

Brandon Dixon

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INTERESTS

Component based software development, systems and software, parallel and sequential algorithms, high performance implementations of algorithms, parallel computing, software engineering, software design and component engineering, client-server systems, computer security and cryptography, computer science education.

Lead systems architect for the CARE project (<http://care.cs.ua.edu>).

EDUCATION

Ph.D. Computer Science, Princeton University, Princeton, New Jersey, 1993.

M.S. Computer Science, Princeton University, Princeton, New Jersey, 1990.

B.S. Computer Science and Mathematics, Vanderbilt University, Nashville, TN, 1989.

EMPLOYMENT

(August 2000 to Present) Associate Professor, The University of Alabama, Tuscaloosa, AL.

(August 1994 to August 2000) Assistant Professor, The University of Alabama, Tuscaloosa, AL.

(August 1993 to May 1994) Visiting Assistant Professor, Washington and Lee University, Lexington, VA.

(Summer 1989, 1993, 1994) Summer Research Staff, Institute for Defense Analysis, Princeton, NJ.
Conducted mathematics and cryptographic research relevant to national security.

(Summer 1991) Research Intern, Bell Communications Research, Morristown, NJ. Developed and implemented high performance versions factoring algorithms for the MasPar parallel computer. Producing new factoring world records.

TEACHING

14 different courses in 6 years , earning an average score of 4.4 out of 5.0 on student evaluations.

Short courses:

Database fundamentals, Feb, 2000, Alabama Department of Transportation.

Object oriented programming, July, 2000, Alabama Department of Transportation

SERVICE

Faculty coordinator for departmental systems staff. Coordinate daily operation, hardware acquisition, software operation and upgrade.

College computing committee: computing lab equipment sub-committee chair. Drafted a 4 year plan for the recurring renewal of all computing lab hardware and infrastructure.

PUBLICATIONS

Refereed Journals:

Dixon, B., Rauch, M., and Tarjan, R.E., "Verification and Sensitivity Analysis of Minimum Spanning Trees in Linear Time", *SIAM Journal on Computing*, **21**(6)(1992)

Dixon, B. and Tarjan, R.E., "Optimal Parallel Verification of Minimum Spanning Trees in Logarithmic Time", *Algorithmica* **17** (1997) pp. 11-18 .

Dixon, B. and Swallow J., "High-Performance Sorting Algorithms for the Cray T3D Parallel Computer", *Journal of Supercomputing* **10** (1997) pp. 371-395.

Parish, A., Dixon, B., Cordes, D., Lusth, J., and Vrbsky, S., "Implementing Persistent Data Structures Using C++," *Software -- Practice and Experience*, vol. 28, no. 15, December 1998, pp. 1559-1579.

Dixon, B., Lusth, J., "A Characterization of Important Algorithms for Quantum-Dot Cellular Automata," *Information Sciences*, 113 (1999), pp. 193-204.

Jukic, N., Vrbsky, S., Parrish, A., Dixon, B., Jukic, B., "A Belief-Consistent Multilevel Secure Relational Data Model", *Information Systems*, Vol. 24, No. 5, 1999, pp. 377-402.

Parrish, A., Cordes, D., Dixon, B., McGregor, J., "A Taxonomy of Module Interactions for Object-Oriented Testing," *Journal of Computer and Information Science*, vol. 1, no. 1, May 2000.

Parrish, A., B. Dixon, D. Cordes, "A Conceptual Framework for Component-Based Software Distribution," to appear, *Journal of Systems and Software*.

Hale, J., Parrish, A., Dixon B., Smith, R., "Enhancing Cost Estimation Models with Task Assignment Information," submitted to *IEEE Software*.

Conference Publications:

Parrish, A., D. Cordes, B. Dixon and J. McGregor, "Class Development and Testing in the Small," *Proceedings of the 38th Annual ACM Southeast Conference*, April 2000, pp. 139-145 (Invited Paper).

Jackson, D. J., R. Pimmel, A. Parrish, B. Dixon, D. Cordes and R. Borie, "Logic Design Programming Assignments in a First-Year Course," *Proceedings of the ISCA 15th Internal Conference on Computers and Their Applications*, March 2000, pp. 412-414.

Parrish, A., B. Dixon, D. Hale, J. Hale, "A Case Study Approach to Teaching Component-Based Software Engineering," *Proceedings of the CSEE&T 2000 Conference on Software Engineering Education and Training*, March 2000, pp. 140-147.

Parrish, A., R. Borie, D. Cordes, B. Dixon, J. Jackson, R. Pimmel, "An Integrated Introductory Course for Computer Science and Engineering," *Proceedings of Frontiers in Education (FIE) '99*, November 1999.

Brown, D., A. Parrish, B. Dixon, S. Vrbsky, C. Gainer, "An Information Mining Approach Toward Improving Aviation Safety," *Proceedings of the 1999 Fifth ISSAT International Conference on Reliability and Quality in Design*, August, 1999.

McInerny, S., B. Dixon, A. Parrish, S. Rubin, D. Wong, and C. Tanner, "Intelligent System for Vibroacoustic and Shock Environment Predictions," *Proceedings of the 5th AIAA/CEAS Aeroacoustics Conference*, May, 1999.

Jackson, D., B. Dixon, D. Cordes, A. Parrish, R. Borie, R. Pimmel, "An Integrated First-Year Computing Curriculum: Combining C++ and Assembly Language Programming, " *Proceedings of the ISCA 11th Internal Conference on Computer Applications in Industry and Engineering*, 286-289, Nov. 11-13, 1998.

Dixon, B., "Concurrent Access in $O(\log \log n)$ Priority Queues," *Parallel and Distributed Computing, Theory and Practice, Lecture Notes in Comput. Sci.* **805** (1994), pp59--72.

Dixon, B. and Lenstra, A.K., "Massively Parallel Elliptic Curve Factoring," *Advances in Cryptology, Eurocrypt '92, Lecture Notes in Comput. Sci.* **658** (1993), pp.183--193.

Dixon, B. and Lenstra, A.K., "Factoring Integers Using SIMD Sieves," *Advances in Cryptology, Eurocrypt '93, Lecture Notes in Comput. Sci.*

Cordes, D., A. Parrish, B. Dixon, R. Borie, D. Jackson, D. Hale, J. Hale, S. Sharpe, "An Inter-Disciplinary Software Engineering Track Emphasizing Component Engineering," *Proceedings of the 1998 Frontiers in Education Conference*, Tempe, Arizona, November 4-7, 1998, pp. 811-813.

Cordes, D., A. Parrish, R. Borie, B. Dixon, D. Jackson, R. Pimmel, "Teaching an Integrated First-Year Computing Curriculum: Lessons Learned," *proceedings of the 1998 ASEE Annual Conference*, Seattle, Washington, June 28-July 1, 1998.

Parrish, A., Borie, R., Cordes, D., Dixon, B., Hale, D., Hale, J., Jackson, J., Sharpe, S., "Computer Engineering, Computer Science and Management Information Systems: Partners in a United Software Engineering Curriculum," *11th Conference on Software Engineering Education and Training*, IEEE Computer Society Press, pp. 67-75.

Cordes, D., Parrish, A., Dixon, B., Borie, R., Jackson, J., Gaughan, P., "An Integrated First-Year Curriculum for Computer Science and Computer Engineering," *Frontiers in Education Conference*, November '97, Pittsburgh PA.

Lusth, J., Dixon, B., Jackson J., Burkett, S., "Quantum cellular automata and the problem of unbalanced logic gates", *Proceedings of the International Conference on Quantum Devices and Circuits*, Alexandria, Egypt, June 1996.

Dixon, B. and Lenstra, A.K., "Fast Massively Parallel Modular Arithmetic," *Proceedings of the Second Annual Dartmouth Institute for Advanced Graduate Studies in Parallel Computation*.

Cordes, D. (speaker), A. Parrish, R. Borie, B. Dixon, D. Jackson, R. Pimmel, "An Integrated First-Year Computing Curriculum," invited poster presentation at the 1998 ACM SIGCSE Conference, Atlanta, Georgia, Feb. 26-28, 1998.

Jackson, D., A. Parrish, R. Borie, D. Cordes, B. Dixon, D. Hale, J. Hale, S. Sharpe, "Component Engineering in a Multidisciplinary Curriculum, ", Proceedings of the ISCA 11th Internal Conference on Computer Applications in Industry and Engineering, pp. 294-296, Nov. 11-13, 1998.

Parrish, A., B. Dixon, "A Conceptual Framework for Component-Based Software Distribution," to appear 17th Annual AoM/IaOM International Conference on Computer Science.

Invited Lectures:

"Sorting on the Cray T3D," Invited Presentation, Cray Users Group Conference, Denver, CO, 1995.

"Implementing Persistent Data Structures Using C++," Auburn University, Auburn, AL, (July 1997).

GRANTS AND CONTRACTS

McInerny, S., Dixon, B., Parrish, A., "Intelligent System for Vibroacoustic and Shock Environment Predictions", Renewal, Aerospace Corporation, \$100,000, 11/1/99 – 5/15/2000.

Brown, D., Dixon, B., Parrish, A., "Upgrading CARE Capabilities for the State of North Carolina", State of North Carolina, \$40,000, 10/1/99 – 9/30/2000.

Brown, D., Dixon, B., Parrish, A., "Automated Information Mining of Aviation Accident Databases using CARE Technology", NASA, \$119,042, 1/1/99 – 9/30/00.

Brown, D., Parrish, A., Vrbsky, S., Dixon, B., A. "Pilot Program for Rotorcraft Accident/Incident Analyses", FAA, \$284,833, 10/1/98 – 3/31/00.

Brown, D., A. Parrish, and B. Dixon, "CPMS Phase 5/Year 2000 (Y2K) Project," State of Alabama Department of Transportation, \$3,481,773, October 1, 1998 to September 30, 1999.

McInerny, S., Dixon, B., Parrish, A., "Intelligent System for Vibroacoustic and Shock Environment Predictions", Aerospace Corporation, \$100,000, 11/1/98 – 5/15/99.

Brown, D., Dixon, B., Parrish, A., "Upgrading of CARE Capabilities for the State of Michigan", State of Michigan, \$35,789, 10/1/98 – 9/30/99.

Brown, D., Parrish, A., Vrbsky, S., Dixon, B., "The Application of "CARE" Technology to FAA Databases", FAA, \$180,935, 6/18/98 – 1/4/99.

Brown, D., Dixon, B., Parrish, A., "Initiating CARE Capabilities for the State of Michigan", State of Michigan, \$36,000, 3/1/98 – 6/30/98.

Brown, D., Dixon, B., Parrish, A., "Initiating CARE Capabilities for the State of North Carolina," State of North Carolina, \$36,000, 6/30/98 – 9/30/98.

Parrish, A., D. Cordes, R. Borie, B. Dixon, D. Hale, J. Hale, S. Sharpe, and D. Jackson, "Integrating Software Architecture Into an Interdisciplinary Software Engineering Curriculum," National Science Foundation, \$250,000, 9/1/97 – 9/1/2000.

Parrish, A., D. Cordes, B. Dixon, R. Borie, D. Jackson and P. Gaughan, "An Integrated Introductory Curriculum for Computer Science and Engineering," National Science Foundation, \$135,000, 5/15/97 – 5/15/99.