

# Kevin R. Sanft

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## Education

Ph.D. in Computer Science, Computational Science and Engineering emphasis,  
University of California, Santa Barbara (UCSB), 2012

NSF Graduate Research Fellowship

NSF IGERT Fellowship in Computational Science and Engineering

M.S. in Computer Science, University of California, Santa Barbara, 2011

Summer Teaching Institute for Associates Certificate, University of California, Santa  
Barbara, 2010

B.S, B.A in Computer Science and Mathematics, Augsburg College, 2002

## Academic Employment

Assistant Professor, Department of Computer Science, University of North Carolina  
Asheville, 2015-Present

Postdoctoral Associate, School of Mathematics, University of Minnesota, 2014-2015

Visiting Assistant Professor/Postdoc, Department of Mathematics, Statistics and  
Computer Science, Center for Interdisciplinary Research, St. Olaf College, 2012-  
2014

## Publications

K.R. Sanft and H.G. Othmer. Constant-complexity Stochastic Simulation Algorithm with  
Optimal Binning. *J Chem Phys*, 143, 074108, 2015.

O.A. Hall-Holt and K.R. Sanft. Statistics-infused Introduction to Computer Science,  
*Proc. 46<sup>th</sup> ACM Technical Symposium on Computer Science Education (SIGCSE) 2015*.

E. Wallace, D.T. Gillespie, K.R. Sanft, L.R. Petzold. The linear noise approximation is  
valid over limited times for any chemical system that is sufficiently large. *IET Systems  
Biology*, 6(4):102-115, 2012.

K.R. Sanft, S. Wu, M. Roh, J. Fu, R.K. Lim, L.R. Petzold. StochKit2: software for  
discrete stochastic simulation of biochemical systems with events. *Bioinformatics*,  
27(17):2457-8, 2011.

K.R. Sanft, D.T. Gillespie, L.R. Petzold. Legitimacy of the stochastic Michaelis-Menten approximation. *IET Systems Biology*, 5(1):58-69, 2011.

C. Luni, J.E. Shoemaker, K.R. Sanft, L.R. Petzold, F.J. Doyle III. Confidence from uncertainty - A multi-target drug screening method from robust control theory. *BMC Systems Biology*, 4:161, 2010.

C. Luni, K.R. Sanft, L.R. Petzold, F.J. Doyle III. Modeling of detailed insulin receptor kinetics affects sensitivity and noise in the downstream signaling pathway. *Proc. IFAC Intl. Symposium on Dynamics and Control of Process Systems (DYCOPS) 2010*.

D.T. Gillespie, Y. Cao, K.R. Sanft, L.R. Petzold. Abridging chemical reaction networks: it's a subtle business. *Proc. Foundations of Systems Biology in Engineering (FOSBE) Conf. 2009*.

E.C. Kwei, J.E. Shoemaker, K.R. Sanft, L.R. Petzold, F.J. Doyle III. Model-based therapeutic target discrimination using stochastic simulation and robustness analysis in an insulin signaling pathway. *Proc. FOSBE Conf. 2009*.

D.T. Gillespie, Y. Cao, K.R. Sanft, L.R. Petzold. The subtle business of model reduction for stochastic chemical kinetics. *J Chem Phys*, 130, 064103, 2009.

E.C. Kwei, K.R. Sanft, J.E. Shoemaker, L.R. Petzold, F.J. Doyle III. Modeling and systems analysis of insulin signaling. [Extended Abstract] *Proc. AIChE Annual Meeting 2008*.

E.C. Kwei, K.R. Sanft, L.R. Petzold, F.J. Doyle III. Systems analysis of the insulin signaling pathway. *Proc. 17th IFAC World Congress, July 2008*.

R. Frigerio, M.M.B. Breteler, L.M.L. de Lau, K.R. Sanft, J.H. Bower, J.E. Ahlskog, B.R. Grossardt, M. de Andrade, D.M. Maraganore, W.A. Rocca. Number of children and risk of Parkinson's disease. *Movement Disorders*, 22(5):632-9, 2007.

R. Frigerio, K.R. Sanft, B.R. Grossardt, B.J. Peterson, A. Elbaz, J.H. Bower, J.E. Ahlskog, M. de Andrade, D.M. Maraganore, W.A. Rocca. Chemical exposures in Parkinson's disease: A population-based case-control study. *Movement Disorders*, 21(10):1688-92, 2006.

W.A. Rocca, B.R. Grossardt, B.J. Peterson, J.H. Bower, M.R. Trennery, J.E. Ahlskog, K.R. Sanft, M. de Andrade, D.M. Maraganore. The Mayo Clinic cohort study of personality and aging: design and sampling, reliability and validity of instruments, and baseline description. *Neuroepidemiology*, 26(3):119-29, 2006.

R. Frigerio, A. Elbaz, K.R. Sanft, B.J. Peterson, J.H. Bower, J.E. Ahlskog, B.R. Grossardt, M. de Andrade, D.M. Maraganore, W.A. Rocca. Education and occupations preceding Parkinson's disease: A population-based case-control study. *Neurology*,

65(10):1575-83, 2005.

### **Articles in Preparation**

K.R. Sanft and L.R. Petzold. StochKit2R: An R Package for Efficient Discrete Stochastic Simulation. [In preparation.]

K.R. Sanft, S. Wu, D.T. Gillespie, L.R. Petzold. Automatic slow-scale stochastic simulation algorithm with dynamic partitioning and efficient partial equilibrium approximation. [In preparation.]

### **Selected Talks**

Statistics-infused Introduction to Computer Science. ACM Technical Symposium on Computer Science Education (SIGCSE), Kansas City, MO, 5 March 2015.

Scaling Properties of Exact Simulation Algorithms for Spatially Discretized Stochastic Reaction-Diffusion Processes. Banff International Research Station Workshop: Particle-Based Stochastic Reaction-Diffusion Models in Biology. Banff, AB, CA, 10 November 2014.

Efficient Simulation of the Stochastic Michaelis-Menten Approximation. University of Minnesota, School of Mathematics, Math Biology Seminar. Minneapolis, MN, 23 October 2013.

Exploiting stiffness for efficient discrete stochastic biochemical simulation. SIAM Conference on Computational Science and Engineering. In minisymposium: Biology, Stochastic Modeling and the Mathematics of Simulation, Boston, MA, 1 March 2013.

Turn down the volume, turn up the noise: a course module in discrete stochastic modeling and simulation. Joint Mathematics Meetings. MAA Contributed Paper Session: Trends in Undergraduate Mathematical Biology Education, San Diego, CA, 12 January 2013.

Stochastic modeling and simulation in biology. Augsburg College Mathematics Department Colloquium, Minneapolis, MN, 26 April 2011.

Model reduction in stochastic simulation of the enzyme-substrate reaction set. Workshop for Young Researchers in Mathematical Biology, Mathematical Biosciences Institute, Ohio State University, Columbus, OH, 1 September 2010.

My role as a Data Analyst and advice for math majors. Augsburg College Mathematics Department Colloquium, Minneapolis, MN, 18 February 2004.

Calculating the motion of waves. Pi Mu Epsilon Undergraduate Research Conference, Collegeville, MN, 13 April 2002.

## **Industry Employment**

2005-2006 Statistical Programmer, Bioinformatics Group, Dept. of Cardiac Rhythm Management Clinical Research, Medtronic, Inc., St. Paul, MN.

2003-2005 Data Analyst, Division of Biostatistics, Dept. of Health Sciences Research, Mayo Clinic, Rochester, MN.

2002 Software Engineer, Retek, Inc.

## **Awards**

2015 Career Development Award from the University of Minnesota Postdoctoral Association.

2014 Systems Biology Premium Award from the Institution of Engineering and Technology (with E. Wallace, D.T. Gillespie, L.R. Petzold).

2013 Travel Grant to attend Biomathematics and Ecology: Education and Research Conference.

2013 Travel Grant to attend the SIAM Conference on Computational Science and Engineering.

2012 Systems Biology Premium Award from the Institution of Engineering and Technology (with D.T. Gillespie, L.R. Petzold).

## **Service and Outreach**

St. Olaf College, Dept. of Mathematics, Statistics, and Computer Science (MSCS) Technology Group [Dept. committee on computational tools for MSCS courses].

Presented “Creating and Presenting Research Posters” to UCSB Institute for Collaborative Biotechnologies SABRE (Summer Applied Biotechnologies Research Experience) students [undergraduate and M.S. students from HBCUs and MIs in STEM fields], 1 July 2011.

Volunteer participant in the UCSB W.E.B. Du Bois Event to teach Educational Opportunity Program students about graduate school, 3 March 2010.

LEAPS (Let's Explore Applied Physical Science) FUSE (Family Ultimate Science Exploration): presented interactive science demonstrations to students and parents at Santa Barbara Junior High, 12 November 2008.

Reviewer: IET Systems Biology, Proc. National Conference on Undergraduate Research, Bioinformatics, Biochemistry.