuous-discontinuous second-order transition in the satisfiability of random Horn-SAT formulas.” *Random Structures and Algorithms* **31** (2007) 173–185.

- H. Jia, C. Moore, and D. Strain, “Generating hard satisfiable formulas by hiding solutions deceptively.” *Journal of Artificial Intelligence Research* **28** (2007) 107–118.
- T. Berger-Wolfe, C. Moore, and J. Saia, “A computational approach to animal breeding.” *Journal of Theoretical Biology* **244** (2007) 433–439.
- C. Moore, D. Rockmore, and A. Russell, “Generic quantum Fourier transforms.” *ACM Transactions on Algorithms* **2** (2006) 707–723. Invited paper in special issue for SODA 2004.
- D. Achlioptas and C. Moore, “Two moments suffice to cross a sharp threshold.” *SIAM Journal on Computing* **36** (2006) 740–762.
- C. Moore and M. Nauenberg, “New periodic orbits for the n -body problem.” *Journal of Computational and Nonlinear Dynamics* **1** (2006) 271–367. Special issue for Philip Holmes’ 60th birthday.
- A. Coja-Oghlan, C. Moore, and V. Sanwalani, “Counting connected graphs and hypergraphs via the probabilistic method.” *Random Structures and Algorithms* **28** (2006) 289–322.
- C. Moore, G. Ghoshal, and M. E. J. Newman, “Exact solutions for models of evolving networks with addition and deletion of nodes.” *Physical Review E* **74** (2006) 036121.
- C.R. Shalizi, R. Haslinger, J.-B. Rouquier, K.L. Klinkner, and C. Moore, “Automatic filters for the detection of coherent structure in spatiotemporal systems.” *Physical Review E* **73** (2006) 036104.
- A. Coja-Oghlan, C. Moore, and V. Sanwalani, “MAX k -CUT and approximating the chromatic number of random graphs.” *Random Structures and Algorithms* **28** (2006) 289–322.
- V. Kalapala, V. Sanwalani, A. Clauset, and C. Moore, “Scale invariance in road networks.” *Physical Review E* **73** (2006) 026130.
- D. Achlioptas, M. Molloy, C. Moore, and F. Van Bussel, “Rapid mixing for lattice colorings with fewer colors.” *Journal of Statistical Mechanics* (2005) P10012.
- F. Ablayev, A. Gainutdinova, M. Karpinski, C. Moore, and C. Pollett, “On the computational power of probabilistic and quantum branching programs.” *Information and Computation* **203** (2005) 145–162.
- P. Beame, J. Culberson, D. Mitchell, and C. Moore, “The resolution complexity of random graph k -colorability.” *Discrete Applied Mathematics* **153** (2005) 25–47.
- D. Achlioptas, H. Jia, and C. Moore, “Hiding satisfying assignments: two are better than one.” *Journal of Artificial Intelligence Research* **24** (2005) 623–639.
- A. Clauset and C. Moore, “Accuracy and scaling phenomena in Internet mapping.” *Physical Review Letters* **94** (2005) 018701.
- A. Clauset, M.E.J. Newman, and C. Moore, “Finding community structure in very large networks.” *Physical Review E* **70** (2004) 066111.
- J. Kari and C. Moore, “Rectangles and squares recognized by two-dimensional automata.” In *Theory Is Forever, Essays Dedicated to Arto Salomaa on the Occasion of His 70th Birthday*. J. Karhumäki, H. Maurer, G. Paun, and G. Rozenberg, Eds. *Lecture Notes in Computer Science* **3113** (2004) 134–144.
- M. Lachmann, M.E.J. Newman, and C. Moore, “The Physical Limits of Communication, or why any sufficiently advanced technology is indistinguishable from noise.” *American Journal of Physics* **72** (2004) 1290–1293.
- D. Achlioptas and C. Moore, “Almost all graphs of degree 4 are 3-colorable.” *Journal of Computer and System Sciences*, **67** (2003) 441–471. Invited paper in special issue for STOC 2002.
- M. Campagnolo, C. Moore, and J.F. Costa, “An analog characterization of the Grzegorzcyk hierarchy.” *Journal of Complexity*. **18** (2002) 977–1000.

- C. Moore and I. Pak, “Ribbon tile invariants from signed area.” *Journal of Combinatorial Theory Ser. A* **98** (2002) 1–16.
- F. Green, S. Homer, C. Moore, and C. Pollett, “Counting, fanout, and the complexity of quantum ACC.” *Quantum Information and Computation* **2(1)** (2002) 35–65.
- C. Moore and M. Nilsson, “Parallel quantum computation and quantum codes.” *SIAM Journal on Computing* **31(3)** (2001) 799–815.
- F. Lemieux, C. Moore, and D. Thérien, “Subtree-counting loops.” *Quasigroups and Related Systems* **8** (2001) 45–65.
- C. Moore and J.M. Robson, “Hard tiling problems with simple tiles.” *Discrete and Computational Geometry* **26(4)** (2001) 573–590.
- F. Lemieux, C. Moore, and D. Thérien, “Polyabelian loops and Boolean-completeness.” *Commentationes Mathematicae Universitatis Carolinae* **41** (2000) 671–686.
- M. Campagnolo, C. Moore, and J.F. Costa, “Iteration, inequalities, and differentiability in analog computers.” *Journal of Complexity* **16** (2000) 642–660.
- C. Moore and J. Machta, “Internal diffusion-limited aggregation: parallel algorithms and complexity.” *Journal of Statistical Physics* **99** (2000) 661–690.
- C. Moore and M. E. J. Newman, “Height representation, critical exponents, and ergodicity in the four-state triangular Potts antiferromagnet.” *Journal of Statistical Physics* **99** (2000) 629–660.
- C. Moore and J.P. Crutchfield, “Quantum automata and quantum grammars.” *Theoretical Computer Science* **237** (2000) 275–306.
- C. Moore, D. Thérien, F. Lemieux, J. Berman, and A. Drisko, “Circuits and expressions with non-associative gates.” *Journal of Computer and System Sciences* **60** (2000) 368–394.
- C. Moore and M.E.J. Newman, “Exact solution of site and bond percolation on small-world networks.” *Physical Review E* **62** (2000) 7059–7064.
- C. Moore and M.E.J. Newman, “Epidemics and percolation in small-world networks.” *Physical Review E* **61** (2000) 5678–5682.
- M.E.J. Newman, C. Moore, and D.J. Watts, “Mean-field solution of the small-world network model.” *Physical Review Letters* **84** (2000) 3201–3204.
- C. Moore and P. Lakdawala, “Queues, stacks, and transcendentality at the transition to chaos.” *Physica D* **135** (2000) 24–40.
- M.E.J. Newman and C. Moore, “Glassy dynamics in an exactly solvable spin model.” *Physical Review E* **60** (1999) 5068–5072.
- C. Moore, M.G. Nordahl, N. Minar, and C. Shalizi, “Vortex dynamics and entropic forces in antiferromagnets and antiferromagnetic Potts models.” *Physical Review E* **60** (1999) 5344–5351.
- C. Moore and M. Nilsson, “The computational complexity of sandpiles.” *Journal of Statistical Physics* **96** (1999) 205–224.
- P. Koiran and C. Moore, “Closed-form analytic maps in one and two dimensions can simulate universal Turing Machines.” *Theoretical Computer Science* **210(1)** (1999) 217–223, Special Issue on Real Numbers.
- C. Moore, “Predicting non-linear cellular automata quickly by decomposing them into linear ones.” *Physica D* **111** (1998) 27–41.
- K. Lindgren, C. Moore, and M.G. Nordahl, “Complexity of two-dimensional patterns.” *Journal of Statistical Physics* **91** (1998) 909–951.

- C. Moore, “Dynamical recognizers: real-time language recognition by analog computers.” *Theoretical Computer Science* **201** (1998) 99–136.
- C. Moore, “Majority-vote cellular automata, Ising dynamics, and P-completeness.” *Journal of Statistical Physics* **88** (1997) 795–805.
- C. Moore, “Quasi-linear cellular automata.” *Physica D* **103** (1997) 100–132.
- C. Moore and T. Boykett, “Commuting cellular automata.” *Complex Systems* **11** (1997) 55–64.
- D. Griffeath and C. Moore, “Life without death is P-complete.” *Complex Systems* **10** (1996) 437–447.
- C. Moore, “Recursion theory on the reals and continuous-time computation.” *Theoretical Computer Science* **162** (1996) 23–44.
- C. Moore and A. Drisko, “Algebraic properties of the block transformation on cellular automata.” *Complex Systems* **10(3)** (1996) 185–194.
- C. Moore, “Braids in classical dynamics.” *Physical Review Letters* **70** (1993) 3675–3679.
- C. Moore, “Generalized one-sided shifts and maps of the interval.” *Nonlinearity* **4** (1991) 727–745.
- C. Moore, “Generalized shifts: undecidability and unpredictability in dynamical systems.” *Nonlinearity* **4** (1991) 199–230.
- C. Moore, “Undecidability and unpredictability in dynamical systems.” *Physical Review Letters* **64** (1990) 2354–2357.
- C. Moore, “Comment on ‘Space-time as a causal set’.” *Physical Review Letters* **60** (1988) 655.

5.3 Refereed conference proceedings

- C. Moore, A. Russell, and P. Śniady, “On the impossibility of a quantum sieve algorithm for Graph Isomorphism.” *Proc. 39th Symp. on Theory of Computing* (STOC ’07), 536–545.
- G. Alagic, C. Moore, and A. Russell, “Quantum algorithms for Simon’s problem over general groups.” *Proc. 18th Symp. on Discrete Algorithms* (SODA ’07), 1217–1224.
- S. Hallgren, C. Moore, M. Rötteler, A. Russell, and P. Sen, “Limitations of quantum coset states for Graph Isomorphism.” *Proc. 38th Symp. on Theory of Computing* (STOC ’06), 604–617.
- R. D’Souza, D. Galvin, C. Moore, and D. Randall, “Global connectivity from local geometric constraints for sensor networks with various wireless footprints.” *Proc. 6th Intl. Conf. on Information Processing in Sensor Networks* (IPSN ’06), 19–26.
- A. Clauset, C. Moore, and M. E. J. Newman, “Structural inference of hierarchies in networks.” *Proc. Workshop on Statistical Network Analysis, International Conference on Machine Learning* (ICML ’06). E. M. Airoldi et al., Eds., *Lecture Notes in Computer Science* **4503**, 1–13.
- C. Moore, A. Russell, and L.J. Schulman, “The symmetric group defies strong Fourier sampling.” *Proc. 46th Foundations of Computer Science* (FOCS ’05), 479–490.
- D. Achlioptas, A. Clauset, D. Kempe, and C. Moore, “On the bias of traceroute sampling, or: why almost every network looks like it has a power law.” *Proc. 37th Symp. on Theory of Computing* (STOC ’05), 694–703.
- H. Jia, C. Moore, and D. Strain, “Generating hard satisfiable formulas by hiding solutions deceptively.” *Proc. 20th Natl. Conf. on Artificial Intelligence* (AAAI ’05), 384–389.
- C. Moore, G. Istrate, D. Demopoulos and M. Vardi, “A continuous-discontinuous second-order transition in the satisfiability of random Horn-SAT formulas.” *Proc. 9th Intl. Workshop on Randomization and Computation* (RANDOM ’05), 414–425.

- C. Moore, D. Rockmore, and A. Russell, “Generic quantum Fourier transforms.” *Proc. 15th Symp. on Discrete Algorithms* (SODA ’04), 778–787.
- C. Moore, D. Rockmore, A. Russell, and L.J. Schulman, “The value of basis selection in Fourier sampling: hidden subgroup problems for affine groups.” *Proc. 15th Symp. on Discrete Algorithms* (SODA ’04), 1113–1122.
- D. Achlioptas, H. Jia, and C. Moore, “Hiding satisfying assignments: two are better than one.” *Proc. 19th Natl. Conf. on Artificial Intelligence* (AAAI ’04), 131–136.
- D. Achlioptas and C. Moore, “The chromatic number of random regular graphs.” *Proc. 8th Intl. Workshop on Randomization and Computation* (RANDOM ’04), 219–228.
- A. Coja-Oghlan, C. Moore, and V. Sanwalani, “Counting connected graphs and hypergraphs via the probabilistic method.” *Proc. 8th Intl. Workshop on Randomization and Computation* (RANDOM ’04), 322–333.
- H. Jia and C. Moore, “How much backtracking does it take to color random graphs? Rigorous results on heavy tails.” *Proc. 10th Intl. Conference on Principles and Practice of Constraint Programming* (CP ’04). *Lecture Notes in Computer Science* **3258** (2004), 742–746.
- H. Jia, C. Moore, and B. Selman, “From spin glasses to hard satisfiable formulas.” *Proc. 7th Intl. Conf. on Theory and Applications of Satisfiability Testing* (SAT ’04), 12–19.
- D. Achlioptas, F. von Bussel, M. Molloy, and C. Moore, “Sampling grid colorings with fewer colors.” *Proc. Latin American Theoretical Informatics Symposium* (LATIN ’04) 80–89.
- C. Morgan, D. Stefanovic, C. Moore, and M. N. Stojanovic, “Building the components for a biomolecular computer.” *Proc. 10th Intl. Meeting on DNA Computing* (DNA 10, ’04).
- A. Coja-Oghlan, C. Moore, and V. Sanwalani, “MAX k -CUT and approximating the chromatic number of random graphs.” *Proc. Intl. Colloquium on Automata, Languages and Programming* (ICALP ’03) 200–211.
- D. Achlioptas and C. Moore, “The asymptotic order of the k -SAT threshold.” *Proc. 43rd Foundations of Computer Science* (FOCS ’02) 779–788.
- D. Achlioptas and C. Moore, “Almost all graphs of average degree 4 are three-colorable.” *Proc. 34th Symp. on Theory of Computing* (STOC ’02) 199–208.
- F. Ablyayev, C. Moore, and C. Pollett, “Quantum branching programs of bounded width.” *Proc. 29th Intl. Colloquium on Automata, Languages and Programming* (ICALP ’02) 343–354.
- C. Moore, I. Rapaport, and E. Rémila, “Tiling groups for Wang tiles.” *Proc. 13th Symp. on Discrete Algorithms* (SODA ’02) 402–211.
- C. Moore and A. Russell, “Quantum walks on the hypercube.” *Proc. 6th Intl. Workshop on Randomization and Approximation Techniques in Computer Science* (RANDOM ’02) 164–178.
- D. Achlioptas and C. Moore, “On the two-colorability of random hypergraphs.” *Proc. 6th Intl. Workshop on Randomization and Approximation Techniques in Computer Science* (RANDOM ’02) 78–90.
- E. Allender, S. Arora, M. Kearns, C. Moore, and A. Russell, “A Note on the Representational Incompatibility of Function Approximation and Factored Dynamics.” *Proc. 16th Ann. Conf. on Neural Information Processing Systems* (NIPS ’02)
- C. Moore, P. Tesson, and D. Thérien, “Satisfiability of systems of equations over finite monoids.” *Proc. 26th Intl. Symp. on Mathematical Foundations of Computer Science* (MFCS ’01) 537–547.
- J. Linde, C. Moore, and M.G. Nordahl, “An n -dimensional generalization of the rhombus tiling.”
- M. Morvan, R. Cori, J. Mazoyer and R. Mosseri, Eds., *Proc. 1st Intl. conference on Discrete Models: Combinatorics, Computation, and Geometry* (DM-CCG’01) 23–42.

- J. Kari and C. Moore, “New results on alternating and non-deterministic two-dimensional finite-state automata.” *Proc. Symp. on Theoretical Aspects of Computer Science (STACS '01)* 396–406.
- D. Achlioptas, A. Chtcherba, G. Istrate, and C. Moore, “The phase transition in 1-in- k SAT and NAE 3-SAT.” *Proc. 12th Symp. on Discrete Algorithms (SODA '01)* 721–722.
- M.L. Campagnolo and C. Moore, “Upper and lower bounds on continuous-time computation.” *Proc. 2nd Intl. Conf. on Unconventional Models of Computation (UMC '00)* 135–153.
- M. Lachmann, C. Moore, and I. Rapaport, “Who wins Domineering on rectangular boards?” In R.J. Nowakowski, Ed., *More Games of No Chance (MSRI Workshop on Combinatorial Games, 2000)* 307–315.
- C. Moore and D. Eppstein, “One-dimensional peg solitaire, and duotaire.” In R.J. Nowakowski, Ed., *More Games of No Chance (MSRI Workshop on Combinatorial Games, 2000)* 341–350.
- D.M. Barrington, P. McKenzie, C. Moore, P. Tesson, and D. Thérien, “Equation satisfiability and program satisfiability for finite monoids.” *Proc. 25th Intl. Symp. on Mathematical Foundations of Computer Science (MFCS '00)* 172–181.
- M. Campagnolo and C. Moore, “An analog characterization of the subrecursive functions.” *Proc. 4th Real Numbers and Computers (RNC '00)* 91–110.
- C. Moore, “Finite-dimensional analog computers: flows, maps, and recurrent neural networks.” *Proc. 1st Intl. Conf. on Unconventional Models of Computation (UMC '98)*.
- J. Berman, A. Drisko, C. Moore, F. Lemieux, and D. Thérien, “Circuits and expressions with non-associative gates.” *Proc. 12th Ann. IEEE Conf. on Computational Complexity (1997)* 193–203.
- C. Moore, “Dynamical recognizers: real-time language recognition by analog computers.” In F. Cucker and M. Shub, Eds., *Foundations of Computational Mathematics*. Springer-Verlag (1997).

6 Funding (Principal Investigator)

- NSF EMT (Emerging Models and Technologies for Computation) with Alex Russell, “The Quantum Complexity of Algebraic Problems.” \$180,000, 2005–2008.
- ARO with Wim van Dam and Alex Russell, “Quantum Algorithms for Algebraic Problems.” \$600,000, 2005–2008.
- NSF Medium ITR with Darko Stefanovic and Milan Stojanovic, “Solution-Phase Computation with Enzymatic Networks.” \$3M, 2003–2008.
- NSF Small ITR with Alex Russell and Daniel Rockmore, “Complexity-Theoretic Applications of non-Abelian Fourier Analysis.” \$195,000, 2002–2005.
- NSF QuBIC with Alex Russell, “Quantum Monte Carlo Algorithms.” \$175,000, 2002–2005.
- NSF Physics, “Phase Transitions and Critical Phenomena in NP-complete Problems.” \$166,000, 2002–2005.
- NSF Physics, “Computational Complexity in Statistical and Quantum Physics.” \$80,000, 2000–2002.
- Los Alamos National Laboratory, “Phase Transitions in NP-complete Problems.” \$25,000, 2002.
- Sandia University Research Program (SURP), “Phase Transitions in NP-complete Problems.” \$35,000, 2001–2002.
- Sandia University Research Program (SURP), “Tilings and self-assembly.” \$35,000, 2000–2001.

7 Invited talks at conferences and selected seminars

MIT Quantum Information Science seminar. MIT, October 2007.

Workshop on Advances in Quantum Algorithms, University of Waterloo, June 2007.

CNLS symposium on Algorithms, Inference, and Statistical Physics, May 2007.

Syracuse University Physics Colloquium and Condensed Matter Seminar, April 2007.

DIMACS/Georgia Tech Workshop on Complex Networks and their Applications, January 2007.

Invited plenary talk, “A Tale of Two Cultures: Phase Transitions in Physics and Computer Science.” European Conference on Complex Systems, Oxford, September 2006.

SIAM Conference on Discrete Mathematics, minisymposium on Random Constraint Satisfaction Problems: from Physics to Algorithms. Victoria, June 2006.

MIT Quantum Information Seminar seminar. MIT, April 2006.

Invited plenary talk, “Fourier Sampling, Representations, and the Hunt for a Quantum Algorithm for Graph Isomorphism.” Quantum Information Processing (QIP), Paris, 2006.

UC Berkeley Theory Lunch, November 2005.

Lectures on Networks, Epidemics, Phase Transitions, and Constraints. University of Michigan, Ann Arbor, 2005.

Invited plenary talk, “Fearful Symmetries: Factoring, Graph Isomorphism, and Quantum Computing.” ALGO/ESA, Palma de Mallorca, 2005.

Institute for Quantum Information seminar. Caltech, 2005.

Quantum Institute Theory Workshop. Los Alamos National Laboratory, 2005.

Optimization Algorithms and Quantum Disordered Systems. Institut Henri Poincaré, Paris, 2004.

AMS Session on Probability and Applications in Combinatorics and Algorithms. Phoenix, 2004.

International Conference on Discrete Models for Complex Systems. Lyon, 2003.

Conference on Typical-Case Complexity, Randomness and Analysis of Search Algorithms. Abdus Salam International Center for Theoretical Physics, Trieste, 2002.

MIT Combinatorics Seminar, 2002.

Workshop on Phase Transitions and Algorithmic Complexity. Institute for Pure and Applied Mathematics, Los Angeles, 2002.

Mini-Symposium on Quantum Computing. Texas A&M University, 2001.

Intl. Conference on Discrete Models, Combinatorics, Computation, and Geometry. Paris, 2001.

NATO Advanced Study Institute on Complexity from Microscopic to Macroscopic Scales: Coherence and Large Deviations. Geilo, Norway 2001.

AMS Session on Quasigroups and Loops. Notre Dame, 2000.

Intl. Conference on the Conceptual Foundations of Statistical Mechanics. Jerusalem, 2000.

INRIA Algorithms Seminar. Versailles, 1999.

MIT Physics of Computation Seminar, 1998.

Second Intl. Conf. on Complex Systems. New England Complex Systems Institute, 1998.

First International Conference on Unconventional Models of Computation. Auckland, 1998.

McGill University Workshop on Computational Complexity. Bellairs Research Institute, 1997.

Neural Information Processing Systems (NIPS) Workshop on Dynamic Recurrent Neural Networks. Snowmass, Colorado 1996.

Altenberg Workshop on Theoretical Biology. Altenberg, Austria, 1996.

8 Teaching

8.1 Courses taught at UNM

Data Structures and Algorithms	Spring and Fall '02, Fall '03, Fall '04, Fall '06
Combinatorics, Probability, and Computation	Fall '06
Introduction to the Theory of Computation (grad)	Spring '04, Spring '07
Introduction to the Theory of Computation (undergrad)	Spring '03
Introduction to Quantum Computation	Fall '04
Theoretical Foundations of Computer Science	Fall '03
Physics and Computation	Spring '00, Spring '01, Spring and Fall '02, Spring '04
Intermediate Object-Oriented Programming	Fall '00, Fall '01

8.2 Courses taught elsewhere

January 2003: Complex Systems Summer School. Valparaiso, Chile.

Summer 2001, 2002, 2006, 2007: Santa Fe Institute Complex Systems Summer School, Budapest.

Spring 2001: Short Course on Computational Complexity for the NSF Physics Graduate Student Fellowship program at the Santa Fe Institute.

Summer 1996 and 1997: Short Course on Computational Complexity at the Santa Fe Institute.

Summer 1993: Santa Fe Institute Complex Systems Summer School, Santa Fe.

Spring 1991: Cornell University, “Components, Systems, and Society: Science and Engineering in a Social Context” (with Zellman Warhaft, Mechanical and Aerospace Engineering).

8.3 Students supervised

Current students: Tiffany Pierce (M.S., Computer Science), Aaron Denney (Ph.D., Physics).

Haixia Jia, Ph.D. 2007 with distinction. Thesis: “Hard Problems with Hidden Solutions.”

Aaron Clauset, Ph.D. 2006 with distinction. Thesis: “Structural Inference and the Statistics of Networks.” Now a postdoc at the Santa Fe Institute

Vishal Sanwalani, Ph.D. 2005 with distinction. Thesis: “Applications of the Probabilistic Method to Random Graphs.” Postdocs at the University of Waterloo and at Microsoft Research.

Vamsi Kalapala, M.S. 2005. Thesis: “Results on Phase Transitions and Scale Invariance.”

Douglas Strain, M.S. 2005.

Qian Liang, M.S. 2003. Thesis: “The Evolution of Mulan: Some Studies in Game-Tree Pruning and Evaluation Functions in the Game of Amazons.” Now at Microsoft.

Manuel Campagnolo. Ph.D. 2002 from the Lisbon University of Technology (co-advised with José Felix Costa). Thesis: “Computational Complexity of Real-valued Recursive Functions and Analog Circuits.” Now an Associate Professor of Mathematics at the Lisbon University of Technology.

9 Professional activities

9.1 Organizing and program committees

Organizing Committee, Quantum Information Processing (QIP) 2009.

Steering Committee, Quantum Information Processing (QIP) 2008.

Co-organizer (with Sue Coppersmith, Jon Machta, and Alan Middleton), Workshop on Complexity, Disorder, and Algorithms. Aspen Center for Physics, Summer 2008.

Program Committee, Intl. Workshop on Randomization and Computation (RANDOM) 2007.

Co-organizer (with Paul Bourguine and Michel Morvan), Scaling in Biological and Social Networks. Santa Fe, 2007.

Co-organizer (with Persi Diaconis, Daniel Fisher, and Charles Radin), Phase Transitions in Physics, Computer Science, Combinatorics and Probability. American Institute of Mathematics, 2006.

Program Committee, Intl. Conf. on Theory and Applications of Satisfiability Testing (SAT) 2006.

Co-organizer (with Michel Morvan), New Perspectives on Complex Systems. Santa Fe, 2005.

Program Committee, Intl. Colloquium on Automata, Languages and Programming (ICALP) 2004.

Co-organizer (with Rajarshi Das, Irina Rish, and Gerry Tesauro) of the Workshop on Robust Communication Dynamics in Complex Networks. NIPS, Whistler, Canada, 2003.

Program Committee, Discrete Models for Complex Systems. Lyon, June 2003.

Co-organizer (with Dana Randall), special session of the joint AMS/MAA national meeting on Discrete Models. Baltimore, January 2003.

Program Committee, Symposium on Theoretical Aspects of Computer Science (STACS) 2002.

Co-organizer (with Allon Percus and Gabriel Istrate), workshop on “Computational Complexity and Statistical Physics.” Santa Fe, 2001.

9.2 Reviewing

(Computer Science) *Journal of the ACM*, *SIAM Journal of Computing*, *Theory of Computing*, *Journal of Computer and System Sciences*, *Information and Computation*, *Theoretical Computer Science*, *Information Processing Letters*, *Random Structures and Algorithms*, *Quantum Information and Computation*, *Theory of Computing Systems*, *Discrete and Computational Geometry*, *IEEE Trans. on Computers*, *IEEE Trans. on Networks*, *ACM Trans. on Modeling and Computer Simulation*, *Foundations of Computer Science (FOCS)*, *Symposium on Theory of Computing (STOC)*, *Symposium on Discrete Algorithms (SODA)*, *Randomization and Approximation Techniques in Computer Science (RANDOM)*, *Intl. Colloquium on Automata, Languages, and Programming (ICALP)*, *Symposium on Theoretical Aspects of Computer Science (STACS)*, *Mathematical Foundations of Computer Science (MFCS)*, *Computing and Combinatorics Conference (COCOON)*

(Physics) *Physical Review Letters*, *Physical Review A*, *Physical Review E*, *Physics Letters A*, *Physica D*, *Europhysics Letters*, *Intl. Journal of Modern Physics C*, *Computers in Physics*

(Other) *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society*, *Annals of Applied Probability*, *Journal of Theoretical Biology*, *Applied Artificial Intelligence*, *Neural Networks*, *Neural Computation*, *European Symposium on Artificial Neural Networks (ESANN)*, *IEEE Trans. Evolutionary Computation*, *IEEE Trans. Neural Networks*, *Intl. Journal of Neural Systems*, *Journal of Intelligent and Fuzzy Systems*, *Fluctuation and Noise Letters*, *Connection Science*, *Advances in Complex Systems*, *Chaos*, *Journal of Complexity*, *Science*, and *Nature*.