Darko Stefanovic

Professor
Department of Computer Science
University of New Mexico
Albuquerque, NM 87131

(505) 277-6561
darko@cs.unm.edu
https://www.cs.unm.edu/~darko/

EDUCATION

Postdoc, Electrical Engineering, Princeton University, 1999–2000. Advisor: Margaret R. Martonosi.

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

2015 – present. Department of Computer Science, University of New Mexico. Professor. Courtesy appointment in the Department of Chemical and Biological Engineering.

2016 – 2022. Department of Computer Science, University of New Mexico. Department Chair.

2009 – 2025. Center for Biomedical Engineering, University of New Mexico. Faculty member.

2005 – present. Nanoscience and Microsystems, University of New Mexico. Faculty member.

2015 – 2016. Department of Computer Science, University of New Mexico. Interim Chair.

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

2006 – 2015. Department of Computer Science, University of New Mexico. Associate Professor.

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

2016 – 2018. Mentor. UNM Post-baccalaureate Research and Education Program.

2013 – 2015. Mentor. UNM Program in Interdisciplinary Biological and Biomedical Science.

2011 – 2015. Mentor. New Mexico Cancer Nanotech Training Center.

EXTENDED VISITS

2015. Visiting faculty, Università di Trento.

2006. Visiting faculty, Universidad Politécnica de Madrid.

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).

HONORS

ACM Distinguished Scientist, 2016. Citation: For contributions to molecular computing.

ACM SIGPLAN Most Influential Paper Award, for OOPSLA 2006 paper "The DaCapo benchmarks: Java benchmarking development and analysis" [C17], 2016.

Senior Faculty Research Excellence Award, UNM School of Engineering, 2014.

NSF CAREER Award, 2003–2009.

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

Regents' Lecturer, UNM, 2004–2007.

Bronze Medal, 14th International Physics Olympiad, 1983.

PROFESSIONAL SOCIETY AFFILIATIONS

Distinguished Member, Association for Computing Machinery / SIGPLAN.

Senior Member, Institute of Electrical and Electronic Engineers / Computer Society.

Member, International Society for Nanoscale Science, Computation, and Engineering.

PUBLICATIONS

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.

EDITED JOURNAL SPECIAL ISSUES

S1 D. Stefanovic and A. Turberfield (eds.), *Natural Computing*: Volume 13, Issue 4 (2014), Preface pp. 497–498.

CHAPTERS IN BOOKS

B10 D.Arredondo, M. R. Lakin, D. Stefanovic, and M. N. Stojanovic, "Development and Application of Catalytic DNA in Nanoscale Robotics", Chapter 15 in *DNA- and RNA-Based Computing Systems*, E. Katz (ed.), Wiley-VCH, 2021.

B9 M. R. Lakin, D. Stefanovic, and M. N. Stojanovic, "Diverse applications of DNAzymes in computing and nanotechnology", in *Ribozymes*, S. Müller, B. Masquida, W. Winkler (eds.), Wiley-VCH, 2021.

B8 M. R. Lakin, M. N. Stojanovic, and D. Stefanovic, "Implementing Molecular Logic Gates, Circuits, and Cascades Using DNAzymes", in *Advances in Unconventional Computing*, A. Adamatzky (ed.), Springer, 2017.

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. Mirolli, and M. Villani (eds.), Springer, 2014.

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. J. Olah, and M. N. Stojanovic, Several entries, in *Nucleic Acids from A to Z*, S. Müller (ed.), Wiley-VCH, 2008.

INVITED ARTICLES

I4 D. Stefanovic, "Molecules that reason" (News & Views), *Nature Nanotechnology*, 10(4), 625–626 (2009).

I3 J. Macdonald, D. Stefanovic, M. N. Stojanovic, "Igre za DNK računare", *Hemijski pregled*, 50 (1), januar 2009.

I2 J. Macdonald, D. Stefanovic, and M. N. Stojanovic, "DNA Computers for Work and Play", *Scientific American*, 299 (5), 84–91 (2008). `doi:10.1038/scientificamerican1108-84`. Translated as "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.

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

(pending) T. L. Mallette, M. R. Lakin, D. Stefanovic, and M. N. Stojanovic, "Heterochiral Translators and Molecular Circuits" (continuation), filed November 2025.

P5 T. L. Mallette, M. R. Lakin, D. Stefanovic, and M. N. Stojanovic, "Heterochiral Translators and Molecular Circuits" US Patent 12,529,103, (January 20, 2026).

P4 A. Goudarzi, D. Stefanovic, S. W. Graves, and D. Kalb, "Hybrid Architecture System and Method for High-dimensional Sequence Processing", US Patent 11,188,813 (November 30, 2021).

P3 C. W. Brown, III, S. W. Graves, D. Stefanovic, and M. R. Lakin, "Signal Propagation Biomolecules, Devices, and Methods", US Patent 10,221,446 (March 5, 2019).

P2 C. W. Brown, III, S. W. Graves, D. Stefanovic, and M. R. Lakin, "Signal Propagation Biomolecules, Devices, and Methods", US Patent 9,476,090 (October 25, 2016).

P1 J. Macdonald, M. N.Stojanovic, and D. Stefanovic, "Medium Scale Integration of Molecular Logic Gates in an Automaton", US Patent 8,119,782 (February 21, 2012).

REFEREED JOURNAL ARTICLES

(in submission) N. Milosavic, R. Baosic, J. Jovicic, M. Stojanovic, K. Yang, D. Stefanovic, A. Idilli, P. D. Ducharme, T. E. Kippin, K. W. Plaxco, M. Lacroix, Y. Ameziane, A. K. Lyashenko, S. Cremers, K. Woodward, J. Stevens, and S. Mohan, "Aptamer-based Sensors for Real-Time Tracking of Drug Elimination in Effluents from Continuous Renal Replacement Therapy".

J43 L. Liu, B. Jacobson, and D. Stefanovic, "PID-controller enhanced artifical β-cells", *PLoS One*, 21(3): e0342799 (2026).

J42 B. I. Harding, N. M. Pollak, D. Stefanovic, and J. Macdonald, "Complexing Deoxyribozymes with RNA Aptamers for Detection of the Small Molecule Theophylline", *Biosensors and Bioelectronics*, 198, 113774 (2022).

J41 O. Staufer, J. A. De Lora, E. Bailoni, A. Bazrafshan, A. S. Benk, K. Jahnke, Z. A. Manzer, L. Otrin, T. Díez Pérez, J. Sharon, J. Steinkühler, K. P. Adamala, B. Jacobson, M. Dogterom, K. Göpfrich, D. Stefanovic, S. R. Atlas, M. Grunze, M. R. Lakin, A. P. Shreve, J. P. Spatz, and G. P. Lopez, "Science Forum: Building a community to engineer synthetic cells and organelles from the bottom-up", *eLife*, 10:e73556 (2021).

J40 T. Mallette, M. N. Stojanovic, D. Stefanovic, and M. R. Lakin, "Robust heterochiral strand displacement using leakless translators", *ACS Synthetic Biology*, 9(7), 1907—1910 (2020).

J39 D. Arredondo and D. Stefanovic, "Effect of polyvalency on tethered molecular walkers on independent one-dimensional tracks", *Physical Review E*, 101, 062101 (2020).

J38 B. I. Harding, N. M. Pollak, D. Stefanovic, and J. Macdonald, "Repeated Reuse of Deoxyribozyme-Based Logic Gates", *Nano Letters*, 19, 7655–7661 (2019).

J37 A. Fabry-Wood, M. E. Fetrow, A. Oloyede, K.-A. Yang, M. N. Stojanovic, D. Stefanovic, S. W. Graves, N. J. Carroll, and M. R. Lakin, "Microcompartments for Protection and Isolation of Nanoscale DNA Computing Elements", *ACS Applied Materials & Interfaces*, 11 (12), 11262–11269 (2019).

J36 A. Fabry-Wood, M. E. Fetrow, C. W. Brown, III, N. A. Baker, N. Fernandez Oropeza, A. P. Shreve, G. A. Montaño, D. Stefanovic, M. R. Lakin, and S. W. Graves, "A Microsphere-Supported Lipid Bilayer Platform for DNA Reactions on a Fluid Surface", *ACS Applied Materials & Interfaces*, 9 (35), 30185–30195 (2017).

J35 M. R. Lakin and D. Stefanovic, "Supervised learning in adaptive DNA strand displacement networks", *ACS Synthetic Biology*, 5(8), 885–897 (2016).

J34 D. Blount, P. Banda, C. Teuscher, and D. Stefanovic, "Feedforward Chemical Neural Network: An In Silico Chemical System That Learns XOR", *Artificial Life*, 23, 295–317 (2017).

J33 D. Mo, M. R. Lakin, and D. Stefanovic, "Logic Circuits Based on Molecular Spider Systems", *BioSystems*, 146, 10–25 (2016).

J32 J. Bürger, A. Goudarzi, D. Stefanovic, and C. Teuscher, "Computational Capacity and Energy Consumption of Complex Resistive Switch Networks", *AIMS Materials Science*, 2(4), 530–545 (2015).

J31 M. R. Lakin, D. Stefanovic, and A. Phillips, "Modular Verification of Chemical Reaction Network Encodings via Serializability Analysis", *Theoretical Computer Science*, 632, 21–42 (2016).

J30 C. W. Brown, III, M. R. Lakin, A. Fabry-Wood, E. K. Horwitz, N. A. Baker, D. Stefanovic, and S. W. Graves, "A Unified Sensor Architecture for Isothermal Detection of Double-Stranded DNA, Oligonucleotides, and Small Molecules", *ChemBioChem*, 16, 725–730 (2015).[1]

[1] Issue cover article.

J29 M. R. Lakin, A. Minnich, T. Lane, and D. Stefanovic, "Design of a biochemical circuit motif for learning linear functions", *Journal of the Royal Society Interface*, 11(101), 20140902 (2014).

J28 M. R. Lakin, C. W. Brown, III, E. K. Horwitz, M. L. Fanning, H. E. West, D. Stefanovic, and S. W. Graves, "Biophysically Inspired Rational Design of Structured Chimeric Substrates for DNAzyme Cascade Engineering", *PLoS ONE*, 9(10): e110986 (2014).

J27 P. L. Krapivsky and D. Stefanovic, "Lattice gases with a point source", *Journal of Statistical Mechanics: Theory and Experiment*, P09003 (2014).

J26 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, "Visual Displays that Directly Interface and Provide Read-Outs of Molecular States via Molecular Graphics Processing Units", *Angewandte Chemie International Edition*, 53(35), 9222–9225 (2014).

J25 M. N. Stojanovic, D. Stefanovic, and S. Rudchenko, "Exercises in Molecular Computing", *Accounts of Chemical Research*, 47 (6) 1845–1852 (2014).[2]

J24 C. W. Brown, III, M. R. Lakin, E. K. Horwitz, M. L. Fanning, H. E. West, D. Stefanovic, and S. W. Graves, "Signal Propagation in Multi-Layer DNAzyme Cascades using Structured Chimeric Substrates", *Angewandte Chemie International Edition*, 53(28), 7183–7187 (2014).

J23 C. W. Brown, III, M. R. Lakin, D. Stefanovic, and S. W. Graves, "Catalytic Molecular Logic Devices by DNAzyme Displacement", *ChemBioChem*, 15, 950–954 (2014).[3]

J22 P. Banda, C. Teuscher, and D. Stefanovic, "Training an Asymmetric Signal Perceptron through Reinforcement in an Artificial Chemistry", *Journal of the Royal Society Interface*, 11(93), 20131100 (2014).

J21 O. Semenov, D. Mohr, and D. Stefanovic, "First-passage properties of molecular spiders", *Physical Review E*, 88, 012724 (2013).

J20 M. J. Olah and D. Stefanovic, "Superdiffusive transport by multivalent molecular walkers moving under load", *Physical Review E*, 87, 062713 (2013).

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).

[2]ACS Editors' Choice article.

[3]Issue cover article.

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",[4] *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).

CONFERENCE PAPERS (PEER-REVIEWED)

(in submission) L. Lin, B. Jacobson, X. Chen, and D. Stefanovic, "CIREN: Continuous Impulse Response Estimator Networks for Predicting Blood Glucose Levels".

C52 H. Nguyen, P. Banda, D. Stefanovic, and C. Teuscher, "Reservoir Computing with Random Chemical Systems", *ALife 2020*, virtual location, July 2020.

[4] Excerpted 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, and analyzed in *The Craft of Scientific Communication*, Ch. 4–5, J. E. Harmon and A. G. Gross, The University of Chicago Press, 2010.

C51 G. Stelle and D. Stefanovic, "Verifiably Lazy: Verified Compilation of Call-by-Need", *IFL2018, Implementation of Functional Languages*, Lowell, Massachusetts, September 2018.

C50 D. Stefanovic, "A simplified account of cooperative effects in molecular walker teams", *5th ACM/IEEE International Conference on Nanoscale Computing and Communication*, Reykjavik, Iceland, September 2018.

C49 M. R. Lakin and D. Stefanovic, "Towards temporal logic computation using DNA strand displacement reactions", *Unconventional Computation and Natural Computation*, Fayetteville, Arkansas, June 2017.

C48 G. Stelle, D. Stefanovic, S. Olivier, and S. Forrest, "Cactus Environment Machine: Shared Environment Call-by-Need", *17th Symposium on Trends in Functional Programming (TFP)*, College Park, Maryland, June 2016.

C47 D. Mohr and D. Stefanovic, "Stella: A Python-based Domain-Specific Language for Simulations", *ACM Symposium on Applied Computing*, Pisa, Italy, April 2016.

C46 D. Mo, M. R. Lakin, and D. Stefanovic, "Scalable Design of Logic Circuits using an Active Molecular Spider System", *10th International Conference on Information Processing in Cells and Tissues (IPCAT)*, San Diego, California, September 2015.

C45 J. Bürger, A. Goudarzi, D. Stefanovic, and C. Teuscher, "Hierarchical Composition of Memristive Networks for Real-Time Computing", *11th ACM/IEEE International Symposium on Nanoscale Architectures (NANOARCH)*, Boston, Massachusetts, July 2015.

C44 M. R. Lakin and D. Stefanovic, "Supervised learning in an adaptive DNA strand displacement circuit", *DNA21, 21st International Conference on DNA Computing and Molecular Programming*, Boston, Massachusetts, August 2015.

C43 A. Goudarzi, A. Shabani, and D. Stefanovic, "Exploring Transfer Function Nonlinearity in Echo State Networks", *Eighth IEEE Symposium on Computational Intelligence for Security and Defense Applications*, Verona, New York, May 2015.

C42 A. Goudarzi, A. Shabani, and D. Stefanovic, "Product Reservoir Computing: Time-Series Computation with Multiplicative Neurons", *International Joint Conference on Neural Networks*, Killarney, Ireland, July 2015.

C41 A. Goudarzi, D. Arnold, D. Stefanovic, K. Ferreira and G. Feldman, "A Principled Approach to HPC Event Monitoring", *Fault Tolerance for HPC at eXtreme Scale Workshop (FTXS)*, Portland, Oregon, June 2015.

C40 A. Goudarzi and D. Stefanovic, "Towards a Calculus of Echo State Networks", *Annual International Conference on Biologically Inspired Cognitive Architectures (BICA)*, Boston, Massachusetts, November 2014.

C39 A. Goudarzi, M. R. Lakin, D. Stefanovic, and C. Teuscher, "A Model for Variation- and Fault-Tolerant Digital Logic using Self-Assembled Nanowire Architectures", *10th ACM/IEEE International Symposium on Nanoscale Architectures (NANOARCH)*, Paris, France, July 2014.

C38 A. Goudarzi, M. R. Lakin, and D. Stefanovic, "Reservoir Computing Approach to Robust Computation using Unreliable Nanoscale Networks", *Unconventional Computation and Natural Computation*, London, Ontario, Canada, July 2014.

C37 M. R. Lakin and D. Stefanovic, "Pattern formation by spatially organized approximate majority reactions", *Unconventional Computation and Natural Computation*, London, Ontario, Canada, July 2014.

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.

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*, Fayeteville, 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.[5]

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.

[5] ACM SIGPLAN Most Influential Paper Award, presented at OOPSLA 2016. Citation: "The DaCapo benchmarks have become the de facto standard Java benchmarking suite, quickly replacing older suites, such as the SPEC JVM benchmarks. The reasons are easy to discern from this paper. The paper puts forward a compelling model for benchmark selection and evaluation methodologies, and discusses in detail the experimental evaluation intricacies of the Java setting. The paper also introduces new metrics and contains detailed measurements of program behavior. The DaCapo paper has set a standard that substantially raised the level of Java experiments in the overall literature of the past decade."

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.

RESEARCH GRANTS RECEIVED

PI (collaborative): National Science Foundation, *ITR: Dynamic Cooperative Performance Optimization* (DaCapo project), $3,156,901, 2000–2005, joint with Kathryn McKinley (U. of Texas), Amer Diwan (U. of Colorado), Tony Hosking (Purdue U.), Eliot Moss (U. of Massachusetts) and Chip Weems (U. of Massachusetts). UNM portion $316,062.

PI (sole): National Science Foundation, *ITR: Intrusion Detection and Intrusion Prevention Through Dynamic Binary Translation*, $132,243, 2002–2004.

PI (collaborative): National Science Foundation, *QuBIC: Decision-Making Deoxyribozyme Networks*, $450,000, 2002–2005, joint with Milan Stojanovic (Columbia U.). UNM portion $80,327.

PI (sole): Sandia National Laboratories: *Malicious Code Analysis and Detection Using Dynamic Binary Translation*, Sandia University Research Program, $35,000, 2002–2003.

PI (sole): Microsoft Research: *Garbage Collection Alternatives for CLI/C#*, $20,000, 2002–2003.

Hewlett-Packard: *Java Virtual Machine and Garbage Collection Performance in Large Address Spaces*, equipment gift, $74,372, 2002.

Intel: software gift matching the Hewlett-Packard equipment gift above, estimated $7,000, 2002.

PI (sole): National Science Foundation, *CAREER: Deoxyribozyme-Deoxyribozyme Logic: A New Computational Substrate*, $450,000, 2003–2008.

PI (collaborative): National Science Foundation, *ITR: Solution Phase Computation with Enzymatic Networks*, $3,003,000, 2003–2008, joint with Cristopher Moore (UNM), Sergei Rudchenko (Hospital for Special Surgery), and Milan Stojanovic (Columbia U.). UNM portion $615,670.

Xilinx: FPGA design software, $6,985, 2003.

National Science Foundation, *REU (research experiences for undergraduates) supplement to ITR: Intrusion Detection and Intrusion Prevention Through Dynamic Binary Translation*, $6,000, 2004-2005.

Eiffel Software: software gift in support of educational activities, estimated $4,799, 2004.

PI (sole): Sandia National Laboratories: *DNA-Based Intelligent Microsensors for Genetically Modified Organisms*, $10,000, 2005.

National Science Foundation: *REU (research experiences for undergraduates) supplement to CAREER: Deoxyribozyme-Deoxyribozyme Logic: A New Computational Substrate*, $12,000, 2005–2006.

PI (collaborative): National Science Foundation, Directorate for Mathematical & Physical Sciences: *Collaborative Research: CBC: Center for Molecular Cybernetics (Chemical Bonding Centers, Phase I)*, $1,500,000, 2005–2008, joint with Paul Krapivsky (Boston U.), Milan Mrksich (U. of Chicago), Niles Pierce (Caltech), Sergei Rudchenko (Hospital for Special Surgery), Milan Stojanovic (Columbia U.), Nils Walter (U. of Michigan), and Erik Winfree (Caltech). UNM portion $138,301.

PI (collaborative): National Science Foundation, *Collaborative Research: Algorithmic Optimization in Dynamic Programming Environments*, $380,000, 2006–2009, joint with Amer Diwan (U. of Colorado). UNM portion $180,000.

Institute for Advanced Study (Los Alamos), *Organization of Workshop on Living Matter as Computing Media*, $17,000, 2008.

PI (collaborative): National Science Foundation, *Collaborative Research: EMT/MISC: Behavior-Based Molecular Robotics*, $2,250,000, 2008–2012, joint with Paul Krapivsky (Boston U.), Milan Mrksich (U. of Chicago), Milan Stojanovic (Columbia U.), Nils Walter (U. of Michigan), Erik Winfree (Caltech), and Hao Yan (Arizona State U.). UNM portion $300,000.

PI (collaborative): National Science Foundation, *Collaborative Research: EMT/MISC: Making Molecular Computation Practical for Biodetection Applications*, $800,000, 2008–2012, joint with Joanne Macdonald (Columbia U.). UNM portion $252,000.

National Science Foundation, supplement to *Collaborative Research: CBC: Center for Molecular Cybernetics (Chemical Bonding Centers, Phase I)*, 2007, $27,660.

PI (collaborative—lead): National Science Foundation, *CDI-Type I: Collaborative Research: Supervised Learning in Molecular Classifiers*, $600,000, 2010–2013, joint with Milan Stojanovic (Columbia U.). UNM portion $250,000.

PI (collaborative—lead): National Science Foundation, *CDI-Type II: Collaborative Research: Computing with Biomolecules: From Network Motifs to Complex and Adaptive Systems*, $1,950,000, 2010–2014, joint with Terran Lane (UNM), Steven Graves (UNM), Christof Teuscher (Portland State U.), and Milan Stojanovic (Columbia U.). UNM portion $1,100,000.

NVIDIA, *Kinetic Monte Carlo Simulation*, equipment gift, estimated $2,500, 2011.

PI (lead): National Science Foundation, *AF: SHF: Small: Compartmentalized circuit architectures for real-world biocomputing applications*, $480,000, 2013–2016, joint with Steven Graves (UNM).

PI (as workshop organizer): National Science Foundation, *Computing with Biomolecules: From Network Motifs to Complex and Adaptive Systems: ALife14 Workshop*, $10,000, 2014.

PI (sole): National Science Foundation, *AF: Small: Programmable nanowalkers: models and simulations*, $400,000, 2014–2017.

Co-I: National Institutes of Health, *Amplified detection of viral RNA using catalytic DNA logic circuits*, $377,760, 2014–2016, joint with Steven Graves (UNM) and Bryce Chackerian (UNM HSC).

National Science Foundation, *REU (research experiences for undergraduates) supplement to AF: SHF: Small: Compartmentalized circuit architectures for real-world biocomputing applications*, $15,837, 2015.

Co-PI: National Science Foundation, *AF: SHF: Small: Adaptive molecular computation using buffered strand displacement networks*, $449,999, 2013–2016, joint with Matthew Lakin (UNM) and Steven Graves (UNM).

PI (collaborative—lead): National Science Foundation, *SHF: Large: Collaborative Research: Molecular computing for the real world*, $2,000,000, 2015–2020, joint with Matthew Lakin (UNM), Steven Graves (UNM), Lydia Tapia (UNM), Christof Teuscher (Portland State U.), Milan Stojanovic (Columbia U.), and Sergei Rudchenko (Hospital for Special Surgery). UNM portion $934,358.

National Science Foundation, *REU (research experiences for undergraduates) supplement to SHF: Large: Collaborative Research: Molecular computing for the real world*, $23,868, 2017.

PI (collaborative—lead): National Science Foundation, *SHF: Collaborative Research: Biocompatible I/O interfaces for robust bioorthogonal molecular computing*, joint with Matthew Lakin (UNM) and Milan Stojanovic (Columbia), $300,000, 2018–2021, UNM portion $200,000.

Co-PI: National Science Foundation, *RoL: Conference: DESYN-C3: An International Conference on Engineering Synthetic Cells and Organelles* joint with Gabriel Lopez (UNM), Andrew Shreve (UNM), Steven Graves (UNM), $100,000, 2018–2019.

National Science Foundation, *REU (research experiences for undergraduates) supplement to SHF: Large: Collaborative Research: Molecular computing for the real world*, $32,000, 2019.

National Science Foundation, *BPC-AE: An Extended CAHSI Alliance to Broaden Participation in Graduate Studies*, $94,475, 2021–2024.

National Science Foundation, *Student and Postdoc Travel Support for DNA28*, $20,000, 2022.

RESEARCH GRANTS PENDING

PI (sole): National Science Foundation, *Elements: Programming tools for biodesign and improved control of synthetic cell processes*, $494,875.

STUDENT SUPERVISION

For students graduated, their first or their last known affiliation is shown.

PHD STUDENTS GRADUATED

Hajime Inoue (co-supervised with Prof. Stephanie Forrest), 2005, *Anomaly Detection in Dynamic Execution Environments*: Principal Scientist, ATC (Architecture Technology Corporation), Ithaca, NY.

Mark Marron (co-supervised with Prof. Deepak Kapur), 2008, *Modeling The Heap: A Practical Approach*: Microsoft Research, Redmond, WA.

Mark Olah, 2012, *Multivalent Random Walkers: A Model for Superdiffusive Nanoscale Transport*; with distinction; winner of the $5,000 QForma prize for best computational dissertation; Nvidia, Santa Clara, CA.

Oleg Semenov, 2013, *Abstract Models of Molecular Walkers*; with distinction; Knewton Inc., New York, NY.

Carl W. Brown, III (Biomedical Sciences Graduate Program, co-supervised with Prof. Steven Graves), 2014, *Engineering Catalytic Molecular Logic Devices for Biodetection*; with distinction; Flagship Pioneering, Cambridge, MA.

M. Leigh Fanning, 2014, *DNA Chemical Reaction Network Synthesis and Compilation*; founder, Versiera LLC, Albuquerque, NM.

David Mohr, 2015, *Stella: A Python-based Domain-Specific Language for Simulations*; Google, Boulder, CO.

Dandan Mo, 2016, *Logic Circuits Based on Extended Molecular Spider Systems*; Massachusetts General Hospital, Boston, MA.

Alireza Goudarzi, 2016, *Theory and Practice of Computing with Excitable Dynamics*; postdoctoral fellow, RIKEN Brain Science Institute, Wako, Japan.

Aurora Fabry-Wood (Biomedical Engineering, co-advised with Prof. Steven Graves), 2018, *Compartmentalization of DNA-Based Molecular Computing Elements Using Lipid Bilayers*; BenuBio, Albuquerque, NM.

George Stelle, 2019, *Shared-Environment Call-by-Need*; Los Alamos National Laboratory.

Adán Myers y Gutiérrez (Nanoscience and Microsystems Engineering, co-advised with Prof. Steven Graves and Prof. Matthew Lakin), 2019, *Diagnostic Sequence Detection Against a Complex Background Using a DNA Molecular Computation Framework*; Los Alamos National Laboratory.

Bradley Harding, 2020, *Development of nucleotide-based resettable molecular circuits and gates, time-keeping systems, and dynamic displays* (University of the Sunshine Coast (Queensland, Australia), associate supervisor (primary supervisor Prof. Joanne Macdonald)); postdoctoral fellow, University of Sidney.

David Arredondo (Nanoscience and Microsystems Engineering, co-advised with Prof. Matthew Lakin), 2022, *Control Mechanisms for Adaptive Nanoscale Devices*; postdoctoral fellow, UNM Cancer Center.

MS STUDENTS GRADUATED

COMPLETED MS THESES

Trek Palmer, 2003, *Design and Implementation of SIND, a Dynamic Binary Translator*: completed PhD at University of Massachusetts, Amherst, MA: Software Engineer at Tranquil Data, Boaton, MA.

QingFeng Duan, 2003, *A Tool for Monitoring and Recording Heap-Allocated Object Behavior*: Microsoft, Raleigh, NC.

Sergiy Kyrylkov, 2004, *Jikes Research Virtual Machine: Design and Implementation of a 64-bit PowerPC Port*: Technical Director, Multiplex Systems, Tallinn, Estonia.

Benjamin Andrews, 2005, *Games, Strategies, and Boolean Formula Manipulation*: Oracle, Tucson, AZ.

Ravi Gorrepati, 2006, *Design and Implementation of a Baseline Port of the Jikes Research Virtual Machine to the IA-64 Architecture*: Senior Software Developer, Location Labs, Emeryville, CA.

James Foucar, 2006, *A Platform for Research into Object-Level Trace Generation*: Sandia National Labs, Albuquerque, NM.

Bryan Cheng, 2009, *New Defenses Against Attacks Caused by Tampered Control Information in Program Memory*: Microsoft, Redmond, WA.

David Mohr, 2010, *Programmer Feedback and Dynamic Analysis to Enable Optimization in Java Applications: The D.U.P.O. Framework*, Google, Boulder, CO.

Geoffrey Reedy, 2013, *Design and Implementation of a Scala Compiler Backend Targeting the Low Level Virtual Machine*: Sandia National Laboratories, Albuquerque, NM.

John Ericksen, *Transfuse: A Compile Time Metaprogramming Solution for Reducing Boilerplate on Google Android*, 2016: PhD student, UNM.

RESEARCH STUDENTS WITH MS UNDER THE COURSE OPTION (NO THESIS)

Brian Stinar, 2009: Owner, Noventum Custom Software, Albuquerque, NM.

David Godinez, 2010: Albuquerque Public Schools.

Marlow Weston, 2010: Intel, Rio Rancho, NM.

Amanda Minnich, 2014: Lawrence Livermore National Lab.

David Ringo, 2018: Los Alamos National Lab.

Brendan Donohoe, 2019: Sandia National Lab.

BS (HONS.) STUDENTS GRADUATED

Dino Dai Zovi, 2002, *Security Applications of Dynamic Binary Translation*: Hacker-in-Residence, NYU Polytechnic Institute, Brooklyn, NY and Square, Inc., San Francisco, CA.

Clint Morgan, 2004, *Building the components for a biomolecular computer*: Software Engineer, Tasktop Technologies, Vancouver, BC.

Lisa Glendenning, 2005, *Mastering Quoridor*: PhD student, University of Washington.

Joseph Farfel, 2005, *Towards practical biomolecular computers using microfluidic deoxyribozyme logic gate networks*: Co-founder, Rad Hard Studios, Albuquerque, NM; Software Engineer, Google, Mountain View, CA.

OTHER BS STUDENTS MENTORED

Nicholas Baker (Chemical Engineering), 2014–2016

Madalyn Elise Fetrow (Chemistry), 2014–2018

Daniel Feinberg, 2003–2005

Brandon Harrington, 2019–2021

Shaswat Shukla, 2020

VISITING SCHOLARS HOSTED

Luis Amable García Fernández (Professor, Universidad Jaume I, Spain), 2008–2009

Marcel Hannes Ablasser (MS student, TU Graz, Austria), 2016

POSTDOCTORAL SCHOLARS

Matthew R. Lakin (PhD, Cambridge University) 2011–2015, now Associate Professor, Computer Science, University of New Mexico

CURRENT PHD STUDENTS

John McIver (completing course requirements)

Liu Lin (completing course requirements)

CURRENT MS STUDENTS

none

CURRENT BS STUDENTS

none

INTERNS MENTORED

Adam Carrión (high-school), summer 2002

Julia Poje (high-school; interned at Columbia), summer 2009 and summer 2010

Steven Troetti (high-school; interned at Columbia), summer 2010 and summer 2011

Paul Greenhouse (high-school), summer 2011

Erin Sosebee (UNM CS undergraduate, NSF STEP program), summer 2013

Katherine Jordan (high-school), summer 2013

Megan Williams (high-school), summer 2013

Nicholas Baker (UNM Chem. Eng. undergraduate, NSF STEP program), summer 2014

Rebecca DeLand (high-school), summer 2014

Madalyn Fetrow (high-school), summer 2014

Tomas Atencio-Pacheco (APS high-school teacher), summer 2014

Cameron Degani (UNM Chem. Eng. undergraduate, NSF STEP program), summer 2015

Priyanka Jain (high-school), summer 2015

Holly Liu (high-school), summer 2015

Brandon Harrington (high-school), summer–fall 2017

Brandon Limary (high-school), 2017–2018

Yana Outkin (high-school—New Mexico Supercomputing Challenge), 2020–2021

SERVICE

PROFESSIONAL

General co-chair, DNA28, 28th International Conference on DNA Computing and Molecular Programming, 2022, Albuquerque.

Organizing committee member and Virtual Technology Committee member, International Conference on Engineering Synthetic Cells and Organelles, 2021, Santa Fe.

Organizing committee member, International Conference on Engineering Synthetic Cells and Organelles, 2020, Santa Fe.

Co-organizer, Computing with Biomolecules Workshop at ALIFE 2014, New York. In charge of student travel awards.

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

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

Associate Editor, International Journal of Parallel, Emergent and Distributed Systems, 2015–present.

Guest Editor, Proceedings of the National Academy of Sciences, 2021; 2023.

Session chair, Unconventional Computing 2010; DNA Computing 2011; DNA Computing 2014; DNA Computing 2015; Theory and Practice of Natural Computing 2014; DNA Computing 2017.

Conference program committees: Unconventional Computing 2009, Ponta Delgada; PLDI 2009 (External Review Committee), Dublin; DNA Computing 2010, Hong Kong; Unconventional Computing 2010, Tokyo; BYTECODE 2011, Saarbrücken; DNA Computing and Molecular Programming 2011, Pasadena; DNA Computing and Molecular Programming 2013, Tempe; IWBDA International Workshop on Bio-design Automation 2013, London; DNA Computing and Molecular Programming 2014, Kyoto; IWBDA International Workshop on Bio-design Automation 2014, Boston; IEEE International Conference on Evolvable Systems 2014 (Special Session: Bio-inspired Computation for the Engineering of Materials and Physical Devices), Orlando; Theory and Practice of Natural Computing 2014, Granada; DNA Computing and Molecular Programming 2015, Boston; IWBDA International Workshop on Bio-design Automation 2015, Seattle; ACM NanoCom (3rd ACM International Conference on Nanoscale Computing and Communication) 2016, New York; IWBDA International Workshop on Bio-design Automation 2016, Newcastle; ACM NanoCom (4th ACM International Conference on Nanoscale Computing and Communication) 2017, Washington; DNA Computing and Molecular Programming 2017, Austin; ACM NanoCom (5th ACM International Conference on Nanoscale Computing and Communication) 2018, Reykjavik; DNA Computing and Molecular Programming 2018, Jinan; DNA Computing and Molecular Programming 2019, Seattle; ACM NanoCom (6th ACM International Conference on Nanoscale Computing and Communication) 2019, Dublin. ACM NanoCom (7th ACM International Conference on Nanoscale Computing and Communication) 2020, College Park, Maryland; DNA Computing and Molecular Programming 2020, Oxford; DNA Computing and Molecular Programming 2021, Oxford; ACM NanoCom (8th ACM International Conference on Nanoscale Computing and Communication) 2021, Catania, Italy; ACM NanoCom (9th ACM International Conference on Nanoscale Computing and Communication) 2022, Barcelona, Spain; ACM NanoCom (10th ACM International Conference on Nanoscale Computing and Communication) 2023, Coventry, UK; ACM NanoCom (11th ACM International Conference on Nanoscale

Computing and Communication) 2024, Milan, Italy; ACM NanoCom (12th ACM International Conference on Nanoscale Computing and Communication) 2025, Chengdu, China; ACM NanoCom (13th ACM International Conference on Nanoscale Computing and Communication) 2026, St. John's, Canada.

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; Nanoscale; Nature Communications; Chemical Science; Nature Chemistry; Chemical Communications; ACS Synthetic Biology; Journal of Chemical Information and Modeling; IEEE Transactions on Dependable and Secure Computing; Molecules; MATCH Communications in Mathematical and in Computer Chemistry; Algorithms for Molecular Biology; ChemPhysChem; ChemBioChem; Angewandte Chemie; Computer Science and Information Systems; ACS Nano; Small; Scientific Reports; Science Advances; Sensors and Actuators B: Chemical; Proceedings of the Royal Society A; IEEE Transactions on Emerging Topics in Computational Intelligence; Computational and Structural Biotechnology Journal; Chemistry: A European Journal; Soft Matter; Journal of Computational Science; New Journal of Physics; IEEE Transactions on Neural Networks and Learning Systems; ACM Journal on Emerging Technologies in Computing Systems; New Generation Computing; Advanced Functional Materials; PLOS ONE; APL Machine Learning; Neuromorphic Computing and Engineering; npj Unconventional Computing.

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.

Research poster reviewer, 2021, 2022, 2024, 2026, CMD-IT/ACM Richard Tapia Celebration of Diversity in Computing

CRA Computing Innovation Fellows Reviewer 2020; 2021

Participant, NSF Institute Planning Workshop on Parallel and Distributed Computing (PDC) Education, July 2020

Site visit panelist for National Science Foundation, Expeditions program.

Grant proposal and other external evaluation: Panelist and ad hoc reviewer for National Science Foundation (numerous occasions), Army Research Office, DFF (Danish Councils for Independent Research (Danish Agency for Science, Technology and Innovation)), FWF (Austrian Science Fund), F.R.S.-FNRS (Belgium), Charles University (Czech R.), New Mexico-INBRE.

Panelist for EU FP8 planning committee.

External evaluation of tenure and promotion cases (particulars omitted).

Occasional manuscript 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).

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.

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 `https://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; `https://dacapobench.org`.

Participated (1991–1997) in the design and implementation of the 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.

DEPARTMENT – UNM CS

Graduate program director, 2022–present.

Graduate committee, 2014–2015.

PhD requirements task force, 2014–2015.

Department building renovation task force, 2013–present.

Chair of Committee for the Promotion of Research, 2013–2014.

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

Tenure and Promotion Committee, 2010–2012; 2013–2014.

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, 2007–2015.

DEPARTMENT – UNM CBME

Biomedical Engineering Graduate Program Admissions Committee, 2011–present.

BME Qualifying Exam Committee, 2015; 2025.

UNM SCHOOL OF ENGINEERING

Ad hoc committee to explore undergraduate curriculum in bioengineering, 2014–2015.

Advisory Committee, 2013–2016.

Research Council, 2013–2014.

Policy Committee, 2013–2016.

Graduate Committee, 2010–2011.

Search committee for associate dean for research , 2009–2010.

UNIVERSITY

Faculty Senate Committee on Intellectual Property, 2001–2004.

Faculty Senate Graduate and Professional Committee, 2025–present.

UNM - Defense Threat Reduction Agency working group, 2004.

Advisory Board member, ARTS Lab, 2016–2020.

EXTERNAL

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

MS Thesis External Examiner, University of Malaya, 2015.

HIR Research Icon, Faculty of Computer Science and Information Technology, University of Malaya, 2015.

STATE AND NATIONAL

New Mexico Higher Education Department, Articulation and Transfer Steering Committee, 2017–2022.

OUTREACH AND COMMUNITY

New Mexico Supercomputing Challenge, Board Member, 2019–2024.

Mentor for post-baccaleurate students, UNM NIH PREP program, 2016–2017.

Mentor for undergraduate students, UNM School of Engineering NSF STEP program to improve retention, 2012–2016.

Mentor for high-school students for Intel Science Fair, Albuquerque Public Schools, 2014–2015.

Mentor for high-school summer interns, UNM CBME PREM program, 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.

S.Y. Jackson Elementary School (Albuquerque) Science Fair, reviewer, 2016.