

Bob Boothe

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Education

- Ph.D. Computer Science, University of California at Berkeley, July 1993
Thesis: "Evaluation of Multithreading and Caching in Large Shared Memory Parallel Computers"
- M.S. Computer Science, U.C. Berkeley, December 1989
Thesis: "Multiprocessor Strategies for Ray-Tracing"
- B.S. Computer Engineering, U.C. San Diego, June 1985 Summa cum Laude

Research Interests

- I am currently working on a project to build a highly supportive system for students in my algorithms class to develop algorithms. This system will provide automatic testing, comparison to reference solutions, and automatic algorithm animations. I feel it will fulfill a strong need for students to validate their algorithm ideas.
- My previous research project was a bidirectional debugger. This bidirectional debugger made it possible for its user to move both forward and backward along the execution path of their program. For example, the user could perform the following new operations: stepping back to the previous statement, setting a breakpoint and stepping back to the point where the program last visited that breakpoint, stepping back to the point where a variable was last assigned a particular value, and undoing previous debugger commands. I still remain very interested in this field and have further research ideas in this area.
- In the past I have done research in the fields of parallel computer architecture and fast computer simulation techniques.

Teaching Experience

University of Southern Maine, Assistant Professor 1993-99, Associate Professor 1999-present, Department Chair 2008-present

Classes taught regularly:

- COS 160, Structured Problem Solving: Java
Our first course in programming, taught in Java.
I recorded this in 2011 for an new online course.
- COS 170 Structured Programming Laboratory
Lab associated with COS 170. This is now a highly integrated lab with lab assignments immediately using the concepts learned each week.

- COS 285, Data Structures
Basic abstract data types and the representations, fundamental algorithms, and algorithm analysis.
- COS 350, Systems Programming
A study of systems programming concepts and software, including the C programming language and the Unix programming environment and operating system interface.
- COS 485 Analysis of Algorithms
This course develops useful algorithm design techniques such as divide-and-conquer, the greedy method, dynamic programming, relaxation, and randomized algorithms.

Classes taught previously:

- COS 250, Computer Organization
The basic hardware, architecture, and software of computer systems including digital logic design and assembly language.
- COS 251, Software Systems
A study of systems programming concepts and software, including the UNIX programming environment, C++ programming language, and UNIX operating system interface.
- COS 255, Computer Organization Laboratory
Building and testing combinational and sequential logic circuits and writing assembly language programs.
- COS 455, Computer Architecture
The design and organization of digital computers, covering implementation of: arithmetic, processors, pipelining, and the memory hierarchy.
- COS 499, Ethical Conduct and Social Responsibility
A study of ethical perspectives and social responsibilities of computer professionals.
- COS 555, Advanced Computer Architecture
Graduate class on the current state of the art in processor design.
- COS 587, Parallel Processing
Graduate class on the programming of large scale parallel computers.

U.C. Berkeley, Graduate Student Instructor, 1986-91

- CS 267, Parallel Programming, Fall 90, Spring 91
I was part of a team of 4 professors and 2 graduate students that developed and introduced a graduate level course in parallel programming at Berkeley. I also helped teach the initial offering of the course in which the students had parallel programming assignments on a Sequent, BBN Butterfly, N-cube, CM-2, and Cray-YMP.
- CS 152, Computer Architecture, Fall 86, Spring 87
Graded exams and course projects and led discussion sections.

Research Experience

- U. Southern Maine, Assistant Professor 1993-99, Associate Professor 1999-present
Current project: developing a highly supportive system for algorithm development and evaluation. Previous project: development of a bidirectional debugger.
- U.C. Berkeley, Graduate Student Researcher with Professor Ranade, 1989-1993
Studied the design of large shared memory multiprocessors and the use of multithreading as a mechanism for hiding memory latency. As part of this project, I built an innovative simulator that made the later simulation studies possible.
- U.C Berkeley, Graduate Student Researcher with Professor Séquin, 1987-1989
Studied parallel ray-tracing on a variety of parallel architectures.

Industrial Experience

- Rising Star Industries, Systems & Application Programmer, 1982-1986
Developed low level graphics drivers as well as graphics applications for a startup company making an integrated user friendly system.

Grants

- CTEL Course Development Grant for development and delivery of COS 160 as on online class for Fall 2011. \$2,000 Spring 2010 – Fall 2011.
- 8/1/97 - 7/31/99 National Science Foundation Software Engineering and Languages program \$80,000 grant to support my research project on "A Fully Capable Bidirectional Debugger"

Publications

- Bob Boothe, "Using Real Execution Timings to Enliven a Data Structures Class," The International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS), July 2012.
- Bob Boothe, "Efficient Algorithms for Bidirectional Debugging," Proceedings of the 2000 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), June, 2000.
- Bob Boothe, "Algorithms for Bidirectional Debugging," USM Technical Report 98-2-23, February 1998.
- Bob Boothe, chapter on "Execution Driven Simulation of Shared Memory Multiprocessors" in book titled "Fast Simulation of Computer Architectures", edited by Thomas M. Conte and Charles E. Gimarc, Kluwer Academic Publishers: Boston, MA., April, 1995.
- Bob Boothe, "Fast Accurate Simulation of Large Shared Memory Multiprocessors," The 26th Annual Hawaii International Conference on System Sciences, January 1994.
- Bob Boothe and Abhiram Ranade, "Performance on a Bandwidth Constrained Network: How much bandwidth do we need?", Supercomputing '93, November 1993.

- Robert Francis Boothe, "Evaluation of Multithreading and Caching in Large Shared Memory Parallel Computers," Ph.D. Dissertation, U.C. Berkeley, Published as Technical Report No. UCB/CSD 93/766 July 1993.
- Bob Boothe, "Fast Accurate Simulation of Large Shared Memory Multiprocessors (revised version)", Report No. UCB/CSD 93/752, April 1993.
- Bob Boothe and Abhiram Ranade, "Improved Multithreading Techniques for Hiding Communication Latency in Multiprocessors," The 19th Annual Int. Symp. on Computer Architecture Conf. Proc., May 1992.
- Bob Boothe, "Fast Accurate Simulation of Large Shared Memory Multiprocessors", Report No. UCB/CSD 92/682, April 1992.
- Bob Boothe, "Multiprocessor Strategies for Ray-Tracing", Master's thesis, U. C. Berkeley, Report No. UCB/CSD 89/534, September 1989.

Conference Presentations

- "Using Real Execution Timings to Enliven a Data Structures Class," presented at FECS 2012.
- "Efficient Algorithms for Bidirectional Debugging," presented at PLDI '00.
- "Fast Accurate Simulation of Large Shared Memory Multiprocessors", presented at HICSS '94.
- "Performance on a Bandwidth Constrained Network: How much bandwidth do we need?", presented at Supercomputing '93.
- "Improved Multithreading Techniques for Hiding Communication Latency in Multiprocessors," presented at ISCA '92.

Master's Theses Supervised

- Craig Dorais, "Adding Some Big O to the Scaffold Project", 5/07
- Chris Redinger, "Design of a Graph Algorithm Toolkit", 5/05
- Paul Sandlin, "An Automatic Algorithm Tester", currently inactive.
- Brent Atkinson, "A Java Bidirectional Debugger", currently inactive.
- Charles Carr, "I/O Replay and Checkpointing for a Bidirectional Debugger", 2/05.
- Richard Best, "A Motif Interface for the Bidirectional Debugger", 3/99.
- Margery Harrison, "An Interactive Tool for Exploring Graph Algorithms", 7/98.
- Steve Dorato, "An Exploration of Algorithms for Bidirectional Code Navigation", 9/97.
- Robert Zulawnik, "Reverse Debugger", 5/95.

Honors

- USM Faculty Award for Outstanding Teaching, May 2003.
- Best Paper Award for the 27th Annual Hawaii International Conference on System Sciences, 1994
- EECS Department Outstanding Teaching Assistant Award, 1987, U.C. Berkeley
- Distinguished pass in preliminary exam, first rank, U.C. Berkeley

Professional Memberships

- ACM