

Curriculum Vitae

Mark Huber

Associate Professor
Department of Mathematics
Claremont McKenna College
850 Columbia Avenue
Claremont, CA 91711

(909) 607-0938 (office)
mhuber@cmc.edu (email)
www.math.duke.edu/~mhuber

Education

B.S. in Mathematics at Harvey Mudd College, 1994
Masters in Operations Research at Cornell University, 1997
Ph.D. in Operations Research at Cornell University, 1999

Thesis

School: Cornell University
Department: School of Operations Research and Industrial Engineering
Advisor: Prof. David Shmoys
Title: *Perfect Sampling Using Bounding Chains*

Research Area

Monte Carlo simulation and stochastic computation for statistical applications, approximation algorithms, and numerical integration. Primary emphasis is on the design and analysis of new perfect sampling methods that draw variates exactly from high-dimensional target distributions.

Employment History

Computer Animator Summer 1991, 1992	Chemistry Animation Project, California Institute of Technology
Office Assistant 1991-1993	Department of Mathematics, Harvey Mudd College
Grader 1993-1994	Department of Mathematics, Harvey Mudd College
Visiting Researcher Summer 1995	Naval Undersea Warfare Center
Visiting Researcher Summer 1996	IBM Almaden Research Center

Teaching Assistant Spring 1999	School of Operations Research and Industrial Engineering, Cornell University
NSF Postdoctoral Research Fellow in the Mathematical Sciences 1999-2001	Department of Statistics, Stanford University
Assistant Professor 2001-2008	Department of Mathematics and Department of Statistical Science, Duke University
Associate Professor 2008-present	Department of Mathematics Claremont McKenna College

Published and Accepted Papers

- M. Huber, *Spatial point processes*, In Handbook of MCMC, Ed. Brooks, Gelman, and Meng, Chapman & Hall/CRC Press, to appear.
- D. B. Woodard, S. C. Schmidler and M. Huber, *Conditions for Torpid Mixing of Parallel and Simulated Tempering on Multimodal Distributions*, Electronic Journal of Probability, vol. 14 (2009), pp. 780—804.
- D. B. Woodard, S. C. Schmidler and M. Huber, *Conditions for Rapid Mixing of Parallel and Simulated Tempering on Multimodal Distributions*, Annals of Applied Probability, vol. 19, no. 2 (2009), pp. 617—640.
- M. Huber, *Perfect simulation with exponential tails*, Random Structures and Algorithms, vol. 33 no. 1 (August 2008), pp.29—43.
- M. Huber and J. Law, *Fast approximation of the permanent for very dense problems*, Proc. of Symposium on Discrete Algorithms (2008), pp. 681—689.
- M. Huber, *Perfect simulation for image restoration*, Stochastic Models, vol. 23 no. 3 (August, 2007), pp. 475—487.
- D. Hearn and M. Huber, *The Ancestral Distance test: A topdown approach to detect correlated evolution in large lineages with missing character data and incomplete phylogenies*, Systematic Biology, vol. 55 no. 5 (October, 2006), pp. 803—817.
- M. Huber, Y. Chen, I. Dinwoodie, A. Dobra, and M. Nicholas, *Monte Carlo algorithms for Hardy-Weinberg proportions*, Biometrics, vol. 62 no. 1 (March, 2006), pp. 49—53.
- M. L. Huber, *Fast perfect sampling from linear extensions*, Discrete Mathematics, vol. 306 (2006), pp. 420—428.
- M. Huber, *Exact sampling from perfect matchings in dense regular graphs*, Algorithmica, vol. 44 (2006), pp. 183—193.
- B. P. Tighe, J. E.S. Socolar, D.G. Schaeffer, W. G. Mitchener, and M. L. Huber, *Force distributions in a triangular lattice of rigid bars*, Physical Review E, vol. 72 no. 031306 (2005), APS Journals [[e031306](#)].
- Y. Chen, I. Dinwoodie, A. Dobra, and M. Huber, *Lattice Points, contingency tables, and sampling*, Contemporary Mathematics, vol. 374 (2005), pp. 65—78.

- M. Huber, *Perfect sampling using bounding chains*, The Annals of Applied Probability, vol. 14 no. 2 (August, 2004), pp. 734–753.
- M. Huber, G. Reinert, *The Stationary Distribution in the Antivoter Model: Exact Sampling and Approximations*, in Stein's Method: Expository Lectures and Applications (2004), pp. 79–94.
- M. L. Huber, *A bounding chain for Swendsen-Wang*, Random Structures and Algorithms, vol. 22 no. 1 (2002), pp. 53–59.
- J. A. Fill and M. L. Huber, *The Randomness Recycler approach to perfect sampling*, 53rd Annual Meeting of the ISI (2001), pp. 69–72.
- A. Benjamin, M. Huber, M. Fluet, *Optimal Token Allocations in Solitaire Knock 'm Down*, The Electronic Journal of Combinatorics, vol. 8 no. 2 (2001), pp. 1–8.
- J. A. Fill, M. L. Huber, *The Randomness Recycler: A new technique for perfect sampling*, Proceedings of the 41th Annual IEEE Symposium on the Foundations of Computer Science (2001), pp. 503–511.
- M. L. Huber, *A faster method for sampling independent sets*, Proceedings of the 11th Annual ACM-SIAM Symposium on Discrete Algorithms (2000), pp. 624–626.
- S. Ahearn, M. L. Huber, G. Sherman, *Finite groups can be arbitrarily Hamiltonian*, Communications in Algebra, vol. 27 no. 3 (1999), pp. 1013–1016.
- M. Huber, *Exact Sampling and Approximate Counting Techniques*, Proc. 30th ACM Symposium on Theory of Computing (1998), pp. 31–40.

Manuscripts and Submitted Papers

- M. L. Huber, *Simulation reductions for the Ising model*, arXiv:0908.2151
- M. Huber and J. Law, *Reducing the Ising model to matchings*, arXiv:0907.0477
- J.A. Fill and M. L. Huber, *Perfect simulation of Vervaat Perpetuities*, Electronic Journal of Probability, submitted.
- M. L. Huber and R. L. Wolpert, *Likelihood based inference for Matérn type III repulsive point processes*, Advances in Applied Probability, submitted.
- M. Huber, *Spatial Birth-Death-Swap chains*, Bernoulli, submitted.
- J. Møller, M. L. Huber and R. L. Wolpert, *The stationary Matérn hard core process of type III*, Stochastic Processes and their Applications, submitted
- J. A. Fill, M. L. Huber, *The Randomness Recycler method for perfect sampling*, preprint.

External funding and awards

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| NSF Postdoctoral Fellow in Mathematical Sciences | 1999-2001 |
| NSF CAREER grant: Perfect sampling techniques for high-dimensional integration | 2006-2011 |

Selected Invited Talks

- Speeding up the product estimator using random temperatures*, Joint Statistical Meetings, Washington D.C., Aug 5, 2009.
- Perfect simulation of Matérn type III processes*, EPSRC Symposium Workshop on Markov Chain-Monte Carlo, Warwick, UK, Mar. 17, 2009.
- Sampling linear extensions for inference*, Computational Algebraic Statistics, Theories and Applications, Kyoto, Japan, Dec 10, 2008.
- Perfect simulation of Matérn type III point processes*, Department of Applied Mathematics and Statistics Seminar, The Johns Hopkins University, Oct 23, 2008.
- Conditions for Parallel and Simulated Tempering to be fast or slow*, Probability Seminar, Dept. of Mathematics, Duke University, Oct 9, 2008.
- Perfect simulation of Matérn type III point processes*, Stochastics Seminar, School of Mathematics, Georgia Institute of Technology, Oct 2, 2008.
- Dealing with Matérn type III point processes*, School of Operations Research and Industrial Engineering Colloquium, Cornell University, Sep 23, 2008.
- An Overview of Perfect Sampling Methods*, Advances in Analysis of Monte Carlo Methods workshop, Harvard University, Dec 02, 2007.
- Perfect simulation of repulsive point processes*, University of Minnesota, School of Statistics seminar, Oct 11, 2007.
- An attractive algorithm for repulsive spatial point processes*, Algorithms Seminar, Duke University, Oct 01, 2007.
- Perfect simulation with the Randomness Recycler for arbitrary state spaces*, University of Warwick, Aug 22, 2006.
- Advanced Acceptance/Rejection Methods for Monte Carlo Algorithms*, UC Davis-Department of Mathematics, Mar 05, 2006.
- Polynomial time generation of random regular graphs*, Random Graphs and Stochastic Computation Workshop, SAMSI, Research Triangle Park, Jun 13, 2005.
- Time Dependent Update Functions for Perfect Sampling*, Joint Statistical Meetings, Aug 9, 2004.
- Time dependent update functions for perfect sampling*, IMS meeting Singapore, Mar 11, 2004.
- Perfect Sampling: techniques and challenges*, University of Ulm, Dec 9, 2003.
- Perfect sampling*, Mathematisches Forschungsinstitut Oberwolfach, Dec 5, 2003.
- Markov chain moves for generating contingency tables with fixed weighted row sums*, SAMSI, Jul 29, 2003.
- Bounded chain techniques for perfect sampling*, Electrical and Computer Engineering seminar at NC State, Feb 14, 2003.
- Using the Randomness Recycler*, UNC Statistics Colloquium, Feb 5, 2002.
- The Randomness Recycler approach to perfect sampling*, 53rd Annual Meeting of the ISI, Aug 2, 2001