

## Biographical Sketch: Lenore R. Mullin

### Lenore R. Mullin

Associate Professor  
Computer Science Department  
University at Albany - SUNY  
1400 Washington Avenue  
Albany, NY 12222

Tel: (518) 442-3332  
Email: [lenore@cs.albany.edu](mailto:lenore@cs.albany.edu)  
Fax: (518) 442-5638

**Education:** B.S. Mathematics, SUC at New Paltz, NY, 1974, M.S. Physics, Syracuse University 1978, Ph.D. Computer Science, 1988.

### Professional Experience:

2005-present Associate Professor of Physics, University at Albany, SUNY.

2001–2002: Technical Staff, MIT Lincoln Laboratory, Embedded Digital Systems Group.

1990–present: Associate Professor of Computer Science, University at Albany - SUNY, 1995–present, University of Missouri-Rolla, 1992–95, University of Vermont, 1990–92.

1990 Post Doctoral Fellowship, Oxford University. Mathematics of Arrays and Bird-Meertens Formalism studies.

1989–90 Visiting Professor of Computer Science, McGill University. Senior Researcher, CRIM (Centre de Recherché Informatique de Montréal). PI for Portable, Parallel Programming Project, NSERC Feasibility Study.

1984–89 Research Associate, NYS CASE Center, Syracuse University, A Mathematics of Arrays, Seed Project S-18.

1976–84 Research Technical Staff, IBM TJ Watson Research Center. Array Language Design, Interpreter and Compiler Development, Real-Time Speech Recognition.

1974–76 Staff Programmer, IBM SPD Division, Scientific Programming.

### Professional Activities:

- *Sigma Xi*, President, Albany Chapter, 1997–98.

- *NSF Panel Reviewer*, 1993 – present

- *Gordon Conference*, Speaker, *What Software Abstractions Help and Hurt Performance and Why?*, 1997.

- *Arrays, Functional Languages, and Parallel Systems*, Editor, Kluwer Publishers, 1990.

- *Second International Workshop on Array Structures*, Editor, University of Montreal, 1992.

- *Member*: SIAM, IEEE Computer Society. 1976–present.

### Awards:

- with Ian Grout, International Collaboration Programme 2006, Enterprise Ireland, *Reconfigurable Application Specific Computing Requirements, Analysis, and Design*, 2006.

- co-PI with D. J. Rosenkrantz, H. B. Hunt III, NSF CCR 0105536, *On the Analysis, Optimization, and Efficient Scalarization of Monolithic-Level Array Programs*, 2001–03.

- NSF Presidential Faculty Fellow'93, *Intermediate Languages for Enhanced Parallel Performance*, 1993–99.

- co-PI with B. Gillett and F. Ercal, NSF (Research Experiences for Undergraduates) REU award, *Parallel Programming: Design and Implementation of Parallel Algorithms*,

- Patent L. Mullin, D. Dooling and D. Moran (IBM), *Method and Apparatus for Indexing Patterned Sparse Arrays for Microprocessor Data Cache* March 1999, No. 5878424.

## Selected Publications

1. Daniel J. Rosenkrantz and Lenore R. Mullin and Harry B. Hunt III, *On Minimizing Materializations of Array Valued Temporaries*, to appear, TOPLAS, 2006.
2. I. Grout, L. Mullin, Q. Li, and J. Ryan, *A Desktop RASC prototyping system*, ESS 2006.
3. L. Mullin, J. Reynolds, I. Grout, J. Ryan, and Q. Li, *Abstract Machines for RASCs and Signal/Image Processing*, HPEC 2006, MIT Lincoln Laboratory, September 2006.
4. Lenore R. Mullin and James E. Reynolds, *Optimizing the Fast Fourier Transform over Memory Hierarchies Using Conformal Computing Techniques: Part I, A fully in-cache algorithm*, Under Review, Journal of Computational Physics, <http://trr.albany.edu/documents/TR00004>, 2006.
5. Lenore R. Mullin and James E. Reynolds, *Optimizing the Fast Fourier Transform over Memory Hierarchies Using Conformal Computing Techniques, Part II, Elements of the formal theory*, Under Review Journal of Computational Physics, <http://trr.albany.edu/documents/TR00005>, 2006.
6. J. Reynolds and L. Mullin, *Optimizing the Fast Fourier Transform over Memory Hierarchies Using Conformal Computing Techniques, Part III, The Hypercube View*, Under Review Computer Physics Communications, 2006.
7. L. Mullin and J. Reynolds, *Density Matrix operations without matrix multiplication: Conformal Computing Techniques illustrated with a Quantum Computing example*, Under Review International Journal of Quantum Information (IJQI), 2006.
8. J. Reynolds and L. Mullin, *Applications of Conformal Computing Techniques to Problems in Computational Physics: the FFT*, Computer Physics Communications, 170(2005) 1-10. Elsevier Publishers.
9. L. Mullin and R. Mattheyses, *Exploring Shape Aware Memory through FPGA Prototyping*, Proceedings of Workshop on Architecture Research using FPGAs at HPCA05, San Francisco, CA, 2005.
10. L. Mullin and J. Reynolds, *HPC from a General Formalism: Conformal Computing Techniques illustrated with a Quantum Computing Example*, Proceedings of HPEC 2005, MIT Lincoln Laboratory, September 2005.
11. L. Mullin and J. Reynolds, *Optimizing the Fast Fourier Transform over memory hierarchies for embedded digital systems: a fully in-cache algorithm*, Proceedings of HPEC 2004, MIT Lincoln Lab, September 2004.
12. L. Mullin, X. Luo, and L. Bush, *Building the Support for Radar Processing across Memory Hierarchies: On the Development of an Array Class with Shapes using Expression Templates in C++*, Proceedings of HPEC 2003, MIT Lincoln Lab, September 2003.
13. L. Mullin, *A Uniform Way of Reasoning about Array-Based Computation in Radar*, Digital Signal Processing, Elsevier Publishers, September, 2005, also available on-line through Science Direct.
14. L. Mullin, D. Rosenkrantz, H. Hunt, and X. Luo, *Efficient Radar Processing Via Array and Index Algebras*, Proceedings of 1st Workshop on Optimizations for DSP and Embedded Systems(ODES), San Francisco, CA. March 23, 2003.
15. L. Mullin, and S. Small, *Four Easy Steps to a Faster FFT*, Journal of Mathematical Modeling and Algorithms, 1(3), 2002.
16. L. Mullin, and S. Small, *Three Easy Steps to a Faster FFT(No, We Don't Need a Plan)*, Proceedings of 2001 International Symposium on Performance Evaluation of Computer and Telecommunication Systems(SPECTS 2001), Orlando, Florida, July 15-19, 2001.

17. L. Mullin, and S. Small, *Three Easy Steps to a Faster FFT(The Story Continues)*, Proceedings of 2001 International Conference on Imaging Science, Systems, and Technology (CISST 2001), Las Vegas, Nevada, June 25-28, 2001.
18. L. Mullin, E. Rutledge, and R. Bond, *Monolithic Compiler Experiments using C++ Expression Templates*, Proceedings of the High Performance Embedded Computing Workshop(HPEC 2002), MIT Lincoln Laboratory, Lexington, MA, September, 2002.
19. D. Rosenkrantz, L. Mullin, and H. Hunt, *On Materialization of Array-Valued Temporaries*, Proceedings of the 13th International Workshop on Languages and Compilers for Parallel Computing 2000, Yorktown Heights, NY, August 2000, pp. 125-141 and Lecture Notes in Computer Science, Vol 2017, Springer, pp. 127 -141.
20. H.B. Hunt III, L.R. Mullin, and D. J. Rosenkrantz, *Experimental construction of a fine-grained polyalgorithm for the FFT*, Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications(PDPTA '99), Las Vegas, Nevada, pp. 1741-1647, June 1999.
21. L. Mullin, W. Kluge, and S. Scholtz, *On Programming Scientific Applications in SAC: a Functional Language Extended by a Subsystem for High-Level Array Operations*, Proceedings of the Eighth International Workshop on Implementation of Functional Languages, Kiel, Germany, September 1996, pp. 321-340.
22. L. Mullin and M. Jenkins, *Effective Data Parallel Computation using the Psi Calculus*, Concurrency: Practice and Experience, John Wiley and Sons, September 1996, pp. 499-515.
23. D. Dooling and L. Mullin, *Indexing and Distributing a General Partitioned Sparse Array*, UMR TR No. CSC 94-23, Proceedings of Workshop on Solving Irregular Problems on Distributed Memory Machines, at International Parallel Processing Symposium, Santa Barbara. CA, April 1995, p. 96-101.
24. H. Pottinger, W. Eatherton, J. Kelly, L. Mullin and R. Ziegler, *AN FPGA Based Reconfigurable Coprocessor Board Utilizing A Mathematics of Arrays*, Proceedings of The IEEE Circuits and Systems Symposium(ISCAS95), Seattle, WA, May 1995, pp 945-948.
25. H. Pottinger, W. Eatherton, J. Kelly, L. Mullin and T. Schifelbein, *Hardware Assists for High Performance Computing Using A Mathematics of Arrays*, Proceedings of INEL94.
26. with G. Hains, *Parallel Functional Programming with Arrays*, The Computer Journal, 36:22, March 1993, p. 238-245.
27. G. Gao, R. Yates, J. Dennis, and L. Mullin A Strict Monolithic Array Constructor, Proceedings of the Second IEEE Symposium on Parallel and Distributed Processing, December 1990, Dallas, Texas, p. 596-600.
28. G. Gao, R. Yates, J. Dennis, and L. Mullin, *An Efficient Monolithic Array Constructor for Scientific Computation*, Proceedings of the Third Workshop on Programming Languages and Compilers for Parallel Computing, MIT Press, 1990.
29. Numerous IBM Confidential and IBM Internal USE Only Publications

### **Synergistic Activities:**

- *RASC-FPGA Workshop 2006*, co-organizer with I. Grout, University at Albany, July 12, 2006, <http://www.cs.albany.edu/>
- *Conformal Computing 2005*, co-organizer with J. Raynolds, University at Albany, October 14-15, 2005, <http://www.albany.edu/CC05/>
- *Siam Minisymposium MS28*, organizer, "Achieving Reproducible Performance Improvements of Linear Algebra, Applications", Siam Annual Meeting 2005.

- *University at Albany, SUNY, Compact Plan Supporting Conformal Computing with College of Computing and Information, College of Arts and Sciences and UA CIO,*  
<http://www.albany.edu/cci/INF2005compacts/>
- *Curriculum Development: Mc Gill, UVM, UMR, UA* Courses in MoA, Psi Calculus, HPC, Quantum Algorithms have been developed at both the graduate and undergraduate levels at all institutions. PhD Qualifying exams include such courses. As joint resource and cross listings these course form a foundation for an advanced graduate certifdate in Computational Science and Honors program for undergraduates.

**Student Achievements:**

First Undergraduate Honors Thesis in UVM History: Scott Thibault(UVM-1992)

First Undergraduate Honors Thesis in UMR History: Thom McMahon(UMR-1995)