

# Marc D. Riedel, Ph.D.

## Academic Rank

Associate Professor with Tenure, Electrical & Computer Engineering  
Graduate Faculty, Biomedical Informatics & Computational Biology  
University of Minnesota, Twin Cities

## Contact Information

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## Websites

Main website: <http://tinyurl.com/marc-riedel-group>  
Research: <http://tinyurl.com/marc-riedel-research>  
Papers: <http://tinyurl.com/marc-riedel-papers>

## EDUCATION

- Postdoctoral Fellow, Computation and Neural Systems, 2004–2005  
*California Institute of Technology*  
Funded by the NIH Human Genome Research Institute
- Ph.D., Electrical Engineering, 2004  
*California Institute of Technology*  
Dissertation Title: “Cyclic Combinational Circuits”  
Advisor: Jehoshua Bruck  
Committee: Yaser Abu-Mostafa, Jehoshua Bruck, Ali Hajimiri, Alain Martin, Erik Winfree, and Andrew Viterbi (external from the Viterbi School of Engineering, University of Southern California)
- M.S., Electrical Engineering, 1998  
*California Institute of Technology*
- B.Eng., Electrical Engineering, 1995  
Minor in Mathematics, 1995  
*McGill University*

## POSITIONS

- Associate Professor with Tenure, 2012–present  
Electrical and Computer Engineering  
*University of Minnesota, Twin Cities*

- Assistant Professor, 2006–2012  
Electrical and Computer Engineering  
*University of Minnesota, Twin Cities*
- Faculty Member, 2006–present  
Digital Technology Center  
*University of Minnesota, Twin Cities*
- Graduate Faculty, 2008–present  
Biomedical Informatics and Computational Biology Program  
*University of Minnesota, Twin Cities*
- Lecturer, 2004–2005  
Computation and Neural Systems  
*California Institute of Technology*
- Research and Teaching Assistant, 2001–2004  
Electrical Engineering  
*California Institute of Technology*

## HONORS AND AWARDS

- **CAREER Award** from the National Science Foundation.
- Paper titled “The Synthesis of Combinational Logic to Generate Probabilities” nominated for the **IEEE/ACM William J. McCalla Best Paper Award** at the International Conference on Computer-Aided Design (ICCAD), 2009.
- **Charles H. Wilts Prize** for the Best Doctoral Research in Electrical Engineering at Caltech, 2004.
- Paper titled “The Synthesis of Cyclic Combinational Circuits” received the **Best Paper Award** at the Design Automation Conference (DAC), 2003.

## RESEARCH FUNDING

### External Sponsored Funding

- Agency: **DARPA**  
Program: Molecular Informatics  
Title: “*Storage and Processing with Native DNA*”  
Investigators: Olgica Milenkovic (PI), Marc Riedel (co-PI), David Soloveichik (co-PI), Huimin Zhao (co-PI), and Alvaro Gonzalo Hernandez (co-PI)  
Amount: \$1,800,000  
Duration: 2018-2021
- Agency: **National Science Foundation**  
Program: Software and Hardware Foundations  
Title: “Advanced Signal Processing with Molecular Reactions”  
Investigators: Keshab Parhi (PI) and Marc Riedel (co-PI)  
Amount: \$300,000  
Duration: 2014-2017

- Agency: **National Science Foundation**  
Program: Software and Hardware Foundations  
Title: “Back to the Future with Printed, Flexible Electronics Design in a Post-CMOS Era when Transistor Counts Matter Again”  
Investigators: K. Bazargan (PI), D. Frisbie (co-PI), R. Harjani (co-PI), and D. Lilja (co-PI), Marc Riedel (co-PI)  
Amount: \$800,000  
Duration: 2013–2018
- Agency: **National Science Foundation**  
Program: Software and Hardware Foundations  
Title: “Digital Yet Deliberately Random – Synthesizing Logical Computation on Stochastic Bit Streams”  
Investigators: Marc Riedel (PI), K. Bazargan (co-PI), R. Harjani (co-PI), and D. Lilja (co-PI)  
Amount: \$300,000  
Duration: 2012–2015
- Agency: **National Science Foundation**  
Program: Software and Hardware Foundations  
Title: “Digital Signal Processing with Biomolecular Reactions”  
Investigators: Keshab Parhi (PI) and Marc Riedel (co-PI)  
Amount: \$400,000  
Duration: 2011–2014
- Agency: **National Science Foundation**  
Program: **NSF CAREER Award**  
Title: “Computing with Things Small, Wet, and Random – Design Automation for Digital Computation with Nanoscale Technologies and Biological Processes”  
Investigator: Marc Riedel (PI)  
Amount: \$500,000  
Duration: 2009–2014
- Agency: **National Science Foundation**  
Program: Design Automation for Micro and Nano Systems  
Title: “Synthesizing Signal Processing Functions with Biochemical Reactions”  
Investigators: Keshab Parhi (PI) and Marc Riedel (co-PI)  
Amount: \$200,000  
Duration: 2009–2011
- Agency: **SRC Focus Center Research Program (FCRP)**  
Program: Functional Engineered Nano-Architectonics (FENA)  
Title: “The Concurrent Logical and Physical Design of Nanoscale Digital Circuits”  
Investigator: Marc Riedel (PI)  
Amount: \$325,000  
Duration: 2007–2010

### University Sources

- Agency: University of Minnesota, Digital Technology Center  
Program: Digital Technology Initiatives (DTI) Seed Grant

Title: “Computational Method for Forward Biological Engineering”  
Investigators: Y. Kaznessis (PI), C. Schmidt-Dannert (co-PI), and M. Riedel (co-PI)  
Amount: \$97,800  
Duration: 2011–2012

- Agency: University of Minnesota  
Program: Biomedical Informatics and Computational Biology (BICB)  
Funding: Student Traineeships for Brian Fett and Adrianna Fitzgerald  
Investigator: Marc Riedel (PI)  
Amount: \$78,000  
Duration: 2007–2009

## PUBLICATIONS and PRESENTATIONS

### Peer-Reviewed Journal Articles and Book Chapters

1. “Computation of Mathematical Functions using DNA”  
S. Ahmad Salehi, Keshab Parhi, and Marc Riedel  
*Nature Scientific Reports*, revision under review, 2017
2. “An Overview of Time-Based Computing with Stochastic Constructs”  
M. Hassan Najafi, S. Jamali-Zavareh, D. Lilja, M. Riedel, K. Bazargan and R. Harjani  
*IEEE Micro*, Vol. 37, No. 6, pp. 62–71, 2017
3. “Polysynchronous Clocking: Exploiting the Skew Tolerance of Stochastic Circuits”  
M. Hassan Najafi, David Lilja, Marc Riedel, and Kia Bazargan  
*IEEE Transactions on Computers*, Vol. 66, No. 10, pp. 1734–1746, 2017
4. “Time-Encoded Values for Highly Efficient Stochastic Circuits”  
M. H. Najafi, S. Jamali-Zavareh, D. Lilja, M. Riedel, K. Bazargan, and R. Harjani  
*IEEE Trans. on Very Large Scale Integration Systems*, Vol. 25, No. 5, pp. 1644–1657, 2017
5. “A Reconfigurable Architecture with Sequential Logic-based Stochastic Computing”  
M. Hassan Najafi, Peng Li, David Lilja, Weikang Qian, Kia Bazargan, and Marc Riedel  
*ACM J. on Emerging Technologies in Computing Systems*, Vo. 13, No. 4, pp. 1–28, 2017
6. “Chemical Reaction Networks for Computing Polynomials”  
S. Ahmad Salehi, Keshab Parhi, and Marc Riedel  
*ACS Synthetic Biology*, Vol. 6, No. 1, pp. 76–83, 2017
7. “Molecular Sensing and Computing Systems”  
S. Ahmad Salehi, Keshab Parhi, and Marc Riedel  
*IEEE Trans. on Molecular, Biological, and Multi-Scale Communications*, Vol. 1, No. 3, 2015
8. “Synthesizing Cubes to Satisfy a Given Intersection Pattern”  
Weikang Qian, Marc Riedel, and Ivo Rosenberg  
*Journal of Discrete Applied Mathematics*, Vol. 193, pp. 11–38, 2015
9. “Computation on Stochastic Bit Streams: Digital Image Processing Case Studies”  
Peng Li, David Lilja, Weikang Qian, Kia Bazargan, and Marc Riedel  
*IEEE Transactions on VLSI Systems*, Vol. 22, No. 3, pp. 449–462, 2014

10. “Logical Computation on Stochastic Bit Streams with Linear Finite State Machines”  
Peng Li, David Lilja, Weikang Qian, Marc Riedel, and Kia Bazargan  
*IEEE Transactions on Computers*, Vol. 63, No. 6., pp. 1474–1486, 2014
11. “Discrete-Time Signal Processing with DNA”  
Hua Jiang, S. Ahmad Salehi, Marc Riedel, and Keshab Parhi  
*ACS Synthetic Biology*, Vol. 2, No. 5, pp. 245–254, 2013
12. “Case Studies of Logical Computation on Stochastic Bit Streams”  
Peng Li, David Lilja, Weikang Qian, Kia Bazargan, and Marc Riedel  
*Lecture Notes in Computer Science: Power and Timing Modeling, Optimization and Simulation Workshop*,  
G. Goos, J. Hartmanis, and J. V. Leeuwen Editors., Springer, pp. 235–244, 2012
13. “Gene Regulatory Network Modeling Using Literature-Curated and High Throughput Data”  
Vishwesh Kulkarni, Reza Arastoo, Anupama Bhat, Kalyanasundaram Subramanian, Mayuresh Kothare, and Marc Riedel  
*Systems and Synthetic Biology*, Vol. 6, No. 3–4, pp. 69–77, 2012
14. “Synthesis of Cyclic Functional Dependencies”  
John Backes and Marc Riedel  
*ACM Trans. on Design Automation of Electronic Systems*, Vol. 17, No. 4, pp. 1–24, 2012
15. “Logic Synthesis for Switching Lattices”  
Mustafa Altun and Marc Riedel  
*IEEE Transactions on Computers*, Vol. 61, No. 11, pp. 1588–1600, 2012
16. “Digital Signal Processing with Molecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*IEEE Design & Test of Computers*, Vol. 29, No. 3, pp. 31–31, 2012
17. “Cyclic Boolean Circuits”  
Marc Riedel and Jehoshua Bruck  
*Journal of Discrete Applied Mathematics*, Vol. 160, No. 13–14, pp. 1877–1900, 2012
18. “Transforming Probabilities with Combinational Logic”  
Weikang Qian, Marc Riedel, Hongchao Zhou, and Jehoshua Bruck  
*IEEE Trans. on CAD of Integrated Circuits & Systems*, Vol. 30, No. 9, pp. 1279–1292, 2011
19. “Synthesizing Logic with Percolation in Nanoscale Lattices”  
Mustafa Altun and Marc Riedel  
*Int’l Journal of Molecular and Nanoscale Computation*, Vol. 3, No. 2, pp. 12–30, 2011
20. “Characterizing the Memory of the GAL Regulatory Network in *Saccharomyces cerevisiae*”  
Vishwesh Kulkarni, Venkatesh Kareenhalli, Ganesh Viswanathan, and Marc Riedel  
*Systems and Synthetic Biology*, Vol. 5, No. 3–4, pp. 97–104, 2011
21. “Rate-Independent Constructs for Chemical Computation”  
Philip Senum and Marc Riedel  
*PLoS ONE*, Vol. 6, Issue 6, 12 pages, 2011

22. “Uniform Approximation and Bernstein Polynomials with Coefficients in the Unit Interval”  
Weikang Qian, Marc Riedel, and Ivo Rosenberg  
*European Journal of Combinatorics*, Vol. 32, No. 3, pp. 448–463, 2011
23. “An Architecture for Fault-Tolerant Computation with Stochastic Logic”  
Weikang Qian, Xin Li, Marc Riedel, Kia Bazargan, and David Lilja  
*IEEE Transactions on Computers*, Vol. 60, No. 1, pp. 93–105, 2011
24. “Synthesizing Combinational Logic to Generate Probabilities: Theories and Algorithms”  
Weikang Qian, Marc Riedel, Kia Bazargan, and David Lilja  
*Advanced Techniques in Logic Synthesis, Optimizations and Applications*  
Sunil Khatri and Kanupriya Gulati Editors, Springer Publishing, pp. 1–28, 2011
25. “The Synthesis of Stochastic Logic for Nanoscale Digital Circuits”  
Weikang Qian, John Backes, and Marc Riedel  
*International Journal of Molecular and Nanoscale Computation*  
Vol. 1, Issue 4, pp. 39–57, 2010
26. “Computing in the RAIN: A Reliable Array of Independent Nodes”  
Vasken Bohossian, Charles Fan, P. LeMahieu, Marc Riedel, Lihao Xu, and Jehoshua Bruck  
*IEEE Transactions on Parallel and Distributed Computing*, Vol. 12, No. 2, pp. 99–114, 2001
27. “Tolerating Faults in Counting Networks”  
Marc Riedel and Jehoshua Bruck  
*Dependable Network Computing*, Dimiter Avresky, Editor  
Kluwer Academic Publishing, pp. 267–278, 2000

### Peer-Reviewed Conference Papers

1. “Power and Area Efficient Sorting Networks using Unary Processing”  
M. Hassan Najafi, D. J. Lilja, M. Riedel, and K. Bazargan  
*IEEE International Conference on Computer Design*, 2017
2. “Unary Positional Computing”  
Mckenzie van der Hagen and Marc Riedel  
*IEEE Global Conference on Signal and Information Processing*, 2017
3. “Molecular Computation of Complex Markov Chains with Self-Loop State Transitions”  
S. Ahmad Salehi, Marc Riedel, and Keshab Parhi  
*Asilomar Conference on Signals, Systems and Computers*, 2017
4. “Time-Encoded Values for Highly Efficient Stochastic Circuits”  
M. H. Najafi, S. Jamali-Zavareh, D. Lilja, M. Riedel, K. Bazargan, and R. Harjani  
*IEEE International Symposium on Circuits & Systems*, 2017
5. “Computing Polynomials with Positive Coefficients using Stochastic Logic by Double-NAND Expansion”  
S. Ahmad Salehi, Yin Liu, Marc Riedel and Keshab Parhi  
*ACM Great Lakes Symposium on VLSI*, 2017
6. “Synthesis of Correlated Bit Streams for Stochastic Computing”  
Yin Liu, Megha Parhi, Marc Riedel, and Keshab Parhi  
*Asilomar Conference on Signals, Systems and Computers*, 2016

7. “A Deterministic Approach to Stochastic Computing”  
Devon Jenson and Marc Riedel  
*ACM/IEEE International Conference on Computer-Aided Design*, 2016.
8. “Computing Polynomials using Chemical Reaction Networks”  
S. Ahmad Salehi, Keshab Parhi, and Marc Riedel  
*IEEE Globecom Symposium*, 2016
9. “Polysynchronous Stochastic Circuits”  
M. Hassan Najafi, David Lilja, Marc Riedel, and Kia Bazargan  
*IEEE/ACM Asia and South Pacific Design Automation Conference*, 2016
10. “Markov Chain Computations using Molecular Reactions”  
S. Ahmed Salehi, Marc Riedel, and Keshab Parhi  
*IEEE International Conference on Digital Signal Processing*, pp. 689–693, 2015
11. “Effect of Bit-Level Correlation in Stochastic Computing”  
Megha Parhi, Marc Riedel, and Keshab Parhi  
*IEEE International Conference on Digital Signal Processing*, pp. 463–467, 2015
12. “Asynchronous Discrete-Time Signal Processing with Molecular Reactions”  
Ahmed Salehi, Marc Riedel, and Keshab Parhi  
*Asilomar Conference on Signals, Systems, and Computers*, pp. 493–497, 2014
13. “IIR Filters Using Stochastic Arithmetic”  
Naman Saraf, Kia Bazargan, Davd Lilja, Marc Riedel  
*IEEE/ACM Conference on Design, Automation and Test in Europe*, pp. 1–6, 2014
14. “Digital Logic with Molecular Reactions”  
Hua Jiang, Marc Riedel and Keshab Parhi  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 721–727, 2013
15. “Stochastic Functions Using Sequential Logic”  
Naman Saraf, Kia Bazargan, David Lilja and Marc Riedel  
*IEEE International Conference on Computer Design*, pp. 507–510, 2013
16. “An Efficient Implementation of Numerical Integration Using Logical Computation on Stochastic Bit Streams”  
Weikang Qian, Chen Wang, Peng Li, David Lilja, Kia Bazargan, and Marc Riedel,  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 156–162, 2012
17. “The Synthesis of Complex Arithmetic Computation on Stochastic Bit Streams Using Sequential Logic”  
Peng Li, David Lilja, Weikang Qian, Kia Bazaragan and Marc Riedel  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 480–487, 2012
18. “The Synthesis of Linear Finite State Machine-based Stochastic Computational Elements”  
Peng Li, Weikang Qian, Marc Riedel, Kia Bazargan, David Lilja  
*IEEE/ACM Asia and South Pacific Design Automation Conference*, pp. 757–762, 2012
19. “Robust Tunable in vitro Transcriptional Oscillator Networks”  
Vishwesh Kulkarni, Theerachai Chanyaswad, Marc Riedel and Jongmin Kim  
*Asilomar Conference on Signals, Systems, and Computers*, pp. 114–119, 2012

20. “Asynchronous Computation with Molecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*Asilomar Conference on Signals, Systems, and Computers*, pp. 493–497, 2011
21. “Synchronous Sequential Computation with Molecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*ACM/IEEE Design Automation Conference*, pp. 836–841, 2011
22. “Rate-Independent Constructs for Chemical Computation”  
Philip Senum and Marc Riedel  
*Pacific Symposium on Biocomputing*, pp. 326–337, 2011
23. “Binary Counting with Chemical Reactions”  
Aleksandra Kharam, Hua Jiang, Marc Riedel, and Keshab Parhi  
*Pacific Symposium on Biocomputing*, pp. 302–313, 2011
24. “Networks of Passive Oscillators”  
Vishwesh Kulkarni, Marc Riedel, and Guy-Bart Stan  
*Allerton Conference on Communication, Control, and Computing*, 559–565, 2011
25. “A Synthesis Flow for Digital Signal Processing with Biomolecular Reactions”  
Hua Jiang, Aleksandra Kharam, Marc Riedel, and Keshab Parhi  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 417–424, 2010
26. “Digital Signal Processing with Biomolecular Reactions”  
Hua Jiang, Aleksandra Kharam, Marc Riedel, and Keshab Parhi  
*IEEE/ACM International Conference on Computer-Aided Design*, 8 pages, 2010
27. “Lattice-Based Computation of Boolean Functions”  
Mustafa Altun and Marc Riedel  
*ACM/IEEE Design Automation Conference*, pp. 609–612, 2010
28. “Reduction of Interpolants for Logic Synthesis”  
John Backes and Marc Riedel  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 602–609, 2010
29. “Writing and Compiling Code into Biochemistry”  
Adam Shea, Brian Fett, Marc Riedel, and Keshab Parhi  
*Pacific Symposium on Biocomputing*, pp. 456–464, 2010
30. “The Synthesis of Combinational Logic to Generate Probabilities”  
Weikang Qian, Marc Riedel, Kia Bazargan, and David Lilja  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 367–374, 2009  
(Nominated for **IEEE/ACM William J. McCalla Best Paper Award**)
31. “Synthesizing Sequential Register-Based Computation with Biochemistry”  
Adam Shea, Brian Fett, Marc Riedel, and Keshab Parhi  
*IEEE/ACM International Conference on Computer-Aided Design*, pp 136–143, 2009
32. “Nanoscale Digital Computation Through Percolation”  
Mustafa Altun, Marc Riedel, and Claudia Neuhauser  
*ACM/IEEE Design Automation Conference*, pp. 615–616, 2009



33. “A Reconfigurable Stochastic Architecture for Reliable Computing”  
Xin Li, Weikang Qian, Marc Riedel, Kia Bazargan, and David Lilja  
*IEEE Great Lakes Symposium on VLSI Design*, pp. 315–320, 2009
34. “Estimation and Optimization of Reliability of Noisy Digital Circuits”  
Satish Sivaswamy, Kia Bazargan, and Marc Riedel  
*IEEE International Symposium on Quality Electronic Design*, pp 213–219, 2009
35. “Stochastic Transient Analysis of Biochemical Systems”  
Bin Cheng and Marc Riedel  
*Pacific Symposium on Biocomputing*, pp. 4–14, 2009
36. “Module Locking in Biochemical Synthesis”  
Brian Fett and Marc Riedel  
*IEEE/ACM International Conference on Computer-Aided Design*, 758–764, 2008
37. “The Analysis of Cyclic Circuits with Boolean Satisfiability”  
John Backes and Marc Riedel  
*IEEE/ACM International Conference on Computer-Aided Design*, pp. 143–148, 2008
38. “The Synthesis of Robust Polynomial Arithmetic with Stochastic Logic”  
Weikang Qian and Marc Riedel  
*ACM/IEEE Design Automation Conference*, pp. 648–653, 2008
39. “Synthesizing Stochasticity in Biochemical Systems”  
Brian Fett, Jehoshua Bruck, and Marc Riedel  
*ACM/IEEE Design Automation Conference*, 640–645, 2007
40. “The Synthesis of Cyclic Combinational Circuits”  
Marc Riedel and Jehoshua Bruck  
*ACM/IEEE Design Automation Conference*, pp. 163–168, 2003  
(Received the **DAC Best Paper Award**)

### Peer-Reviewed Workshop Papers

1. “A Deterministic Approach to Stochastic Computing”  
Devon Jenson and Marc. D. Riedel,  
*IEEE/ACM International Workshop on Logic and Synthesis*, 7 pages, 2016  
**Nominated for Best Student Paper Award**
2. “Using a Two-Dimensional Finite-State Machine for Stochastic Computation”  
Peng Li, Weikang Qian, David Lilja, Marc Riedel, and Kia Bazargan  
*IEEE/ACM International Workshop on Logic and Synthesis*, 8 pages, 2012
3. “Resolution Proofs as a Data Structure for Logic Synthesis”  
John Backes and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, 8 pages, 2011
4. “Synthesizing Cubes to Satisfy a Given Intersection Pattern”  
Weikang Qian and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 217–224, 2010

5. “Two-Level Logic Synthesis for Probabilistic Computation”  
Weikang Qian and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 95–102, 2010
6. “Reduction of Interpolants for Logic Synthesis”  
John Backes and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, 6 pages, 2010
7. “Digital Signal Processing with Biomolecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*IEEE Workshop on Signal Processing Systems*, pp. 237–242, 2010
8. “The Synthesis of Cyclic Dependencies with Craig Interpolation”  
John Backes and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 24–30, 2009
9. “Synthesizing Sequential Register-Based Computation with Biochemistry”  
Adam Shea, Brian Fett, Marc Riedel, and Keshab Parhi  
*IEEE/ACM International Workshop on Logic and Synthesis*, 8 pages, 2009
10. “The Synthesis of Combinational Logic to Generate Probabilities”  
Weikang Qian, Marc Riedel, Kia Bazargan, and David Lilja  
*IEEE/ACM International Workshop on Logic and Synthesis*, 8 pages, 2009
11. “The Synthesis of Stochastic Logic to Perform Multivariate Polynomial Arithmetic”  
Weikang Qian and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 79–86, 2008
12. “The Synthesis of Stochastic Circuits for Nanoscale Computation”  
Weikang Qian, John Backes, and Marc Riedel  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 176–183, 2007
13. “Application of LUT Cascades to Numerical Function Generators”  
Tsutomu Sasao, Jon Butler, and Marc Riedel  
*Workshop on Synthesis & System Integration of Mixed Information*, 7 pages, 2004
14. “Timing Analysis of Cyclic Combinational Circuits”  
Marc Riedel and Jehoshua Bruck  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 446–453, 2004
15. “Cyclic Combinational Circuits: Analysis for Synthesis”  
Marc Riedel and Jehoshua Bruck  
*IEEE/ACM International Workshop on Logic and Synthesis*, pp. 105–112, 2003

## Patents

1. “Stochastic Computing on Deterministic Bit Streams”  
Devon Jenson and Marc Riedel  
U.S. Patent Application Number: 15/618530  
Filing Date: Mar 2017  
Status: Pending
2. “Polysynchronous stochastic circuits”  
David J. Lilja, M. Hassan Najafi, Marc Riedel and Kia Bazargan  
U.S. Patent Application Number: 15/448997  
Filing Date: Mar 2017  
Status: Pending
3. “Stochastic Computation using Pulse-Width Modulated Signals”  
M. Hassan Najafi, S Jamali-Zavareh, D. J. Lilja, M. Riedel, K. Bazargan, and R. Harjani  
U.S. Patent Application Number: 15/869453  
Filing Date: Jan 2018  
Status: Pending
4. “Method and Means for the Synthesis of Cyclic Combinational Circuits”  
Marc Riedel and Jehoshua Bruck  
U.S. Patent 7,249,341
5. “A Reliable Array of Distributed Computing Nodes”  
Vincent Bohossian, Charles Fan, Paul LeMahieu, Marc Riedel, Lihao Xu, and Jehoshua Bruck  
U.S. Patent 6,128,277

## Presentations with Published Abstracts

1. “Stochastic Computing: A New Paradigm for Ultra Low Power, Fault-Tolerant, Skew-Tolerant Computing”  
Marc Riedel (**invited**)  
*Energy Consequences of Information Workshop*  
Sponsored by Air Force Office of Scientific Research, Santa Fe, NM, 2017
2. “A Deterministic Approach to Stochastic Computing”  
Devon Jenson and Marc Riedel (**invited**)  
*Information Theory and Applications Workshop*, UC San Diego, 2017
3. “Polysynchronous Clocking for Stochastic Computing”  
Marc Riedel (**invited**)  
*CMOS Emerging Technologies Workshop*, Montreal, Quebec, 2016
4. “Polysynchronous Clocking for Molecular Computing”  
Marc Riedel (**invited**)  
*Workshop on Communications, Inference, and Computing in Molecular and Biological Systems*, Los Angeles, CA, 2015
5. “Synchronous Computation and Signal Processing and DNA”  
Marc Riedel (**invited**)  
*Workshop on Coding Techniques for Synthetic Biology*, Urbana-Champaign, IL, 2015

6. “Probability as State Variable for Nanoscale Computation”  
Marc Riedel (**invited**)  
*CMOS Emerging Technologies Workshop*, Vancouver, BC, 2015
7. “Pipelining for Accuracy with Stochastic Computing”  
Marc Riedel (**invited**)  
*Information Theory and Applications Workshop*, UC San Diego, 2015
8. “Probability as State Variable for Nanoscale Computation”  
Marc Riedel (**invited**)  
*Information Theory and Applications Workshop*, UC San Diego, 2014
9. “A Biomolecular Implementation of Non-Linear Systems”  
Vishwesh Kulkarni, Hua Jian, Theerachai Chanyaswad, Angelina Shudy, and Marc Riedel  
*International Workshop on Bio-Design Automation*, San Fransisco, CA, 2012
10. “So Simple a Caveman Could Do It – Computing On Stochastic Bit Streams”  
Marc Riedel (**invited**)  
*Information Theory and Applications Workshop*, UC San Diego, 2012
11. “Synthesizing Logical Computation on Stochastic Bit Streams for Sensing Applications”  
Marc Riedel (**invited**)  
*IEEE CANDE Workshop*, San Jose, CA, 2011
12. “Digital Signal Processing with DNA”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*International Conference on DNA Computing*, Pasadena, CA, 2011
13. “Synthesizing Logical Computation on Stochastic Bit Streams”  
Marc Riedel (**invited**)  
*CMOS Emerging Technologies Workshop*, Whistler, BC, 2011
14. “Asynchronous Sequential Computation with Molecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*International Workshop on Bio-Design Automation*, San Diego, CA, 2011
15. “Biological Network Reconstruction Using Literature Curated and High Throughput Data”  
Vishwesh Kulkarni, Kalyanasundaram Subramanian, Reza Arastoo,  
Mayuresh Kothare, and Marc Riedel  
*International Workshop on Bio-Design Automation*, San Diego, CA, 2011
16. “Rate-Independent Constructs for DNA Computing”  
Philip Senum and Marc Riedel  
*Annual Institute of Biological Engineering Conference*, Atlanta, GA, 2011
17. “Lattice-Based Computation with Percolation”  
Mustafa Altun and Marc Riedel (**invited**)  
*IEEE/ACM International Symposium on Nanoscale Architectures*, Anaheim, CA, 2010
18. “Signal Processing Functions with Biomolecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*International Workshop on Bio-Design Automation*, Anaheim, CA, 2010

19. Session Summary: “Engineering Biology: Fundamentals and Applications”  
Marc Riedel, Soha Hassoun, and Ron Weiss (**invited**)  
*ACM/IEEE Design Automation Conference*, Anaheim, CA, 2010
20. “Digital Signal Processing with Biochemistry”  
Marc Riedel (**invited**)  
*Symposium on the Foundations of Nanoscience*, Salt Lake City, UT, 2010
21. “Iterative Computation with Biomolecular Reactions”  
Hua Jiang, Marc Riedel, and Keshab Parhi  
*Annual Institute of Biological Engineering Conference*, Boston, MA, 2010
22. “Stochastic Logic and Stochastic Biological Processes”  
Marc Riedel (**invited**)  
*Information Theory and Applications Workshop*, UC San Diego, 2010
23. “Computing with Things Small, Wet, and Random”  
Marc Riedel (**invited**)  
*IEEE CANDE Workshop*, Monterey, CA, 2009
24. “Stochastic Chemical Reaction Networks”  
Marc Riedel (**invited**)  
*International Workshop on Stochasticity*, Banff, Alberta, 2009
25. “Synthesizing Sequential Register-Based Computation with Biochemistry”  
Adam Shea, Brian Fett, Marc Riedel, and Keshab Parhi  
*International Workshop on Bio-Design Automation*, San Francisco, CA, 2009
26. “Synthesizing Circuit Constructs with Chemical Reaction Networks”  
Marc Riedel (**invited**)  
*Emergence in Chemical Systems Conference*, Anchorage, AK, 2009
27. “Rate-Independent Biochemical Synthesis”  
Adam Shea, Brian Fett, and Marc Riedel  
*Annual Institute of Biological Engineering Conference*, Santa Clara, CA, 2009
28. “Modular Stochastic Biochemistry”  
Brian Fett and Marc Riedel  
*Synthetic Biology 4.0*, Hong Kong, 2008
29. “Biochemical Pathways from Generic Designs”  
Brian Fett and Marc Riedel  
*Synthesis of Cells Meeting*, Kobe, Japan, 2008
30. “The Computer-Aided Synthesis of Stochastic Biochemistry”  
Brian Fett and Marc Riedel  
*Advances in Synthetic Biology Conference*, Cambridge, UK, 2008
31. “Synthesizing Stochasticity”  
Brian Fett and Marc Riedel  
*Synthetic Biology 3.0*, Zürich, Switzerland, 2007

32. “Using The Probability Gradient to Analyze Bifurcating Biochemical Systems”  
Brian Fett and Marc Riedel  
*International Conference on Systems Biology*, Yokohama, Japan, 2006
33. “Exact Stochastic Simulation with Event Leaping”  
Marc Riedel and Jehoshua Bruck  
*International Conference on Systems Biology*, Boston, MA, 2005

#### **Invited Talks, Colloquia, and Panels (without published abstracts)**

1. “A Deterministic Approach to Stochastic Computing with Coding Applications”  
*IEEE Global Conference on Signal and Information Processing*  
Workshop on Stochastic and Approximate Computing for Signal Processing and Machine Learning, Montreal, 2017
2. “Polysynchronous Clocking for Molecular Computing”  
*Bio Physics Seminar Series*  
Host: Elias Puchner  
University of Minnesota, Sept. 29, 2016
3. “A Deterministic Approach to Stochastic Computing”  
*Waterloo Workshop on Stochastic Computing*  
Host: Vincent Gaudet  
University of Waterloo, May 25, 2016
4. “The Future of Computer Engineering”  
*Keynote address to IEEE General Meeting, UMN Student Branch*  
Host: Karel Kalthoff  
University of Minnesota, Jan. 25, 2016
5. “Towards a Computer Engineering Discipline with DNA”  
*Biochemistry Seminar*  
Host: Prof. Aseem Ansari  
University of Wisconsin, Sept. 30, 2013
6. “The Modest Mathematician: Anecdotes from the Personal and Professional Life of Ivo Rosenberg”  
*Honorary Doctorate Ceremony for Ivo Rosenberg*  
Host: Prof. Dietlinde Lau  
University of Rostock, Germany, May 15, 2013
7. “Towards a Computer Engineering Discipline with DNA”  
*Computer Science Seminar*  
Host: Prof. Jack Lutz  
Iowa State University, Nov. 30, 2012
8. “Logic Synthesis for Networks of Four-Terminal Switches”  
*Computer Science Seminar*  
Host: Prof. Alex Sprintson  
Texas A&M University, April 20, 2012

9. “Random and Loopy Circuits: Complexity in Electronic and Biological Circuit Design”  
*Dept. of Defense Research and Engineering Complex Systems Study*  
Host: Robert Bond  
Squam Lake, NH, July 27, 2010
10. Panelist: “CAD for Nanoelectronic Circuits and Architectures – Are We There Yet?”  
*IEEE/ACM International Symposium on Nanoscale Architectures*  
Organizer: Prof. Garrett Rose  
Anaheim, CA, June 17, 2010
11. “Robust Stochastic Computation with Biomolecular Reactions”  
*NSF Workshop on Shared Organizing Principles in Biology*  
Organizer: Prof. Melanie Mitchel  
Arlington, VA, May 25, 2010
12. “Computing with Things Small, Wet, and Random”  
*Biological and Medical Physics Seminar Series*  
Host: Prof. Vincent Noireaux  
University of Minnesota, March 30, 2010
13. “Computing with Things Small, Wet, and Random”  
*Computer Science Seminar*  
Host: Prof. Soha Hassoun  
Tufts University, March 1, 2010
14. Tutorial: “Programming Constructs for Chemical Reaction Networks”  
*Pacific Symposium on Biocomputing*  
Organizer: Dr. Gil Alterovitz  
Kona, Hawaii, Jan. 7, 2010
15. “Computing with Things Small, Wet, and Random”  
*Electrical and Computer Engineering Seminar*  
Host: Prof. Azadeh Davoodi  
University of Wisconsin, Feb. 27, 2009
16. “Computing with Things Small, Wet, and Random”  
*Electrical and Computer Engineering Seminar*  
Host: Prof. Lin Zhong  
Rice University, Feb. 17, 2009
17. “Computing with Things Small, Wet, and Random”  
*Electrical and Computer Engineering Seminar*  
Host: Prof. Anxiao (Andrew) Jiang  
Texas A&M University, Feb. 17, 2009
18. “Synthesizing Nearly Rate Independent Biochemical Computation”  
*NSF Expeditions in Computing – Molecular Programming Workshop*  
Organizer: Prof. Erik Winfree  
Oxnard, CA, Jan. 10, 2009

19. “Computing with Things Small, Wet, and Random”  
*Electrical and Computer Engineering Seminar*  
Host: Prof. Rick Kiehl  
UC Davis, Sep. 29, 2008
20. “Synthesizing Stochastic Logic”  
*SRC Center on Functional Engineered Nano-Architectonics (FENA) Annual Meeting*  
Organizer: Prof. Kang Wang  
La Jolla, CA, June 13, 2008
21. Tutorial: “Synthesizing Stochastic Biochemical Reactions”  
*Tech Tune Up*  
Organizer: Prof. Ahmed Tewfik  
University of Minnesota, May 26, 2008
22. “Synthesizing Stochasticity in Circuits and in Biology”  
*DARPA MTO LIBRA Workshop*  
Organizer: Dr. John Damoulakis  
Arlington, VA, Nov. 29, 2007
23. Public Lecture: “Circuit Engineers Doing Biology –  
A Discourse on the Changing Landscape of Scientific Research”  
*Café Scientifique Public Seminar Series, Bell Museum of Natural History*  
Organizer: Peggy Korsmo-Kennon  
Bryant-Lake Bowl, Minneapolis, MN, Nov. 20, 2007
24. “High-Performance Computing for the Analysis and Synthesis of Biochemistry”  
*IBM Company Seminar*  
Host: Tim Mullins  
Rochester, MN, Oct. 8, 2007
25. “Analysis and Synthesis of Biochemical Reactions”  
*Cadence Research Labs Seminar*  
Host: Dr. Andreas Kuelmann  
Berkeley, CA, May 24, 2007
26. Tutorial: “Analysis and Synthesis of Stochastic Biochemical Reactions”  
*Tech Tune Up*  
Organizer: Prof. Kia Bazargan  
University of Minnesota, May 23, 2007
27. “Analysis and Synthesis of Stochastic Logic for Nanoscale Computation”  
*SRC Center on Functional Engineered Nano-Architectonics (FENA) Workshop*  
Organizer: Prof. Kang Wang  
UCLA, April 19, 2007
28. “Synthesizing Stochasticity in Biochemical Reaction Networks”  
*Mathematical Biology Seminar*  
Host: Prof. Hans Othmer  
University of Minnesota, March 21, 2007



29. “Exact Stochastic Simulation with Event Leaping”  
*Mathematical Biology Seminar*  
Host: Prof. Hans Othmer  
University of Minnesota, Nov. 2, 2006
30. “Cycles – The Good and the Bad in Logic Synthesis and Computational Biology”  
*Medtronic Technology Quarterly Seminar*  
Host: Sara Audet  
Fridely, MN, Oct. 5, 2006
31. “Cycles – The Good and the Bad in Logic Synthesis and Computational Biology”  
*Electrical Engineering Seminar*  
Host: Prof. Mustafa Kamash  
UC Santa Barbara, May 17, 2006
32. Job Talks: “Cyclic Combinational Circuits and Other Novel Constructs”
  - *Electrical and Computer Engineering Dept.*  
University of Minnesota
  - *Electrical and Computer Engineering Dept.*  
University of Utah
  - *Electrical Engineering and Computer Science Dept.*  
Case Western Reserve University
  - *Electrical and Computer Engineering Dept.*  
University of Connecticut
  - *Electrical and Computer Engineering Dept.*  
University of Rochester
  - *Electrical and Computer Engineering Dept.*  
University of British Columbia
  - *Electrical Engineering and Computer Science Dept.*  
Washington State University
  - *Electrical and Computer Engineering Dept.*  
Arizona State University
  - *Electrical and Computer Engineering Dept.*  
University of Waterloo
  - *Electrical and Computer Engineering Dept.*  
Purdue University
  - *Electrical Engineering Dept.*  
University of Montreal École Polytechnique

February–March, 2005

**(11 interviews, 11 offers)**

**TEACHING at the UNIVERSITY of MINNESOTA****Lecture-Based Courses**

- EE 1301, “Introduction to Computing Systems”: Fall 2009, Spring 2010, Fall 2010, Fall 2011, Fall 2012, and Fall 2013
- EE 2301, “Introduction to Digital System Design”: Spring 2007, Spring 2008, Spring 2009, Fall 2014, Fall 2016, and Fall 2017
- EE 2361, “Introduction to Microncontrollers”: Fall 2015
- EE 5393, “Circuits, Computation, and Biology”: Spring 2008, Fall 2008, Spring 2011, Spring 2012, Spring 2013, Spring 2014, Spring 2015, Spring 2016, Spring 2017, and Spring 2018
- EE 5583, “Error Control Coding”: Fall 2012
- EE 5950, “Special Topics in Electrical and Computer Engineering”: Fall 2006

**Project-Based Courses**

- EE 4951, “Senior Design” Spring 2008, Spring 2009, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Fall 2015, Spring 2017, and Spring 2018
- IT 1311, “Freshman Design” Fall 2006

**ADVISING and MENTORING****Visiting Scholars Hosted**

- Vishwesh Kulkarni (2011–2013)  
Funded through NSF CAREER Award.

**Doctoral Students**

- Yadu Kiran (2017– )  
Dissertation topic: Deterministic Approaches to Stochastic Computing
- Zoe Dordmuth (2018– )  
Dissertation topic: DNA Storage
- Ahmad Salehi (2012–2017)  
Jointly advised with Keshab Parhi  
Received a University of Minnesota **Doctoral Dissertation Award**, 2015–2016  
Dissertation title: “Advanced Digital Signal Processing with Molecular Reactions”
- John Backes (2009–2013)  
Received a University of Minnesota **Doctoral Dissertation Award**, 2012–2013  
Dissertation title: “SAT-Based Techniques for Logic Synthesis” Has accepted a position at Rockwell Collins Research, 2013.
- Hua Jiang (2009–2012)  
(jointly advised with Keshab Parhi)  
Dissertation title: “Digital Logic and Digital Signal Processing with Molecular Reactions”  
Has accepted a position at Synposys, 2012.

- Mustafa Altun (2008–2012)  
Dissertation title: “Logic Synthesis for Networks of Four-Terminal Switches”  
Has accepted a tenure-track faculty position at the Istanbul Technical University, 2012
- Weikang Qian (2006–2011)  
Dissertation title: “Synthesizing Logical Computation on Stochastic Bit Streams”  
Received a University of Minnesota **Doctoral Dissertation Award**, 2010–2011.  
Has accepted a tenure-track faculty position at the University of Michigan – Shanghai Jiao Tong University Joint Institute (SJTU), 2011.

### Master’s Students

- Vahbai Desai (2014–2017)  
Thesis title: “Data Cycling in Networks: Thoughts and Experiments”
- Brian Fett (2006–2008)  
Thesis title: “Synthesizing Stochasticity with Biochemical Reactions”
- Bin Cheng (2007–2008)  
Thesis title: “Stochastic Transient Analysis of Biochemical Systems”

### Undergraduate Students

- NSF Research Experiences for Undergraduates (REUs): Lawrence Hessburg (2015–2016), and Michelle Kleckler (2015–2016)
- Directed Undergraduate Research Opportunities Program (UROP) projects for: John Backes (2008), Adam Shea (2008), Phil Greenberg (2009), Dan Hudrlik (2009), Kathleen Thurmes (2009), Aleksandra Kharam (2010), Joshua Krist (2010), Phillip Senum (2010), Jing Xiong (2010), Nick Gunderson (2011), Tor Anderson (2012), Grant Elbert (2012, 2013), Joe Connelley (2013), Caleb Sykes (2014), Blake Anderson (2014), Andrew Decker (2014), Megha Parhi (2015), Alex Keddy (2015), Ryan Mathison (2016), McKenzie van Derhagen (2016), Owen Hoffend (2017), Arnav Solanki (2017), Aceif Oubaha (2017) Benjamin Ertl (2017), Harsh Patel (2018), Serena Nicoll (2018), Jack Erhardt (2018)
- Directed Senior Honors projects for: Jason Heebl (2006–2007), Tim Pankratz (2006–2007), John Kablan (2008–2009), John Backes (2008–2009), Phil Greenberg (2010–2011), Caitlin Race (2010–2011), Theerachai Chanyaswad (2011–2012), Phillip Senum (2012–2013), Thomas Daede (2013–2014), Megha Parhi (2014–2015), Andrew Erickson (2015–2016), Devon Jensen (2015–2016), Michelle Kleckler (2016–2016), Vendant Goyal (2016–2017), Michelle Kleckler (2016–2017), Ryan Mathison (2016–2017), McKenzie van Derhagen (2016–2017), Lawrence Hessburg (2017–2018), Zach Krueger (2017–2018), Tonglin Chen (2017–2018)

### Degree Committees

- Ph.D. Final Committee for:  
Mustafa Altun (EE), Baktash Boghrati (EE), Denis Foo Kune (CS), Shuo Guo (EE), Sakeet Gupta (EE), Jianxin Fang (EE), Hua Jiang (EE), Hyoung Kim (EE), Robert Knuesel (EE), Sanjay Kumar (EE), Yingjie Lao (EE), Qunzeng Liu (EE), Pongstorn Maidee (EE), Andrew Ness (EE), Weikang Qian (EE), Hung Pham (CS), Satish Sivaswamy (EE), Jing Wang (EE), Yao Wang (EE), Xiaofei Wang (EE), Chuan Zhang (EE), Ningyuan Wang (Psychology), Zhiheng Wang (EE), Bo Yuan (EE), and Chi Xu (EE)

- Ph.D. Preliminary Committee for:  
Mustafa Altun (EE), John Backes (EE), Baktash Boghrati (EE), Hari Cherupalli (EE), Jianxin Fang (EE), Elaheh Ghassabani (CS), Chenjie Gu (EE), Shuo Guo (EE), Sakeet Gupta (EE), Hyoung Kim (EE), Robert Knuesel (EE), Denis Foo Kune (CS), Sanjay Kumar (EE), Peng Li (EE), Qunzeng Liu (EE), Pongstorn Maidee (EE), Huang Pham (CS), Weikang Qian (EE), Naman Saraf (EE), Jonghyeon Shin (Physics), Satish Sivaswamy (EE), Bennett Swiniarski (CEMS), Jing Wang (EE), Chi Xu (EE), En Yuan (EE), Bo Yuan (EE), Yingie Lao (EE), and Zhiheng Wang (EE)
- M.S. Committee for:  
Amit Bose (CS), David Boutcher (EE), Bin Chen (EE), Wuyang Dai (EE), Vaibhav Desai (EE), Brian Fett (EE), Brandon Hoffman (CS), Praveen Kambam (CS), Manas Mignas (CS), Andrew Ness (EE), Kwangsung Oh (CS), Bennett Swiniarski (CEMS), Nimish Agashiwala (CS), and Vaibhav Sharma (CS)

## PROFESSIONAL SERVICE

### Journal Paper Refereeing

- Served as referee for numerous journals, including: *Public Library of Science ONE*; *Science*; *Nature*; *Proceedings of the National Academy of Sciences*; *IEEE Transactions on Computers*; *IEEE Transactions on Computer-Aided Design of Circuits and Systems*; *IEEE Transactions on Information Theory*; *IEEE Transactions on Molecular, Biological, and Multi-Scale Communications*; *ACM Transactions on Design Automation of Electronic Systems*; *ACM Journal on Emerging Technologies*; *Bioinformatics*; *Journal of Chemical Physics*; *SIAM Journal on Scientific Computing*; *ACS Synthetic Biology*; *Journal of Discrete and Applied Math*

### Editorships

- Guest Associate Editor, *IEEE Transactions on Emerging Topics in Computing* Special Issue on Approximate and Stochastic Computing, to appear 2018

### Chairing, Moderating, and Organizing Special Sessions, Panels, and Tutorials

- IEEE International Conference on Design, Automation and Test in Europe (2017)
  - Organized Tutorial: “Stochastic Computing: The Hype and the Hope”
- ACM/IEEE International Conference on Computer-Aided Design (2016)
  - **Chair** of Biological Systems and Electronics, Brain Inspired Computing, and New Computing Paradigms Track (2016).
  - **Moderator** of Special Session “Challenges and Opportunities of Stochastic Computing in the Dusk of Moore’s Law and the Dawn of Big Data” (2016).

### Technical Program Committee Memberships

- ACM/IEEE Design Automation Conference (2012–2014, 2017–2018)
- IEEE International Conference on Communication (2017)
- International Conference on Computational Methods in Systems Biology (2017–2018)

- ACM/IEEE International Conference on Computer-Aided Design (2008, 2014–2016)
- ACM International Conference on Nanoscale Computing and Communication (2016)
- ACM/IEEE International Workshop on Bio-Design Automation (2009–2014)
- IEEE Great Lakes Symposium on VLSI (2009–2010)
- IEEE International Workshop on Genomic Signal Processing and Statistics (2009)
- IEEE/ACM International Workshop on Logic and Synthesis (2006–2014)

### Review Panels

- Served on review panel for
  - National Science Foundation’s Biocomputation Cluster (2014, 2015, 2017)
  - National Science Foundation’s Software and Hardware Foundations Cluster (2009, 2010, 2017)

### Workshop Organization

- DAC International Workshop on Bio-Design Automation (IWBDA)
  - Initiated Workshop in 2009
  - Steering Committee Chair (2009– )
  - General Chair (2010)
  - Technical Program Chair (2009)

Workshop attendance: **100 people** 2009, **85 people** in 2010, and **120 people** in 2011, more than 100 annually since.

- IEEE/ACM International Workshop on Logic and Synthesis (IWLS)
  - Program Chair (2009)
  - General Chair (2008)
  - Publications Chair (2007)
  - Panel Chair (2006)
- IEEE International Workshop on Genomic Signal Processing and Statistics
  - Finance Chair (2009)

### Professional Interest Groups

- ACM Special Interest Group on Design Automation (SIGDA)
  - Associate Editor of SIGDA Newsletter (2006– )
  - Co-chair of Technical Committee on Logic/RTL Design (2006–2009)
  - Vice-Chair of CAD-athlon Programming Competition (2006–2007)

## SERVICE to the UNIVERSITY of MINNESOTA

### Electrical and Computer Engineering Department

- Standards & Awards Committee, Chair (2014– )

- Student Services and Advising Committee (2011–2014)
- Graduate Committee (2006–2011)
- Ph.D. Written Preliminary Exam (WPE) Committee: 2006–2007, 2007–2008, 2008–2009, 2010–2011, 2012–2013, 2014–2015, 2015–2016, and 2016–2017.

**Biomedical Informatics and Computational Biology Program**

- Member of Admissions Committee (2008–2009)

**University-Wide**

- Faculty Senator (2013–2016)
- Interdisciplinary Informatics Seed Grant Program Review Panel (2009)