

DARKO STEFANOVIĆ

Associate Professor
Department of Computer Science
University of New Mexico
darko@acm.org

June 2013

EDUCATION

Ph.D., Computer Science, University of Massachusetts Amherst, 1999. (Thesis title: *Properties of Age-Based Automatic Memory Reclamation Algorithms*. Advisor: J. Eliot B. Moss. Co-advisor: Kathryn S. McKinley.)

M.S., Computer Science, University of Massachusetts Amherst, 1994. (Thesis title: *Generational Copying Garbage Collection for Standard ML: a quantitative study*. Advisor: J. Eliot B. Moss.)

Dipl. Ing., Electrical Engineering (Electronics/Computer Science track), University of Belgrade, 1989.

POSITIONS

2010. Department of Computer Science, University of New Mexico. Acting Associate Chair.

2009 – present. Center for Biomedical Engineering, University of New Mexico. Member.

2006 – present. Department of Computer Science, University of New Mexico. Associate Professor.

2006. Polytechnic University of Madrid (UPM), Visiting Scholar.

2000 – 2006. Department of Computer Science, University of New Mexico. Assistant Professor.

1998 – 2000. Department of Electrical Engineering, Princeton University. Post-doctoral Research Associate.

1993 – 1998. Department of Computer Science, University of Massachusetts Amherst. Research Assistant.

1992 – 1993. School of Computer Science, Carnegie Mellon University. Visiting Scholar.

1991 – 1992. Department of Computer Science, University of Massachusetts Amherst. Research Assistant.

1990 – 1991. Department of Computer and Information Science, University of Massachusetts Amherst. Teaching Assistant.

1987 – 1989. Faculty of Electrical Engineering, University of Belgrade. Teaching Assistant.

1985. Burroughs Corporation, Milano, Italy. *Sistemista*.

ACADEMIC AFFILIATIONS

New Mexico Cancer Nanotech Training Center

UNM Nanoscience and Microsystems

UNM Center for Biomedical Engineering

UNM Program in Interdisciplinary Biological and Biomedical Science

RESEARCH INTERESTS

Molecular computation and computation in synthetic chemistry (biochemical modes of computation, molecular robotics, statistical physics, microfluidics)

Experimental computer science in the field of programming language implementation (virtual machines, garbage collection, compilers, security)

TEACHING EXPERIENCE

Programming Languages

Operating Systems

Compilers

Biocomputing

PROFESSIONAL SOCIETY AFFILIATIONS

Association for Computing Machinery

Institute of Electrical and Electronic Engineers (Computer Society)

European Association for Programming Languages and Systems

International Society for Nanoscale Science, Computation, and Engineering

HONORS

Nominated for the 2012–2014 Presidential Teaching Fellowship, UNM.

NSF CAREER Award, 2003–2009.

Junior Faculty Research Excellence Award, UNM School of Engineering, 2004.

Regents' Lecturer, UNM, 2004.

Bronze Medal, 14th International Physics Olympiad, 1983.

PUBLICATIONS

(Reverse chronological order in each section)

MANUSCRIPTS UNDER REVIEW (JOURNALS)

- P. Banda, C. Teuscher, and D. Stefanovic, "Training an Asymmetric Signal Perceptron through Reinforcements in an Artificial Chemistry", submitted, June 2013.
- C. W. Brown III, M. R. Lakin, D. Stefanovic and S. W. Graves, "Enzyme Displacement Reactions for Programmable Molecular Logic", submitted, June 2013.
- O. Semenov, D. Mohr, and D. Stefanovic, "First-passage time properties of multivalent catalytic walkers". submitted, April 2013, in revision June 2013. arXiv:1304.5572 [physics.bio-ph]
- M. R. Lakin, A. Minnich, T. Lane, and D. Stefanovic, "A biomolecular learning machine", submitted, April 2013.
- J. E. Poje, T. Kastratovic, A. R. Macdonald, A. C. Guillermo, S. E. Troetti, O. J. Jabado, M. L. Fanning, D. Stefanovic, and J. Macdonald, "Molecular Automata as Graphics Processing Units and Visual Displays", submitted, February 2013.

MANUSCRIPTS UNDER REVIEW (CONFERENCES)

none

MANUSCRIPTS IN PREPARATION (JOURNALS)

- C. W. Brown III, M. R. Lakin, H. E. West, D. Stefanovic, and S. Graves, "Modular Signal Propagation Between DNA Logic Architectures"
- A. Goudarzi, M. R. Lakin, and D. Stefanovic, "Microfluidic feedback loops"
- M. R. Lakin, A. Phillips, and D. Stefanovic, "Modular verification of DNA strand displacement networks"
- P. L. Krapivsky and D. Stefanovic, "Diffusive Lattice Gases"

EDITED PROCEEDINGS VOLUMES

- V1** D. Stefanovic and A. Turberfield (eds.), *DNA18, 18th International Conference on DNA Computing and Molecular Programming*, Springer LNCS Vol. 7433, 2012.

CHAPTERS IN BOOKS

- B7** O. Semenov, D. Stefanovic, and M. N. Stojanovic, "The Effects of Multivalency and Kinetics in Nanoscale Search by Molecular Spiders", in *Evolution, Complexity and Artificial Life*, S. Cagnoni, M. Mirrolli, and M. Villano (eds.), Springer, in press (extended version of [C27]).
- B6** M. N. Stojanovic and D. Stefanovic, "Some Experiments and Models in Molecular Computing and Robotics", Chapter 8 in *Biomolecular Computing: From Unconventional Computing to "Smart" Biosensors and Actuators*, E. Katz (ed.), Wiley-VCH, 2012.
- B5** J. Macdonald, D. Stefanovic, and M. Stojanovic, "Molecular Automata", in *Encyclopedia of Complexity and System Science*, R. A. Meyers, (ed.) Springer, 2009.

- B4** D. Stefanovic, "Emerging models of computation: directions in molecular computing", in *Challenges for Software-Intensive Systems and New Computing Paradigms*, M. Wirsing, J.-P. Banâtre, M. Hölzl, and A. Rauschmayer (eds.), Springer (LNCS Vol. 5380), 2008.
- B3** J. Sager, J. Farfel, and D. Stefanovic, "Nanocomputing", Chapter 10 in *NanoBioTechnology: BioInspired Devices and Materials of the Future*, O. Shoseyov and I. Levy (eds.), Humana Press, 2008.
- B2** J. Macdonald, D. Stefanovic, and M. N. Stojanovic, "Solution-Phase Molecular-Scale Computation With Deoxyribozyme-Based Logic Gates and Fluorescent Readouts", Chapter 22 in *Fluorescent Energy Transfer Nucleic Acid Probes*, V. V. Didenko (ed.), Methods in Molecular Biology Series, Humana Press, 2006.
- B1** M. N. Stojanovic, D. Stefanovic, Th. LaBean, and H. Yan, "Computing with Nucleic Acids", Chapter 14 in *Bioelectronics: From Theory to Applications*, I. Willner and E. Katz (eds.), Wiley-VCH, 2005.

ENCYCLOPAEDIC ENTRIES

- E2** D. Stefanovic and J. Macdonald, "Deoxyribozymes performing logic operations and simple computations", in *Scholarpedia, the peer reviewed open-access encyclopedia*, http://www.scholarpedia.org/article/Deoxyribozymes_performing_logic_operations_and_simple_computations, 2012.
- E1** D. Stefanovic, M. Olah, and M. N. Stojanovic, Several entries, in *Nucleic Acids from A to Z*, S. Müller (ed.), Wiley-VCH, 2008.

INVITED ARTICLES

- I5** D. Stefanovic, "Molecules that reason" (News & Views), *Nature Nanotechnology*, 10(4), 625–626 (2009).
- I4** J. Macdonald, D. Stefanovic, M. N. Stojanovic, "Igre za DNK računare", *Hemijski pregled*, 50 (1), januar 2009.
- I3** J. Macdonald, D. Stefanovic, M. Stojanovic, "Des assemblages d'ADN rompus au jeu et au travail", *Pour la science*, Numero 375, janvier 2009; also in other international editions of *Scientific American*, variously dated—Germany, Japan, Italy, China, Russia, etc.
- I2** J. Macdonald, D. Stefanovic, and M. N. Stojanovic, "DNA Computers for Work and Play", *Scientific American*, 299 (5), 84–91 (2008).
- I1** S. M. Blackburn, K. S. McKinley, R. Garner, C. Hoffmann, A. Khan, R. Bentzur, A. Diwan, D. Feinberg, D. Frampton, S. Z. Guyer, M. Hirzel, A. Hosking, M. Jump, H. Lee, J. E. B. Moss, A. Phansalkar, D. Stefanovic, T. VanDrunen, D. von Dincklage, and B. Wiedermann, "Wake Up and Smell the Coffee: Evaluation Methodology for the 21st Century", *Communications of the ACM (Research Highlights)*, 51 (8), 83–89 (2008).

PATENTS

- P3** C. W. Brown III, M. R. Lakin, D. Stefanovic and S. W. Graves, "Structured DNA-RNA Hybrid Molecules to Provide an Interface between DNA Logic Architectures", disclosed April 2013. [NEED TO ADD Application No.]

- P2** M. L. Fanning, J. Macdonald, and D. Stefanovic, "ISO: Numeric Representation of Nucleic Acid Form", Utility Application No. 13/844,646 filed on March 15, 2013.
- P1** J. Macdonald, M. N. Stojanovic, and D. Stefanovic, "Medium Scale Integration of Molecular Logic Gates in an Automaton", US Patent 8,119,782 (granted February 21, 2012).

REFEREED JOURNAL ARTICLES

- J20** M. J. Olah and D. Stefanovic, "Superdiffusive transport by multivalent molecular walkers moving under load", *Physical Review E*, accepted. arXiv:1211.3482 [physics.bio-ph]
- J19** O. Semenov, M. J. Olah, and D. Stefanovic, "Cooperative Linear Cargo Transport with Molecular Spiders", *Natural Computing*, 12(2), 259–276 (2013).
- J18** K.-A. Yang, R. Pei, D. Stefanovic, and M. N. Stojanovic, "Optimizing Cross-reactivity with Evolutionary Search for Sensors", *Journal of the American Chemical Society*, 134(3), 1642–1647 (2012).
- J17** O. Semenov, M. J. Olah, and D. Stefanovic, "Mechanism of Diffusive Transport in Molecular Spider Models", *Physical Review E*, 83, 021117 (2011).
- J16** M. N. Stojanovic and D. Stefanovic, "Chemistry at a Higher Level of Abstraction", *Journal of Computational and Theoretical Nanoscience*, 8(3), 434–440 (2011).
- J15** R. Pei, E. Matamoros, M. Liu, D. Stefanovic, and M. N. Stojanovic, "Training a molecular automaton to play a game", *Nature Nanotechnology*, 5, 773–777 (2010).
- J14** R. Pei, A. Shen, M. J. Olah, D. Stefanovic, T. Worgall, and M. N. Stojanovic, "High-resolution Cross Reactive Array for Alkaloids", *Chemical Communications*, 22, 3193–3195 (2009).
- J13** E. Green, M. J. Olah, T. Abramova, L. R. Williams, D. Stefanovic, and M. N. Stojanovic, "A Rational Approach to Minimal High-Resolution Cross-Reactive Arrays", *Journal of the American Chemical Society*, 128(47), 15278–15282 (2006).
- J12** J. Macdonald, Y. Li, M. Sutovic, H. Lederman, K. Pendri, W. Lu, B. L. Andrews, D. Stefanovic, and M. N. Stojanovic, "Medium Scale Integration of Molecular Logic Gates in an Automaton", *Nano Letters*, 6(11), 2598–2603 (2006).
- J11** R. Pei, S. K. Taylor, D. Stefanovic, S. Rudchenko, T. E. Mitchell, and M. N. Stojanovic, "Behavior of Polycatalytic Assemblies in a Substrate-Displaying Matrix", *Journal of the American Chemical Society*, 128(39), 12693–12699 (2006).
- J10** H. Inoue, D. Stefanovic, and S. Forrest, "On the Prediction of Java Object Lifetimes", *IEEE Transactions on Computers*, 55(7), 880–892 (2006).
- J9** M. Hertz, S. M. Blackburn, J. E. B. Moss, K. S. McKinley, and D. Stefanovic, "Generating Object Lifetime Traces with Merlin", *ACM Transactions on Programming Languages and Systems*, 28(3), 476–516 (2006).
- J8** J. Sager, M. Young, and D. Stefanovic, "Characterization of Transverse Channel Concentration Profiles Obtainable With a Class of Microfluidic Networks", *Langmuir*, 22(9), 4452–4455 (2006).
- J7** H. Lederman, J. Macdonald, D. Stefanovic, and M. N. Stojanovic, "Deoxyribozyme-Based Three-Input Logic Gates and Construction of a Molecular Full Adder", *Biochemistry*, 45(4), 1194–1199 (2006).

- J6** E. G. Barrantes, D. H. Ackley, S. Forrest, and D. Stefanovic, "Randomized Instruction Set Emulation", *ACM Transactions on Information and System Security*, 8(1), 3–40 (2005).
- J5** M. N. Stojanovic, S. Semova, D. Kolpashchikov, J. Macdonald, C. Morgan, and D. Stefanovic, "Deoxyribozyme-Based Ligase Logic Gates and Their Initial Circuits", *Journal of the American Chemical Society*, 127(19), 6914–6915 (2005).
- J4** M. N. Stojanovic and D. Stefanovic, "A Deoxyribozyme-Based Molecular Automaton",¹ *Nature Biotechnology*, 21, 1069–1074 (2003).
- J3** M. N. Stojanovic and D. Stefanovic, "Deoxyribozyme-based Half-Adder", *Journal of the American Chemical Society*, 125(22), 6673–6676 (2003).
- J2** M. N. Stojanovic, D. B. Nikic, and D. Stefanovic, "Implicit-OR tiling of Deoxyribozymes: Construction of Molecular Scale OR, NAND, and Four-Input Logic Gates", *Journal of the Serbian Chemical Society*, 68(4–5), 321–326 (2003).
- J1** M. N. Stojanovic, T. E. Mitchell, and D. Stefanovic, "Deoxyribozyme-Based Logic Gates", *Journal of the American Chemical Society*, 124(14), 3555–3561 (2002).

REFEREED CONFERENCE PAPERS

- C36** D. Stefanovic, M. N. Stojanovic, M. J. Olah, and O. Semenov, "Catalytic Molecular Walkers: Aspects of Product Release", *ECAL 2013, 12th European Conference on Artificial Life*, Taormina, Italy, September 2013.
- C35** M. R. Lakin, A. Phillips, and D. Stefanovic, "Modular verification of two-domain DNA strand displacement networks via serializability analysis", *DNA19, 19th International Conference on DNA Computing and Molecular Programming*, Tempe, Arizona, September 2013.
- C34** D. Mo and D. Stefanovic, "Iterative Self-Assembly with Dynamic Strength Transformation and Temperature Control", *DNA19, 19th International Conference on DNA Computing and Molecular Programming*, Tempe, Arizona, September 2013.
- C33** A. Goudarzi, M. R. Lakin, and D. Stefanovic, "DNA Reservoir Computing: A Novel Molecular Computing Approach", *DNA19, 19th International Conference on DNA Computing and Molecular Programming*, Tempe, Arizona, September 2013.
- C32** D. Stefanovic and M. N. Stojanovic, "Computing Game Strategies", *Computability in Europe*, Milano, Italy, July 2013.
- C31** D. Stefanovic, "Maze Exploration with Molecular-Scale Walkers", *Theory and Practice of Natural Computing*, Tarragona, Spain, October 2012.
- C30** M. R. Lakin, A. Minnich, T. Lane and D. Stefanovic, "Towards a biomolecular learning machine", *Unconventional Computation and Natural Computation*, Orléans, France, September 2012.
- C29** M. J. Olah, D. Mohr, and D. Stefanovic, "Representing Uniqueness Constraints in Object-Relational Mapping: The Natural Entity Framework", *TOOLS Europe 2012, 50th International Conference on Objects, Models, Components, Patterns*, Prague, Czech R., May 2012.

¹Excerpted in *The Scientific Literature: A Guided Tour*, Ch. 6, *Organizing Scientific Arguments*, J. E. Harmon and A. G. Gross, The University of Chicago Press, 2007.

- C28** O. Semenov, D. Stefanovic, and M. N. Stojanovic, “The Effects of Multivalency and Kinetics in Nanoscale Search by Molecular Spiders” *WIVACE2012, Italian Workshop on Artificial Life and Evolutionary Computation*, Parma, Italy, February 2012.
- C27** M. J. Olah and D. Stefanovic, “Multivalent Random Walkers—A Model for Deoxyribozyme Walkers”, *DNA17, 17th International Conference on DNA Computing and Molecular Programming*, Pasadena, California, September 2011.
- C26** O. Semenov, M. J. Olah, and D. Stefanovic, “Multiple Molecular Spiders With a Single Localized Source—the One-Dimensional Case”, *DNA17, 17th International Conference on DNA Computing and Molecular Programming*, Pasadena, California, September 2011.
- C25** M. L. Fanning, J. Macdonald, and D. Stefanovic, “ISO: Numeric Representation of Nucleic Acid Form”, *BCB2011, ACM Conference on Bioinformatics, Computational Biology and Biomedicine*, Chicago, Illinois, August 2011.
- C24** M. Marron, R. Majumdar, D. Stefanovic, and D. Kapur, “Shape Analysis with Reference Set Relations”, *VMCAI2010, Verification, Model Checking, and Abstract Interpretation*, Madrid, Spain, January 2010.
- C23** M. L. Fanning, J. Macdonald, and D. Stefanovic, “Evolving The Deoxyribozyme-Based Logic Gate Design Process Through MAYA II Reconstruction”, *DNA15, 15th International Meeting on DNA Computing*, Fayetteville, Arkansas, June 2009.
- C22** M. Marron, M. Méndez-Lojo, M. Hermenegildo, D. Stefanovic, and D. Kapur, “Sharing Analysis of Arrays, Collections, and Recursive Structures”, *PASTE2008, 8th ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering*, Atlanta, Georgia, November 2008.
- C21** M. Marron, D. Stefanovic, D. Kapur and M. Hermenegildo, “Identification of Heap-Carried Data Dependence Via Explicit Store Heap Models”, *LCPC 2008, Languages and Compilers for Parallel Computing (LCPC) 21st Annual Workshop*, Edmonton, Alberta, Canada, July–August 2008.
- C20** M. Marron, M. Hermenegildo, D. Stefanovic, and D. Kapur, “Efficient Context-Sensitive Shape Analysis with Graph Based Heap Models”, *Compiler Construction*, Budapest, Hungary, April 2008.
- C19** M. Marron, D. Stefanovic, M. Hermenegildo, and D. Kapur, “Heap Analysis in the Presence of Collection Libraries”, *PASTE2007, 7th ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering*, San Diego, California, June 2007.
- C18** M. Marron, D. Kapur, D. Stefanovic and M. Hermenegildo, “Static Heap Analysis for Automatic Parallelization”, *LCPC2006, The 19th International Workshop on Languages and Compilers for Parallel Computing*, New Orleans, Louisiana, November 2006.
- C17** S. M. Blackburn, R. Garner, C. Hoffmann, A. Khan, K. S. McKinley, R. Bentzur, A. Diwan, D. Feinberg, D. Frampton, S. Z. Guyer, M. Hirzel, A. Hosking, M. Jump, H. Lee, J. E. B. Moss, A. Phansalkar, D. Stefanovic, T. VanDrunen, D. von Dincklage, and B. Wiedermann, “The DaCapo Benchmarks: Java Benchmarking Development and Analysis”, *OOPSLA, Object-Oriented Programming Systems, Languages, and Applications*, Portland, Oregon, November 2006.
- C16** J. Sager and D. Stefanovic, “Designing Nucleotide Sequences for Computation: A Survey of Constraints”, *DNA11, 11th International Meeting on DNA Computing*, London, Ontario, Canada, June 2005.
- C15** J. Farfel and D. Stefanovic, “Towards practical biomolecular computers using microfluidic deoxyribozyme logic gate networks”, *DNA11, 11th International Meeting on DNA Computing*, London, Ontario, Canada, June 2005.

- C14 C. Morgan, D. Stefanovic, C. Moore, and M. N. Stojanovic, "Building the components for a biomolecular computer" *DNA10, 10th International Meeting on DNA Computing*, Milano, Italy, June 2004.
- C13 S. Kyrylkov, D. Stefanovic, and E. Moss, "Design and Implementation of a 64 Bit PowerPC Port of Jikes RVM 2.0.3" *2nd Workshop on Managed Run-time Environments*, Palo Alto, CA, March 2004.
- C12 E. G. Barrantes, D. H. Ackley, S. Forrest, T. S. Palmer, D. Stefanovic, and D. Dai Zovi, "Randomized instruction set emulation to disrupt binary code injection attacks", *CCS2003, 10th ACM Conference on Computer and Communications Security*, Washington, DC, October, 2003.
- C11 J. Cochran, D. Kapur, and D. Stefanovic, "Model Checking Reconfigurable Processor Configurations for Safety Properties", *FPL, 13th International Conference on Field Programmable Logic and Applications*, Lisbon, Portugal, September, 2003.
- C10 D. Stefanovic, M. Hertz, S. M. Blackburn, K. S. McKinley and J. E. B. Moss, "Older-first Garbage Collection in Practice: Evaluation in a Java Virtual Machine", *ACM SIGPLAN Workshop on Memory System Performance*, Berlin, Germany, June 2002.
- C9 M. Hertz, S. Blackburn, J. E. B. Moss, K. S. McKinley, and D. Stefanovic, "Error-Free Garbage Collection Traces: How to Cheat and Not Get Caught", *ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*, Marina del Rey, California, June 2002.
- C8 D. Stefanovic, K. S. McKinley, and J. E. B. Moss, "On Models for Object Lifetime Distributions", *ACM International Symposium on Memory Management*, Minneapolis, Minnesota, October 2000.
- C7 D. Stefanovic and M. Martonosi, "Limits and Graph Structure of Available Instruction-Level Parallelism", *Euro-Par 2000, European Conference on Parallel Computing*, Munich, Germany, September 2000.
- C6 D. Stefanovic and M. Martonosi, "On Availability of Bit-narrow Operations in General-purpose Applications", *FPL, 10th International Conference on Field Programmable Logic and Applications*, Villach, Austria, August 2000.
- C5 D. Stefanovic, K. S. McKinley, and J. E. B. Moss, "Age-Based Garbage Collection", *OOPSLA, Object-Oriented Programming Systems, Languages, and Applications*, Denver, Colorado, November 1999.
- C4 J. E. B. Moss, P. Utgoff, J. Cavazos, D. Precup, D. Stefanovic, C. Brodley, and D. Scheeff, "Learning to Schedule Straight-Line Code", *Neural Information Processing Systems – Natural and Synthetic*, Denver, Colorado, December 1997.
- C3 D. Stefanovic and J. E. B. Moss, "Characterisation of object behaviour in Standard ML of New Jersey", *Proceedings of the 1994 ACM Conference on Lisp and Functional Programming*, Orlando, Florida, June 1994.
- C2 D. Stefanovic, "The Garbage Collection Toolkit as an Experimentation Tool", *Object-Oriented Programming Systems, Languages, and Applications: Workshop on Memory Management and Garbage Collection*, Washington, DC, September 1993.
- C1 A. Hosking, J. E. B. Moss, and D. Stefanovic, "A Comparative Performance Evaluation of Write Barrier Implementations", *OOPSLA, Object-Oriented Programming Systems, Languages, and Applications*, Vancouver, British Columbia, October 1992.

NOTABLE UNPUBLISHED

- U3 M. Calhoun-Lopez and D. Stefanovic, "Reaction Simulations: A Rapid Development Framework", 2008.

- U₂ S. Kyrlykov and D. Stefanovic, "A Study of Garbage Collection With a Large Address Space for Server Applications", 2005.
- U₁ J. Karlin, D. Stefanovic, and S. Forrest, "The Triton Branch Predictor", 2004. (Championship Branch Prediction challenge, ranked 10th)

INVITED TALKS

TBA, Computability in Europe, Special session on computation in nature, Milano, Italy, July 2013.

"Molecular Spiders: Motion, Computation, and Behaviors", Computing with Spatio-Temporal Dynamics Workshop, Tokyo, Japan, June 2010.

"Molecular Computation", DARPA DSRC Workshop, Menlo Park, California, March 2010.

"Biomolecular Automata Using Deoxyribozymes for Solution and Surface Computation", European Union – ERCIM InterLink Workshop, Èze, France, May 2007.

"Biomolecular Automata Using Deoxyribozymes: Accomplishments and Open Problems", Unconventional Computation: Quo Vadis? (Center for Nonlinear Studies, Los Alamos National Laboratory), Santa Fe, New Mexico, March 2007.

"Biomolecular Automata Using Deoxyribozymes: Accomplishments and Open Problems", Workshop "Automata and formal languages for DNA computation and bioinformatics" (European Science Foundation AutoMathA Program), Como, Italy, October 2006.

"Biomolecular Automata" (invited tutorial), Unconventional Computing Conference, York, England, September 2006.

"Deoxyribozyme logic - achievements and perspective", University of Colorado, Boulder, Colorado, November 2004.

"Flexible and Fast Garbage Collection Algorithms", Institut für Programmstrukturen und Datenorganisation, University of Karlsruhe, Germany, September 2000.

"Performance Analysis Tools for Reconfigurable Hardware", Department of Computer Science, University of Colorado Boulder, November 1999.

"Results in Age-Based Garbage Collection", Alpha Architecture Development Group, Compaq Computer Corporation, Shrewsbury, Massachusetts, July 1999.

"Age-Based Garbage Collection", Compaq Computer Corporation, Nashua, New Hampshire, December 1998.

"Rethinking age-based garbage collectors", DARPA Information Technology Office Graduate Student Workshop, Arlington, Virginia, July 1998.

SERVICE

DEPARTMENT – UNM CS

Chair of Committee for the Promotion of Research, 2013–present.

Acting Associate Chair, 2010. Focused on new space for teaching labs and on student outcomes.

Tenure and Promotion Committee, 2010–2012.

Chair of Graduate Admissions Committee, 2001–2006.

Undergraduate Curriculum Committee, 2006–2008, 2010–2013.

Undergraduate Honors Committee, 2002–present.

PhD Comprehensive Examination, Programming Languages Section examiner, 2000–2012; coordinator 2002–2012.

MS examination examiner 2000–2010; coordinator 2004–2006.

Technical Reports series coordinator, 2005–2006.

Faculty Hiring Committee, 2009–2010.

Software track committee, 2007–present.

DEPARTMENT – UNM CBME

Biomedical Engineering Graduate Program Admissions Committee, 2011–present.

UNM SCHOOL OF ENGINEERING

Associate dean for research search committee, 2009–2010.

Graduate Committee, 2010–2011.

Policy Committee, 2013–present.

UNIVERSITY

Faculty Senate Committee on Intellectual Property, 2001–2004.

UNM - Defense Threat Reduction Agency working group, 2004.

EXTERNAL

PhD Scholarship Committee, University of the Sunshine Coast (Australia), 2012.

PROFESSIONAL

Program committee co-chair, 18th International Conference on DNA Computing and Molecular Programming, 2012.

Conference program committees: Unconventional Computing 2009, Ponta Delgada, Portugal; PLDI 2009, Dublin, Ireland (External Review Committee); DNA Computing 2010, Hong Kong; Unconventional Computing 2010, Tokyo; DNA Computing 2011, Pasadena; DNA Computing 2013, Tempe; IWBDIA International Workshop on Bio-design Automation 2013, London.

Reviewer for journals: ACM Transactions on Computer Systems; ACM Transactions on Architecture and Compiler Optimizations; IEEE Transactions on Parallel and Distributed Systems; IEEE Transactions on Computers; IEEE Transactions on Nanobioscience; Journal of the American Chemical Society; Nucleic Acids Research; BioSystems; Nano Letters; Science; Theoretical Computer Science; Journal of the Royal Society Interface; Nature Nanotechnology; International Journal of Computer Mathematics; PLoS Computational Biology; Journal of Computational and Theoretical Nanoscience; International Journal of Unconventional Computation; Nature Reviews Genetics; Higher-Order and Symbolic Computation; Journal of Systems and Software; Physica D: Nonlinear Phenomena; Chemistry & Biology; Natural Computing; BMC Bioinformatics; Journal of Cheminformatics; Proceedings of the National Academy of Sciences; Analytical Chemistry; Journal of Physical Chemistry.

Reviewer for conferences: Architectural Support for Programming Languages and Operating Systems (ASPLOS); Object-Oriented Programming Systems, Languages, and Applications (OOPSLA); Programming Language Design and Implementation (PLDI); Parallel Architectures and Compilation Techniques (PACT); International Conference on Supercomputing (ICS); European Compiler Construction Conference; High Performance Computer Architectures (HPCA); International Symposium on Computer Architecture (ISCA); International Symposium on Performance Analysis of Systems and Software; International Symposium on Microarchitecture (MICRO); Workshop on Hot Topics in Operating Systems (HotOS); International Meeting on DNA Computing.

Special issue guest editor, *Natural Computing* (Springer), 2012–2013.

Co-organizer and host, Workshop on Living Matter as Computing Media, July 2008.

Host, DaCapo NSF PI meetings, January 2003 and January 2006.

Host, Next Generation Virtual Machine meeting, January 2006.

Member and director for cyberinfrastructure, Center for Molecular Cybernetics, an NSF Chemical Bonding Center, 2005–2009.

Grant proposal evaluation: Panelist and ad hoc reviewer for National Science Foundation (numerous occasions); panelist for EU FP planning committee.

Occasional reviewer for Addison-Wesley, Morgan Kaufmann, John Wiley, etc.

Participant (together with UNM CS351 students) in class-testing the 2nd edition of Michael Scott's *Programming Language Pragmatics* (evaluated text and exercises ahead of publication).

NOTEWORTHY "SYNERGISTIC" ACTIVITIES

The 64-bit PowerPC platform port of Jikes RVM (2001–2006), in collaboration with the University of Ghent and the University of Massachusetts, recognized as the most significant user contribution to the Jikes RVM open-source project <http://jikesrvm.org> [IBM Systems Journal 44(2), 2005, 399–417]; this included a port of the optimizing compiler, which was my personal summer project in 2004.

Participated (2003–2008) in the development of the DaCapo benchmark suite for memory management and other performance studies of Java virtual machine implementations; <http://dacapobench.org>.

Participated (1991–1997) in the design and implementation of UMass Garbage Collector Toolkit, a language-independent set of tools for building flexible memory managers, made available to researchers in academia and industry.

DIMACS implementation challenge for data structures (1995–1996): constructed and provided to participants in the challenge very long sequences of abstract data type operations as found in program tracing applications.

OTHER ACADEMIC – LINGUISTICS

Informant for Alan R. King's modal verbs project.

Field work: collected and compiled a *Dictionary of a New England Idiolect*, with over 1100 entries.

OUTREACH AND COMMUNITY

Mentor for undergraduate students, UNM School of Engineering NSF STEP program to improve retention, 2012–present.

Mentor for high-school summer interns, UNM CBME PREM program to attract underrepresented groups to engineering, 2011.

Mentor for high-school summer interns, Albuquerque Public Schools' Career Enrichment Center, 2002–2003.

Book repair volunteer, Clark Field Library, Maxwell Museum of Anthropology, 2003–2006.

Magnifico Art Forward (non-profit urban art space), Steering Committee, 2003–2004.

Jefferson Middle School (Albuquerque) Science Fair, judge, 2005.

Intel International Science Fair Finals, judge for IEEE section award, 2007.