

YONGTAO GUAN

a.k.a Grant

5110 S. Kenwood Ave Apt 901, Chicago, IL 60615
ytguan@uchicago.edu, ytguan@gmail.com
<http://quartus.uchicago.edu/~yguan/>
773-954-3855

Education

- **Ph.D.** Dept. of Mathematics, University of Idaho. 2006.
Thesis Title: *Algorithms and Monte Carlo Methods in Computational Biology*
Advisor: Professor Steve Krone
- **M.S.** Dept. of Mathematics, University of Minnesota, Duluth. 2002.
- **B.S.** Biomedical Engineering. Southeast University; Nanjing, China. 1996.

Professional Experience

Postdoctoral Research

- Dept. of Statistics and Dept. of Human Genetics, University of Chicago. Sept, 2006 – Now
Dept. of Statistics, University of Washington. May, 2006 – Sept, 2006
Mentor: Professor Matthew Stephens.
Research subjects: Markov chain Monte Carlo; Bayesian variable selection; Bayesian network inference; Statistical genetics.

Teaching Experience

- Lecturer
 - *Statistical Methods and Applications*. Dept. of Statistics, University of Chicago. 2008.
 - *Calculus I*. Dept. of Mathematics, University of Idaho. 2004.
- Teaching Assistant
 - *Finite Mathematics, Ordinary differential equations*. Dept. of Mathematics, University of Minnesota, Duluth. 2001.
 - Supervised a team of three undergraduates preparing, participating and winning a *First Class Honor* in Chinese MCM (*Mathematical Contest for Modeling*) in 1998.

Reviewer For The Following Journals

- American Journal of Human Genetics, Bioinformatics, Biometrical Journal, Crop Science, Genetics, Genetic Epidemiology, PLoS Genetics,

Honors and Awards

- *Best Talk*. Initiative in Organismal Interactions, Camp Wooden, Washington, 2004.

- *Excellence in Scientific Research and Communication*. Sigma XI, The Scientific Research Society, The University of Idaho Chapter. 2004.
- *Chinese Ambassador Award* for Excellence in Chinese Community Service, 2002.
- *Southeast University Alumni Award*. 1996. (8 out of 10,000, merit-based.)
- *First Class Honor*. American Mathematical Contest for Modeling, 1996.
- *Second Class Honor*. Chinese Mathematical Contest for Modeling, 1995

Memberships and Community Service

- The American Mathematical Society (2001 – Present)
- The American Society of Human Genetics (2006 – Present)
- President of CSSA (*Chinese Student and Scholar Association*), University of Minnesota, Duluth (2001–2002)

Select Talks and Titles by Subject

Markov chain Monte Carlo

- The 11th International Conference on Molecular Systems Biology (ICMSB'09), Shanghai, China, June 2009. *Sampling Bayesian Network With Fast Mixing MCMC*.
- Eighth International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing. Montreal, Canada, Jul. 2008. *Hot Small World or: How I Learned to Stop Worrying and Love to Use the Heated Empirical Distributions to Ease the Sampling*.
- 32nd Conference on Stochastic Processes and their Applications. UIUC, Urbana, IL, Aug. 2007. *Convergence Rate of Markov Chain Monte Carlo in a Small World*.
- Annual SMBE Meeting: Genomes, Evolution, & Bioinformatics. Tempe, AZ, May 2006. *Phylogenetic MCMC Is Not Misleading If One Leads (Proposes) Right*.
- Initiative in Organismal Interaction Retreat. Camp Wooten, WA. Aug. 2004. *Small World Effect with Markov Chain Monte Carlo*.

Bayesian Variable Selection and GWAS

- Enhancing Development of Genome-wide Association Methods (ENDGAME), Ann Arbor, MI, June 2009. *Bayesian Genome-Wide Association Study With Shrinkage Priors*.
- Joint Statistical Meeting. Denver, Co, Aug. 2008. *Bayesian Variable Selection With Application to Large Scale Genome-Wide Association Studies*.
- The DIMACS Workshop on Computational Issues in Genetic Epidemiology, Rutgers, NJ, Aug. 2008. *Bayesian Genome-Wide Association Study With Shrinkage Priors*.

Statistical Genetics and Others

- Annual Meeting of American Society of Human Genetics. Honolulu, HI, Oct. 2009. *Detecting Epistatic Interactions Using Directed Acyclic Graphs*
- Annual Meeting of American Society of Human Genetics. San Diego, CA, Oct. 2007. *Bayesian Imputation Based Association Mapping*.
- International Conference on Complex Systems. Boston, MA. May 2004. *Spatial Self-Organization in a Cyclic Resource-Species Model*.

Software Developed

- BaySel: Bayesian Variable Selection.
This software performs Bayesian variable selection and model averaging via MCMC sampling (beta version available upon request).
- iPX: Identify Parental Crossover Events.
This software use model based approach to identify crossover events in a nuclear family with multiple children (beta version available upon request).
- BIMBAM: Bayesian IMputation Based Association Mapping.
<http://quartus.uchicago.edu/~yguan/bimbam>
The software performs genotype imputation and statistical tests for disease association, including single SNP tests and multi-SNP tests for a small region.
- WinSSS: Stochastic Spatial Simulator.
<http://www.webpages.uidaho.edu/~krone/winsss/sss-main.html>
This software implements many classical interacting particle systems, e.g., contact process and Rock-Scissor-Paper dynamic. The real time animations are rendered by OpenGL.

Peer Reviewed Publications

Appeared and In Press

- **Yongtao Guan** and Matthew Stephens (2008), Practical Issues in Imputation Based Association Mapping. PLoS Genetics, 4(12): e1000279. doi:10.1371/journal.pgen.1000279
- Reiner AP, Barber MJ, **Guan Y**, Ridker PM, Lange LA, Chasman DI, Walston JD, Cooper GM, Jenny NS, Rieder MJ, Durda JP, Smith JD, Novembre J, Tracy RP, Rotter JI, Stephens M, Nickerson DA, Krauss RM. (2008) Polymorphisms of the HNF1A Gene Encoding Hepatocyte Nuclear Factor-1alpha are Associated with C-Reactive Protein. American Journal of Human Genetics 82:1193-1201
- **Yongtao Guan** and Steve Krone (2007), Small-world MCMC and Convergence to Multimodal Distributions: From Slow Mixing to Fast Mixing. Annals of Applied Probability, 17, 284-304.
- **Yongtao Guan**, Roland Fleißner, Paul Joyce and Steve Krone (2006), Markov Chain Monte Carlo in Small Worlds. Journal of Statistics and Computing, 16, 193–202.
- Steve Krone and **Yongtao Guan** (2006), Spatial Self-Organization in a Cyclic Resource-Species Model. Journal of Theoretical Biology, 241, 14-25.

- **Yongtao Guan** and Steve Krone (2004), WinSSS: Stochastic Spatial Simulator. Bulletin of Ecological Society of America 85, Number 3, 102-104.

In Preparation

- **Yongtao Guan** and Matthew Stephens, Small World MCMC With Tempering: Ergodicity, Spectral Gap and Applications.
- **Yongtao Guan** and Matthew Stephens, Genome-wide Multi-SNP Association via Bayesian Shrinkage.
- **Yongtao Guan** and Matthew Stephens, Detecting Epistatic Interaction Using Directed Acyclic Graphs.