Vita (as of June 2023)

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Degrees

B.A. Centre College, Mathematics, 1970

Ph.D. Indiana University, Mathematics, 1977

Awards

Woodrow Wilson Fellow, 1970

National Science Foundation Traineeship, 1971

University Teaching Award, SUNY Binghamton, 1983

Incentive for Excellence Awards, Digital Equipment Corporation, 1986, 1987, 1988

Best Article Award, *IEEE Micro*, 1986

"Most Outstanding Presentation", 1987 Int'l. Conf. on Parallel Processing

College of Engineering Service Award, University of Michigan, 1995

Partnership Award, IBM, 1999

College of Engineering Team Research Excellence Award, University of Michigan, 1999, 2014

Highly Cited Researcher, Thomson Reuters, 2003

Employment

1984—   Associate Professor to Professor, Electrical Engineering and Computer Science,
              also Climate and Space Sciences and Engineering (CLaSP) (courtesy appointment);
         a founding member of the Advanced Computer Architecture Laboratory (ACAL),
              Laboratory for Scientific Computation (LaSC), CSEM, CPC, and SSRL;
         University of Michigan

2017—   CSE MS Chair

2001–12 Co-Director, Center for Space Environment Modeling (CSEM), University of Michigan

1997–02 Director, Center for Parallel Computing (CPC), University of Michigan

1993–98 Director, Software Systems Research Laboratory (SSRL), University of Michigan

1976–84 Assistant to Associate Professor, Department of Mathematical Sciences,
         State University of New York at Binghamton

- I have been a consultant for Ford Motor, Dow Chemical, GlaxoSmithKline, King Abdulaziz University, and an expert witness on algorithms & data structures (for Proskauer Rose) and on distributed computing.

Publications

Books Authored

1. *Parallel Algorithms for Regular Architectures: Meshes and Pyramids* (with R. Miller), MIT Press, 1996.

Books Edited

2. *Reconfigurable Massively Parallel Computers*, (co-edited with H. Li), Prentice Hall, 1991.

3. *Proceedings 5th Distributed Memory Computing Conference*, (co-edited with D.W. Walker), IEEE Computer Society, 2 vols., 1990.

4. *Proceedings 6th Distributed Memory Computing Conference*, (co-edited with M. Wolfe), IEEE Computer Society, 1991.

5. *Proceedings 1992 International Conference on Parallel Processing, Vol. III Algorithms and Applications*, Computer Science Press.

Chapters in Books

6. "Algorithms for regular networks of processors" (with R. Miller), in *Algorithms and Theory of Computation Handbook*, 2nd ed., 2009, M. Atallah, ed., 46:1–18.

7. "Parallel programs for adaptive designs" (with J. Hardwick), in *Handbook of Parallel Computing and Statistics*, E.J. Kontoghiorghes, ed., Marcel Dekker, 2006, pp. 347–373.

8. "Advanced Modeling, Simulation, and Analysis" (with E. Antonsson et al.), in *NASA Capability Roadmaps Report*, 2005, pp. 306–320.

9. "Adaptive mesh refinement for global magnetohydrodynamic simulation" (with T. Gombosi et al.), in *Space Plasma Simulation*, (J. Büchner, C.T. Dum, M. Scholer, eds.), Lecture Notes in Physics 615, Springer-Verlag, 2003, pp. 247–274.

10. "Optimal adaptive designs for delayed response models: exponential case" (with J. Hardwick and R. Oehmke), in *MODA6: Model Oriented Data Analysis*, (A. Atkinson, P. Hackl, W. Müller, eds.), Physica Verlag, 2001, pp. 127–134.

11. "Optimizing a unimodal response function for binary variables" (with J. Hardwick), in *Optimum Design 2000*, A. Atkinson, B. Bogacka, and A. Zhigljavsky, eds., Kluwer, 2001, pp. 195–208.

12. "Development of an integrated predictive MHD Space Weather model from the solar surface to the Earth's upper atmosphere" (with CR Clauer et al.), *Space Weather Study Using Multipoint Methods*, (Lyu, L-H, ed.), COSPAR Colloquium Series 12, Elsevier, 2000, pp. 149–162.

13. "Algorithmic techniques for networks of processors" (with R. Miller), in *Algorithms and Theory of Computation Handbook*, M. Atallah, ed., CRC Press, 1999, pp. 46:1–19.

14. "Flexible algorithms for creating and analyzing adaptive sampling procedures" (with J. Hardwick), in *New Developments and Applications in Experimental Design*, N. Flournoy, W.F. Rosenberger, and W.K. Wong, eds., Institute Math. Stat. Lecture Notes — Monograph Series Vol. 34, 1998, pp. 91–105.

15. "Exact computational analyses for adaptive designs" (with J. Hardwick), in *Adaptive Designs*, N. Flournoy and W.F. Rosenberger, eds., Institute Math. Stat. Lecture Notes — Monograph Series Vol. 25, 1995, pp. 223–237.

16. "Behind the scenes of HPCC", in *Suggesting Computer Science Agendas for High Performance Computing*, U. Vishkin, ed., Assoc. Computing Machinery, 1994, pp. 156–158.

17. "Image processing on reconfigurable meshes" (with R. Miller, V.K. Prasanna-Kumar, and D. Reisis), in *From Pixels to Features II: Parallelism in Image Processing*, H. Burkhardt, Y. Neuvo, and J.C. Simon, eds., North-Holland, 1991, pp. 85–101.

18. "Reconfigurable massively parallel computers: an introduction" (with H. Li), in *Reconfigurable Massively Parallel Architectures*, H. Li and Q.F. Stout, eds., Prentice-Hall, 1991, pp. 1–32.

19. "Efficient parallel algorithms for intermediate-level vision analysis on the reconfigurable mesh" (with R. Miller, V.K. Prasanna Kumar, and D. Reisis), in *Parallel Architectures and Algorithms for Image Understanding*, V.K. Prasanna Kumar, ed., Academic Press, 1991, pp. 185–207.

20. "The complex behavior of simple machines" (with R. Machlin), in *Emergent Computation*, S. Forrest, ed., MIT Press, 1991, pp. 85–98. Reprint of paper 134.

21. "Tree algorithms for unbiased coin tossing with a biased coin" (with B. Warren), in *Complexity of Probability Distributions Generation* (in Russian), S.M. Ermakov, ed., MIR Publishers. Translation of paper 187.

22. "A microprocessor-based hypercube supercomputer" (with S. Colley, J.P. Hayes, T.N. Mudge, and J. Palmer), in *Multi-Microprocessors*, A. Gupta, ed., IEEE Press, 1987, pp. 250–260. Reprint of paper 178.

23. "Pyramid algorithms optimal for the worst case", in *Parallel Computer Vision*, L. Uhr, ed., Academic Press, 1987, pp. 147–168.

24. "Hypercubes and pyramids", in *Pyramidal Systems for Computer Vision*, V. Cantoni and S. Levialdi, eds., NATO ASI Series ARW Vol. F 25, Springer-Verlag, 1986, pp. 75–89.

25. "Algorithm guided design considerations for meshes and pyramids", in *Intermediate-level Image Processing*, M.J.B. Duff, ed., Academic Press, 1986, pp. 147–163.

26. "An algorithmic comparison of meshes and pyramids", in *Evaluation of Multicomputers for Image Processing*, L. Uhr, K. Preston, S. Levialdi, and M.J.B. Duff, eds., Academic Press, 1986, pp. 107–121.

Papers

27. "Best L_p isotonic regressions, $p \in \{0, 1, \infty\}$" (2023), arXiv:2306.00269

28. "Low power mesh algorithms for image problems" (2022), arXiv:2212.02640

29. "L_p isotonic regression using an L_0 approach" (2021), arXiv:2107.00251

30. "L_0 isotonic regression with secondary objectives" (2021), arXiv:2106.00279

31. "Generating artificial core users for interpretable condensed data" (with A. Nesky) (2021), arXiv:2102.03674

32. "Neural networks with block diagonal inner product layers: a look at neural network architecture through the lens of random matrices" (with A. Nesky), *Neural Computing and Applications* 32 (2020), pp. 6755–6767.

33. "Weighted L$_\infty$ isotonic regression", *J. Computer Sys. Sci.* 91 (2018), pp. 69–81.

34. "A framework for recursive algorithms on low-energy sensor networks" (with T. Lewis), *Int'l J. Parallel, Emergent, and Distrib. Sys.* (2018), DOI:10.1080/17445760.2018.1448930

35. "Training neural networks using predictor-corrector gradient descent" (with A. Nesky), *Proc. ICANN 2018* part III, pp. 51–61.

36. "Neural networks with block diagonal inner product layers" (with A. Nesky), *Proc. ICANN 2018*, part III, pp. 62–72.

37. "Optimal algorithms for a mesh-connected computer with limited additional global bandwidth" (with Y. An), *Proc. IPDPS* 2017, pp. 937–946.

38. "Optimal algorithms for graphs and images on a shared memory mesh" (with Y. An), *Proc. IPDPS* 2016, 8p.

39. "Isotonic regression for multiple independent variables", *Algorithmica* 71 (2015), pp. 450–470.

40. "L_∞ isotonic regression for linear, multidimensional, and tree orders" (2015), arXiv:1507.02226.

41. "Optimal reduced isotonic regression" (with J. Hardwick) (2014), arXiv:1412.2844

42. "An algorithm for L_∞ approximation by step functions" (2014), arXiv:1412.2379

43. "An optimal time-power tradeoff for sorting on a mesh-connected computer with on-chip optics" (with P. Poon), *Int.'l J. Networking and Computing* 4 (2014), pp. 70–77.

44. "Isotonic regression via partitioning", *Algorithmica* 66 (2013), pp. 93–112.

45. "Time-power tradeoffs for sorting on a mesh-connected computer with optical connections", (with P. Poon), *Proc. IPDPS* 2013.

46. "Optimal reduced isotonic regression", *Proc. Interface 2012: Future of Statistical Computing* (2012), 12p.

47. "Strict L_∞ isotonic regression", *J. Opt. Theory and Appl.* 152 (2012), pp. 121–135.

48. "Adaptive numerical algorithms in space weather modeling" (with G. Toth et al.), *J. Computational Phys.* 231 (2012), pp. 870–903.

49. "Automatic hybrid OpenMP + MPI program generation for dynamic programming problems" (with D.R. VandenBerg), *Proc. IEEE CLUSTER* (2011), pp. 178–186.

50. "CRASH: a block-adaptive mesh code for radiative shock hydrodynamics — implementation and verification" (with B. van der Holst et al.), *Astrophysical J. Sup.* 194:23 (2011), 20p.

51. "Radiative effects in radiative shocks in shock tubes" (with R.P. Drake et al.), *High Energy Density Physics* 7 (2011), pp. 130–140.

52. "Analysis of delays caused by local synchronization" (with J. Lipman), *SIAM J. Computing* 39 (2010), pp. 3860–3884.

53. "Application of 3-d spherical shell adaptive mesh refinement to an atmospheric model with a vertical Lagrangian coordinate" (with N.G. Andronova et al.), *Proc. SciDAC 2010*, pp. 124–127.

54. "Block-structured adaptive meshes and reduced grids for atmospheric general circulation models" (with C. Jablonowski and R.C. Oehmke), *Phil. Trans. Royal Soc. A* 367 (2009), pp. 4497–4522.

55. "Algorithms for response adaptive sampling designs" (with J. Hardwick), *WIREs: Computational Statistics* 1 (2009), DOI: 10.1002/wics.25

56. "Unimodal regression via prefix isotonic regression", *Comp. Stat. and Data Anal.* 53 (2008), pp. 289–297.

57. "An analysis for parallel algorithm on image recognition using principle components algorithm" (with R. Baik and S. Baik), *Abs. Korean Math. Soc.* (2008), 81.

58. "Three dimensional adaptive mesh refinement on a spherical shell for atmospheric models with La-grangian coordinates" (with J. Penner et al.) (2007), *J. Physics: Conf. Series* 78, *Proc. SciDAC 2007*.

59. "Response adaptive designs that incorporate switching costs and constraints" (with J. Hardwick), *J. Statistical Planning and Inference* (JSPI) 137 (2007), pp. 2654–2665.

60. "Block-structured adaptive grids on the sphere: advection experiments" (with C. Jablonowski et al.), *Monthly Weather Review* 134 (2006), pp. 3691–3713.

61. "A performance analysis of local synchronization" (with J. Lipman), *Symp. Parallelism in Algorithms and Architectures* (SPAA) 2006, pp. 254–260.

62. "Minimizing peak energy on mesh-connected systems", *Symp. Parallelism in Algorithms and Archi-tectures* (SPAA) 2006, p. 331.

63. "New adaptive designs for delayed response models" (with J. Hardwick and R. Oehmke), *J. Statistical Planning and Inference* (JSPI) (2006), 136, pp. 1940–1955.

64. "Halloween storm simulations with the Space Weather Modeling Framework", (with T.I. Gombosi et al.) (2006), *Proc. 44th AIAA Aerospace Sciences Meeting*, 12p.

65. "Integrated frameworks for Earth and Space weather simulation" (with T. Killeen et al.), *Proc. 3rd Space Weather Symposium* (2006), 10p.

66. "Parallel adaptive solution of the MHD equations and its role in the Space Weather Modeling Framework" (with K.G. Powell et al.) (2006), *Proc. Numerical Modeling of Space Plasma Flows: Astronum–2006*, pp. 33–46.

67. "Space Weather Modeling Framework: a new tool for the space science community", (with G. Toth et al.) (2005), *J. Geophysical Research* 110, A12226

68. "Development of an atmospheric climate model with self-adapting grid and physics", (with J.E. Pen-ner et al.) (2005), *J. Physics Conf. Series* 16, *Proc. SciDAC 2005*, pp. 353–357.

69. "New adaptive designs that incorporate switching concerns" (with J. Hardwick), *Simulation 2005*, V.B. Melas, ed., NII Chemistry St. Petersburg, 2005, pp. 305–312.

70. "Adaptive grids for future weather prediction models" (with C. Jablonowski et al.), *Geophysical Research Abstracts* 7 (2005), SRef-ID: 1607-7962/gra/EGU05-A-00134.

71. "Optimal screening designs with flexible cost and constraint structures" (with J. Hardwick), *J. Statistical Planning and Inference* (JSPI) 132 (2005), pp. 149–162.

72. "A High-Performance Framework for Sun-to-Earth Space Weather Modeling" (with O. Volberg et al.), *Proc. IPDPS/PDSEC05* (2005).

73. "The Space Weather Modeling Framework" (with G. Toth et al.), *Proc. ISSS-7* (2005).

74. "Adaptive grids for weather and climate models" (with C. Jablonowski et al.), *ECMWF Proc. Recent Developments in Numerical Methods for Atmospheric and Climate Modeling* (2004), pp. 233–250.

75. "Emergence of the Earth System Modeling Framework" (with C. DeLuca et al.), *Proc. Symp. 50th Ann. Operational Numerical Weather Prediction* (2004).

76. "A physics-based software framework for Sun-Earth connection modeling" (with G. Toth et al.), *Mul-tiscale Coupling of Sun-Earth Processes*, Proc. Conf. on the Sun-Earth Connection, Kona, Hawaii, 2004, A. T. Y. Lui, Y. Kamide, and G. Consolini, eds., Elsevier, pp. 383–397

77. "Solution adaptive MHD for space plasmas: Sun-to-Earth simulations" (with T.I. Gombosi et al.), *Computers in Science and Engineering* 6 (2004), pp. 14–35.

78. "Directed walk designs for dose response problems with competing failure modes" (with J. Hardwick and M.C. Meyer), *Biometrics* 59 (2003), pp. 229–236.

79. "The Earth Systems Modeling Framework" (with A. da Silva et al.), *Proc. 3rd NASA Earth Science Technology Conf.*, 2003.

80. "Optimal few-stage designs" (with J. Hardwick), *J. Statistical Planning and Inference* (JSPI) 104 (2002), pp. 121–145.

81. "Optimal screening designs with flexible cost structures" (with J. Hardwick), in *Simulation 2001*, NII Chemistry St. Petersburg, 2001, pp. 253–260.

82. "Adaptive mesh refinement MHD for global simulations" (with T. Gombosi, G. Toth, D. de Zeeuw, and K.G. Powell), *Proc. ISSS-6* (2001), 8 p.

83. "Parallel adaptive blocks on a sphere" (with R. Oehmke), *SIAM Conf. Parallel Proc. for Scientific Computing*, 2001, 9 p.

84. "Development and validation of a solution-adaptive, parallel scheme for compressive plasmas" (with KG Powell et al.), *Proc. AIAA Comp. Fluid Dynam. Conf.* (2001), A01-3101, 11p.

85. "Multiscale MHD simulations of a coronal mass ejection and its interactions with the magnetosphere-ionosphere system" (with T.I. Gombosi, D. DeZeeuw, C.P.T. Groth, and K. Powell), *J. Atmos. Solar-Terrestrial Phys.* 62 (2000), pp. 1515–1525.

86. "Scalable algorithms for adaptive statistical designs" (with J. Hardwick and R. Oehmke), *Scientific Programming* 8 (2000), pp. 183–193. Reprint of article 92.

87. "Optimal algorithms for unimodal regression", *Computing Science and Statistics* 32 (2000), 8 p.

88. "Parallel implementation of a multiphase remediation simulator" (with L. Abriola, C. Drummond, J. Landrum, and J. Lang), *Proc. Comp. Methods in Water Resources XIII* (2000), pp. 145–151.

89. "High performance computer methods applied to predictive space weather simulations" (with C.R. Clauer et al.), *IEEE Trans. Plasma Science* 28 (2000), pp. 1931–1937.

90. "An adaptive MHD method for global space weather simulations", (with D.L. De Zeeuw, T.I. Gombosi, C.P.T. Groth, K.G. Powell), *IEEE Trans. Plasma Science* 28 (2000), pp. 1956–1965. Invited.

91. "pMISER (parallel Michigan Simulator for Environmental Remediation)" (with J.R. Lang, J.K. Landrum, C.D. Drummond, L.M. Abriola), *Proc. HPC-2000, 6th Int.'l. Conf. Applications of High-performance Computing to Engineering*, pp. 167–176.

92. "Scalable algorithms for adaptive statistical designs" (with J. Hardwick and R. Oehmke), *Proc. SC 2000* (Supercomputing), 15 p. Finalist, Best Paper.

93. "Load balancing 2-phased geometrically based problems" (with A.A. Poe), *Proc. 1999 SIAM Conf. Parallel Processing for Scientific Computing*.

94. "A parallel solution-adaptive scheme for ideal magnetohydrodynamics", (with C.T.T. Groth, D.L. De Zeeuw, K.G. Powell, and T.I.Gombosi), *Proc. AIAA 14th Computational Fluid Dynamics Conf.* (1999), 17p.

95. "Using path induction to evaluate sequential allocation procedures" (with J. Hardwick), *SIAM J. Scientific Computing* 21 (1999), pp. 67–87.

96. "A program for sequential allocation of three Bernoulli populations" (with J. Hardwick and R. Oehmke), *Computational Statistics and Data Analysis* 31 (1999), pp. 397–416.

97. "Minimizing the costs of screening trials" (with J. Hardwick), *Computing Science and Statistics* 31 (1999), pp. 440–444.

98. "Sequentially deciding between two experiments for estimating a common success probability" (with J. Hardwick and C. Page), *J. American Statistical Assoc.* 93 (1998), pp. 1502–1511.

99. "Adaptive allocation in the presence of censoring" (with R. Oehmke and J. Hardwick), *Computing Science and Statistics* 30 (1998), pp. 219–223.

100. "Predicting algorithm performance" (with J. Landrum and J. Hardwick), *Computing Science and Statistics* 30 (1998), pp. 309–314.

101. "Adaptive parallel computation of a grand-challenge problem: Prediction of the path of a solar-corona mass ejection" (with D.L. deZeeuw et al.), *Proc. SC'98*.

102. "A parallel adaptive 3D MHD scheme for modeling coronal and solar wind plasmas" (with D.L. deZeeuw et al.), *Proc. SCIIO Work. on Coronal Holes and Solar Wind Acceleration*, 1998.

103. "Ultra-fast expected time parallel algorithms" (with P.D. MacKenzie), *J. Algorithms* 26 (1998), pp. 1–33.

104. "Shift-product networks" (with M. Livingston), *Mathematical and Computer Modelling*.

105. "Multiscale modeling of heliospheric plasmas" (with T. Gombosi et al.), *High Performance Computing 1997*, pp. 46–51. Invited.

106. "Adaptive blocks: A high-performance data structure" (with D.L. deZeeuw, T.I. Gombosi, C.P.T. Groth, H. Marshall, K.G. Powell), *Proc. SC'97*.

107. "A parallel program for 3-arm bandits" (with J. Hardwick and R. Oehmke), *Computing Science and Statistics* 29 (1997), pp. 390–395.

108. "Multiscale modeling of heliospheric plasmas" (with T.I. Gombosi et al.), *Proc. High Performance Computing '97*.

109. "Optimal allocation for estimating the mean of a bivariate polynomial" (with J. Hardwick), *Sequential Analysis* 15 (1996), pp. 71–90.

110. "Unique domination in cross-product graphs" (with J.D. Masters and D. Van Wieren), *Congresses Numerantium* 118 (1996), pp. 49–71.

111. "Exploiting a theory of phase transitions in three-satisfiability problems" (with D.M. Pennock), *Proc. Amer. Assoc. Artificial Intelligence* (AAAI) (1996), pp. 253–258.

112. "Sequential allocation with minimal switching" (with J. Hardwick), *Computing Science and Statistics* 28 (1996), pp. 567–572.

113. "Ultrafast graph algorithms on reconfigurable meshes" (with D. Van Wieren), *Proc. 2nd Work. on Reconfigurable Architectures* (1995), pp. 1–13.

114. "Determining optimal few-stage allocation procedures" (with J. Hardwick), *Computing Science and Statistics* 27 (1995), pp. 342–346.

115. "The communication performance of the IBM SP2" (with J. Hardwick and T. Tabe), *Computing Science and Statistics* 27 (1995), pp. 347–351.

116. "Bringing algorithms to life: cooperative computing activities using students as processors" (with G. Bachelis, D.A. James, and B.R. Maxim), *School Science and Math.* 94 (1994), pp. 176–186.

117. "Constant time computation of minimum dominating sets" (with M. Livingston), *Congresses Numerantium* 105 (1994), pp. 116–128.

118. "Subcube fault-tolerance in hypercubes" (with N. Graham, F. Harary, and M.L. Livingston), *Information and Computation* 102 (1993), pp. 280–314.

119. "Parallel computations on reconfigurable meshes" (with R. Miller, V.K. Prasanna Kumar, and D. Reisis), *IEEE Trans. on Computers* 42 (1993), pp. 678–692.

120. "Optimal parallel construction of Hamiltonian cycles and spanning trees in random graphs" (with P.D. MacKenzie), *Proc. 5th ACM Symp. Parallel Algorithms and Architectures* (SPAA) (1993), pp. 224–229.

121. "Perfect dominating sets for cube-connected cycles" (with D. Van Wieren and M.L. Livingston), *Congresses Numerantium* 97 (1993), pp. 51–70.

122. "Efficient convexity and domination algorithms for fine- and medium-grain hypercube computers" (with E. Cohen, R. Miller, and E.M. Sarraf), *Algorithmica* 7 (1992), pp. 51–75.

123. "Ultrafast parallel algorithms and reconfigurable meshes", *Proc. 1992 DARPA Software Technology Conf.*, pp. 184–188.

124. "Selection on the reconfigurable mesh" (with E. Hao and P.D. MacKenzie), *Proc. Frontiers '92: 4th Symp. on Frontiers of Mass. Par. Comp.*, pp. 38–45.

125. "Optimal allocation for estimating the product of two means" (with J. Hardwick), *Computing Science and Statistics* 24 (1992), pp. 592–596.

126. "Optimal adaptive equal allocation rules" (with J. Hardwick), *Computing Science and Statistics* 24 (1992), pp. 597–601.

127. "A novel approach to introducing parallel algorithms in undergraduate computer science courses" (with G. Bachelis, D.A. James, and B.R. Maxim), *Computer Science Education* 3 (1992), pp. 17–33.

128. "Reconfigurable SIMD massively parallel processors" (with H. Li), *Proc. of the IEEE* 79 (1991), pp. 429–443. Invited.

129. "Ultra-fast expected time parallel algorithms" (with P.D. MacKenzie), *Proc. 2nd ACM-SIAM Symp. on Discrete Algorithms* (SODA) (1991), pp. 414–423.

130. "Fault tolerance of the cyclic buddy subcube location scheme in hypercubes" (with M. Livingston), *Proc. 6th Distributed Memory Computing Conf.* (DMCC) (1991), IEEE, pp. 34–41.

131. "Linear-time distance transforms for quadtrees" (with C.A. Shaffer), *Computer Vision, Graphics, and Image Processing: Image Understanding* (CVGIP) 54 (1991), pp. 215–223.

132. "Computing convexity properties of images on a pyramid computer" (with R. Miller), *Algorithmica* 6 (1991), pp. 658–684.

133. "Bandit strategies for ethical sequential allocation" (with J. Hardwick), *Computing Science and Statistics* 23 (1991), pp. 421–424.

134. "The complex behavior of simple machines" (with R. Machlin), *Physica D* 42 (1990), pp. 85–98.

135. "Multi-tiered algorithms for 2-dimensional bin packing" (with R. Fenrich and R. Miller), *Proc. 5th Distrib. Mem. Comput. Conf.* (1990), pp. 58–63.

136. "Asymptotically efficient hypercube algorithms for computational geometry (preliminary version)" (with P.D. MacKenzie), *Proc. 3rd Symp. Frontiers Massively Parallel Computation*, (1990), pp. 8–11.

137. "Practical hypercube algorithms for computational geometry (preliminary version)" (with P.D. MacKenzie), *Proc. 3rd Symp. Frontiers Massively Parallel Computation*, (1990), pp. 75–80.

138. "Intensive hypercube communication: Prearranged communication in link-bound machines" (with B. Wagar), *J. of Parallel and Distributed Computing* 10 (1990), pp. 167–181.

139. "Seymour: a portable parallel programming language" (with R. Miller), *Structured Programming* 11 (1990), pp. 157–171.

140. "Perfect dominating sets" (with M.L. Livingston), *Congressus Numerantium* 79 (1990), pp. 187–203.

141. "Bringing computer algorithms to life" (with G. Bachelis, D.A. James, and B.R. Maxim), *Factorial* 21 (1990), pp. 8–19.

142. "Special issue on algorithms for hypercube computers: Guest editor's introduction", *J. Parallel and Distributed Computing* 8 (1990), pp. 301–302.

143. "Mesh computer algorithms for computational geometry" (with R. Miller), *IEEE Trans. on Computers* C-38 (1989), pp. 321–340.

144. "Parallel allocation algorithms for hypercubes and meshes" (with M.L. Livingston), *Proc. 4th Conf. Hypercubes, Concurrent Computers, and Applications* (1989), pp. 59–66.

145. "A comparison of join algorithms for hypercubes" (with C.K. Baru, S. Padmanabhan, and B. Wagar), *Proc. 4th Conf. Hypercubes, Concurrent Computers, and Applications* (1989), pp. 469–474.

146. "Hypercube algorithms for some NP-hard packing problems" (with R. Fenrich and R. Miller), *Proc. 4th Conf. Hypercubes, Concurrent Computers, and Applications* (1989), pp. 769–776.

147. "Optimal hypercube algorithms for labeled images" (with R. Miller), *Algorithms and Data Structures: Proc. WADS '89*, Springer-Verlag Lec. Notes in Comp. Sci. 382 (1989), pp. 517–528.

148. "An introduction to the portable parallel programming language Seymour" (with R. Miller), *Proc. 13th IEEE Comp. Software and Applic. Conf.* (1989), pp. 94–101.

149. "Writing portable parallel programs in Seymour" (with R. Miller), *Proc. 4th SIAM Conf. Parallel Proc. for Sci. Computing* (1989), pp. 419–424.

150. "Embeddings in hypercubes" (with M.L. Livingston), *Mathematical and Computer Modeling* 11 (1988), pp. 222–227.

151. "Distributing resources in hypercube computers" (with M.L. Livingston), *Proc. 3rd Conf. Hypercube Concurrent Computers and Applications* (1988), ACM, pp. 222–231.

152. "Hypercube message routing in the presence of faults" (with J. Gordon), *Proc. 3rd Conf. Hypercube Concurrent Computers and Applications* (1988), ACM, pp. 318–327.

153. "Computational geometry on hypercube computers" (with R. Miller), *Proc. 3rd Conf. Hypercube Concurrent Computers and Applications* (1988), ACM, pp. 1220–1229.

154. "Meshes with reconfigurable buses" (with R. Miller, V.K. Prasanna Kumar, and D. Reisis), *Proc. 5th MIT Conf. on Advanced Research in VLSI* (1988), MIT Press, pp. 163–178.

155. "Mapping vision algorithms to parallel architectures", *Proc. of the IEEE* 76 (1988), pp. 982–995. Invited.

156. "Simulating essential pyramids" (with R. Miller), *Proc. Computer Vision and Pattern Recognition '88* (CVPR), IEEE, pp. 912–917.

157. "Convexity algorithms for parallel machines" (with R. Miller), *Proc. Computer Vision and Pattern Recognition '88* (CVPR), IEEE, pp. 918–924.

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168. "Fault tolerance of allocation schemes in massively parallel computers" (with M.L. Livingston), *Proc. 2nd Symp. Frontiers of Massively Parallel Computation* (1988), pp. 491–494.

169. "Data movement techniques for the pyramid computer" (with R. Miller), *SIAM J. on Computing* 16 (1987), pp. 38–60.

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171. "Passing messages in link-bound hypercubes" (with B. Wagar), *Hypercube Multiprocessors 1987*, M. Heath, ed., SIAM, pp. 251–257.

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I subsequently wrote up the results and put them in arXiv:1502.01435

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190. "The pyramid computer for image processing" (with R. Miller), *Proc. 7th Int'l. Conf. on Pattern Recognition* (1984), pp. 240–242.

191. "Mesh-connected computer algorithms for determining geometric properties of figures" (with R. Miller), *Proc. 7th Int'l. Conf. on Pattern Recognition* (1984), pp. 475–477.

192. "Computational geometry on a mesh-connected computer" (with R. Miller), *Proc. 1984 Int'l. Conf. on Parallel Processing* (ICPP), IEEE, pp. 66–73.

193. "Convexity algorithms for pyramid computers" (with R. Miller), *Proc. 1984 Int'l. Conf. on Parallel Processing* (ICPP), IEEE, pp. 177–184.

194. "Relational databases" (with P. Woodworth), *American Math. Monthly* 90 (1983), pp. 101–118.

195. "Mesh-connected computers with broadcasting", *IEEE Trans. on Computers* C-32 (1983), pp. 826–830.

196. "The numerical range of a weighted shift", *Proc. American Math. Society* 88 (1983), pp. 495–502.

197. "Topological matching", *Proc. 15th ACM Symp. on Theory of Computing* (STOC) (1983), pp. 24–31.

198. "Sorting, merging, selecting, and filtering on tree and pyramid machines", *Proc. 1983 Int'l. Conf. on Parallel Processing*, pp. 214–221.

199. "Broadcasting in mesh-connected computers", *Proc. 1982 Conf. on Information Sciences and Systems*, Princeton University (1982), pp. 85–90.

200. "Drawing straight lines with a pyramid cellular automaton", *Information Processing Letters* 15 (1982), pp. 233–237.

201. "Using clerks in parallel processing", *Proc. 23rd IEEE Symp. on Foundations of Computer Science* (FOCS) (1982), pp. 272–279.

202. "Searching and encoding for infinite ordered sets", *Int'l. J. Computer and Information Sciences* 11 (1982), pp. 55–72.

203. "Schur multiplication and the essential numerical range", *Trans. American Math. Society* 264 (1981), pp. 39–47.

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206. "Love is not here" and "Snow", *Eucuyo* (1968).

Ph.D. Theses Supervised

1. *Pyramid Computer Algorithms*, Russ Miller, 1985. This won the SUNY Binghamton Distinguished Dissertation Award

2. *Distributed Genetic Algorithms for Function Optimization*, Reiko Tanese, 1989.

3. *Efficient Schemes for Massively Fault Tolerant Parallel Communication*, Jesse Gordon, 1990.

4. *Practical Sorting Algorithms for Hypercube Computers*, Bruce Wagar, 1990.

5. *Parallel Algorithms for Polygonal and Rectilinear Geometry*, Sumanta Guha, 1991.

6. *Parallel Algorithms with Ultra-Fast Expected Times*, Philip MacKenzie, 1992. This won the University of Michigan Distinguished Dissertation Award.

7. *Oasis: A High-Performance Agent-Oriented Programming Language for Heterogeneous Distributed Computing*, Fan C. Cheong, 1992.

8. *Expected-Case Analysis with Semi-Random Data Models*, Douglas Van Wieren, 1999.

9. *Applications of the Ham Sandwich Theorem to Multi-Constraint Load Balancing Problems*, Andrew Poe, 1999.

10. *Using Hardware-Based Data Forwarding Predictors to Increase Multiprocessor Performance*, Ted B. Tabe, 2001.

11. *Predicting Algorithm Performance*, Joshua Landrum, 2004.

12. *High-Performance Dynamic Array Structures on Parallel Computers*, Robert Oehmke, 2004.

13. *On the Performance Analysis of Local Synchronization with Stochastic Task Times*, Julia Lipman, 2007.

14. *Energy-Efficient Algorithms on Mesh-Connected Systems with Additional Communication Links*, Patrick Poon, 2013.

15. *Efficient Algorithms for a Mesh-Connected Computer with Additional Global Bandwidth*, Yujie An, 2018.

16. *Energy Efficient Algorithms in Low-Energy Wireless Sensor Networks*, Timothy B. Lewis, 2019

17. *Efficiency in Machine Learning with Focus on Deep Learning and Recommender Systems*, Amy Nesky, 2020.

Major Professional Activities

Advisory Committees:
    DOE SciDAC Institutes program review and selection committees, 2014, '17, '20, '23
    NSF prop. review and selection panel, "Benchmarks of realistic scientific application performance on large-scale computer systems" (BRAP), 2015
    For Administrator of NASA: review of agency's modeling, simulation, and analysis capabilities and recommendations for further development, 2004–5.
    For National Science Board, chaired NSF Site Visit Team of proposed Sci. and Tech. Center (STC) on grid computing, 2001
    Sci. Comp. Advisory Comm., National Center for Atmospheric Research (NCAR), 2000–3.
    NSF Major Research Instrumentation (MRI) award panel, 1997.
    For Chief Scientist, NSA, developed design for Supercomputing Research Center for unclassified NSA-academic collaboration, 1985.

Large External Collaborations:
    Executive Board, Earth Systems Modeling Framework (ESMF), 2001—
    National Partnership for Advanced Computing Infrastructure (NPACI), 1996—2004.

Tutorial on "Parallel Computing 101" (with M.L. Livingston or C. Jablonowski), an all-day tutorial with continually evolving variations taught at numerous places, including:
    Supercomputing (SC) '91 – '93, '96 – '98, '00, '01, '04 – '10, '13 – '22
    Ford Motor Company
    U.S. Patent and Trademark Office (USPTO)   (a highly modified version of the tutorial)
    NASA Glenn and Langley Research Centers

Lecturer:
    Adaptive Trial Designs, 2007   (MDs attending received Continuing Medical Education credit)
    Statistics of Optimal Dosing, 2001.
    NPACI Parallel Computing Institute, 2001, 1998, 1997.
    NATO Advanced Study Institute, Parallel Computing on Distributed Memory Multiprocessors, Ankara, Turkey, 1991.

Program Chair or Co-Chair:
    1992 International Conference on Parallel Processing, Chicago, IL.
    6th Distributed Memory Computer Conference, Portland, OR, 1991
    5th Distributed Memory Computer Conference, Charleston, SC, 1990.

Editorial Board:
    IEEE Transactions on Parallel and Distributed Systems.
    Information Processing Letters
    Frontiers in Computing Systems Research
    Journal of Parallel and Distributed Computing

Selected Program Committee Participation:
    Supercomputing '08, Austin, TX, 2008.
    Int'l. Conf. Parallel and Distributed Processing, Rhodes, Greece, 2006.
    High Performance Computing for Statistical Inference, Dublin, Ireland, 2006.
    3rd Work. Reconfigurable Architectures and Algorithms, Santa Barbara, CA, 1996.
    5th Int'l Work. on Parallel Processing by Cellular Automata and Arrays, Berlin, Germany, 1990.
    1989 ACM Symp. Parallel Algorithms and Architectures, Santa Fe, NM.
    4th Conference on Hypercube Concurrent Computers and Applications, Monterey, CA, 1989.