

Brian J. Drawert

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Research Interest

I am interested in the development of Spatial Stochastic Algorithms as a solution to the Reaction-Diffusion Master Equation with a specific focus on their application to Systems Biology. I am also interested in the modeling and simulation of spatially inhomogeneous stochastic biological systems.

Education

PhD. Computer Science
(*in progress*)

University of California - Santa Barbara
Computational Science & Engineering Emphasis.
Advisors: Linda R. Petzold, Dept. of Computer Science
Mustafa Khammash, Dept. of Mechanical Engineering

M.S. Physics, 2007

DePaul University
Advisor: Jesus Pando, Dept. of Physics

B.S. Computer Science, 2001

Illinois Institute of Technology
Graduated *Cum Laude*

Research Experience

Ph.D. Thesis (*in progress*) *Abstract:* We are developing a spatial stochastic model of cell polarization in yeast, along with a computational framework for the accurate and efficient simulation of this model. The new computational method is based on a hybrid of the SSA and the Finite State Projection algorithm for reaction-diffusion systems.

Master's Thesis *Title:* Spatial Anisotropy in the Cosmic Microwave Background Radiation via Wavelet Analysis of the Wilkinson Microwave Anisotropy Probe

Teaching Experience

Instructor *Intro to Programming for Engineers*, College of Engineering, UCSB
Aug-Sep 2010 & 2011 Instructor of record for summer session of ENG-3.

Educational Coordinator *Intro to Programming for Engineers*, College of Engineering, UCSB
Jun-Dec 2009 First worked to restructure the curriculum and create course content: Moving from syntax oriented C to Problem Solving oriented Matlab format. Then worked to coordinate the team of teaching assistants, graders, and tutors while maintaining the course instructional software site.

Teaching Assistant *Intro to Physics 1, 2 & 3* Physics Department, DePaul University
2004-2007 Led Discussion Sections, Held Office Hours, Graded Exams & Homework

Peer-Reviewed Journal Articles

- B. Drawert, M. Lawson, L. Petzold, M. Khammash “The Diffusive Finite State Projection Algorithm for Efficient Simulation of the Stochastic Reaction-Diffusion Master Equation” *Journal of Chemical Physics* (Feb 2010)
- C. Bunch, B. Drawert, N. Chohan, C. Krintz, L. Petzold, K. Shams “Language and Runtime Support for Automatic Configuration and Deployment of Scientific Computing Software over Cloud Fabrics” *Journal of Grid Computing* (Mar 2012)

Peer-Reviewed Conference Proceedings

- P-O Östberg, A. Hellander, B. Drawert, E. Elmroth, S. Holmgren, L. Petzold “Abstractions for Scaling eScience Applications to Distributed Computing Environments; A StratUm Integration Case Study in Molecular Systems Biology” In Proceedings of: *BIOINFORMATICS 2012, International Conference on Bioinformatics Models, Methods, and Algorithms* (Feb 2012)
- P-O Östberg, A. Hellander, B. Drawert, E. Elmroth, S. Holmgren, L. Petzold “Reducing Complexity in Management of Scientific Computations” In Proceedings of: *CCGrid 2012, The 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing* (May 2012)

Technical Reports

- B. Drawert, S. Engblom, A. Hellander “URDME v. 1.1: Users manual”. Technical Report 2011-003, *Department of Information Technology, Uppsala University* (Mar 2011)

Oral Presentations

- “Polarization in Yeast Mating: Modeling and Simulation of Spatial Stochastic Phenomena” *Scientific Computing Seminar - Uppsala University* Uppsala, Sweden (Mar 2011)
- “Polarized Spatial Stochastic Amplification During Mating in *Saccharomyces cerevisiae*” *International Conference on Systems Biology* Edinburgh, Scotland (Oct 2010)
- “Spatial Stochastic Simulation of Biochemical Systems” *Theoretical Ecology Seminar* UCSB (Mar 2010)

Posters and Abstracts

- “Efficient Stochastic Simulation of Spatially Inhomogeneous Biochemical Systems”
B. Drawert, M. J. Lawson, A. Hellander, M. Khammash, L. Petzold,
Gordon Research Conference on Stochastic Physics in Biology (Jan 2011)
- “Polarized Spatial Stochastic Amplification During Mating in *Saccharomyces cerevisiae*”
B. Drawert, M. J. Lawson, L. Petzold, M. Khammash, T-M. Yi, *ICSB* (Oct 2010)
- “Stochastic Modeling and Simulation of Cell Polarization During Mating in Budding Yeast”
B. Drawert, M. J. Lawson, T-M. Yi, L. Petzold, M. Khammash, *IGERT Project Meeting* (May 2010)
- “Stochastic Modeling and Simulation of Cell Polarization During Mating in Budding Yeast”
B. Drawert, M. J. Lawson, T-M. Yi, L. Petzold, M. Khammash, *Q-Bio* (Aug 2009)

Honors and Awards

- 2007-2010 National Science Foundation IGERT Fellowship, UCSB
2001 Outstanding Community Contribution Award, IIT
1996-2001 Heald merit-based scholarship, IIT

Professional Experience

- Skills:** C/C++, Fortran 77/90/95, MATLAB, Perl, Java, Python, PHP, DHTML, XML, MPI, POSIX Threads, TCP/IP, IPC, SQL, OOA/D, Distributed/Parallel Computing, Clustering, HA/Fault-Tolerance, Unix Administration

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|---------------------|----------------------|-----------------------------|----------------|
| Software Contractor | MD Records, Inc | <i>Jun 2002 - Aug 2007</i> | Chicago, IL |
| Software Engineer | Leapfrog Online, Inc | <i>Jan 2003 - Jun 2004</i> | Evanston, IL |
| Software Engineer | Period 7, Inc | <i>Sept 2001 - Nov 2001</i> | Chicago, IL |
| Software Engineer | Vicode, Inc. | <i>Aug 2001 - Sept 2001</i> | Chicago, IL |
| Software Engineer | L90, Inc. | <i>Jun 1999 - Aug 2001</i> | Chicago, IL |
| Web Engineer | MyPoints.com, Inc. | <i>Jun 1998 - Jun 1999</i> | Schaumburg, IL |