Carl J. Mauer

contact: cmauer@cs.wisc.edu
http://www.cs.wisc.edu/~cmauer

Professional Experience

- **Senior Computer Scientist** - Research Department February 2004—Present
  TomoTherapy, Inc,. Madison, WI
  4D Motion Management. Led a multi-disciplinary team integrating four technologies (camera tracking, motion algorithm, real-time control, robotic test phantom), to prototype innovative real-time advanced delivery. Responsibilities included implementing tracking (camera) sub-system, integration and initial testing, documenting feasibility, identifying and resolving risks. Supported customer collaboration using prototype hardware and software at UW-Hospital. C++.

  Respiratory coaching and analysis software. Responsible for developing prototype software to coach patients for more reproducible breathing. Implemented analysis package for determining eligibility criteria using Java, Swing. Some JNI, C++, and DirectX for image capture.

  Collaborated on image processing prototype using stereo cameras for optical measurement. Increased performance by adding threads, added support for dumping images during calibration of camera parameters and relative placement. Wrote MFC tracking application, with real-time graph and feedback. C++, pthreads, OpenCV, MFC.

  Decoupled two major subsystems, to allow better testability and more agile development, by implementing a fake object representing the data server. Wrote corba and xml-rpc forwarding program to bridge between company network and isolated product network. Python, omniORBpy, wxwidgets, numpy, matplotlib.

  Monte Carlo simulation. Responsible for integrating existing physics simulation package (PENELOPE) into a product package. Wrapped FORTRAN library with C++ front-end, implemented cluster version using MPI, performance tuning. C++, MPI, CORBA, Intel MKL.

- **Research Assistant** May 1999—December 2003
  University of Wisconsin, Madison, WI
  Authored two conference publications, presented results at ASPLOS and CAECW conferences.
  Developed dataflow analysis tool in C++ to characterize program's memory parallelism.
  Developed timing simulator in C++ that models out-of-order SPARC V9 microprocessor.
  Released under GPL, see http://www.cs.wisc.edu/gems/.

- **Teaching Assistant** August 1998—May 1999
  University of Wisconsin, Madison, WI
  Discussion leader for 50 students in an introductory Java programming course.
  Prepared lecture materials, answered student questions, graded quizzes and projects.

- **Software Engineer** December 1995—May 1998
  Simplex Solutions, Sunnyvale, CA
  Developed and optimized CAD verification software using C++. Lead programmer on netlist comparison application. Contributing programmer to hierarchical netlist extraction application.
  Increased performance of existing netlist compare by using hierarchical algorithm.
  Implemented GUI to visualize IR drop, waveform glitches using X, Motif.

Education

- Graduate: **University of Wisconsin–Madison,WI** August 1998—December 2003
  M.S. in Computer Science, May 2000. 3.85 / 4.0.
  Completed doctoral course work including four MBA courses. Passed qualifying exam in computer architecture. Relevant coursework:
  - –Advanced computer architecture
  - –Multiprocessor computer architecture
  - –VLSI system design
  - –Compiler construction
  - –Topics in database design
  - –Computer networking
  - –Intro to operating systems
  - –Organizational behavior

- Undergraduate: **Carleton College–Northfield, MN** August 1991—June 1995
  Bachelor of Arts, *magna cum laude*, June 1995.
  Double major in Computer Science and Mathematics. 3.73 / 4.0.
  National Merit Scholar. Dean's List.

Technical Knowledge

Languages:	C++, C, Python, Java
Applications:	IntelliJ, Visual Studio, linux (emacs, gmake, jam, valgrind), Purify
Technologies:	pthreads, MPI, CORBA, wxWidgets, Swing, JNI, Virtutech Simics
Platforms:	Windows, Linux, Solaris

Publications

- *Monte Carlo Generation of Phase Spaces for Dose Computation in TomoTherapy.* Michel Moreau, Yu Chen, Bob Cravens, **Carl Mauer**, Edmond Sterpin, Francesc Salvat, Ken Ruchala, and Gustavo Olivera. In the 50th American Association of Physicists in Medicine Poster Session, July 2008.

- *Real Time Motion Adaptive Delivery-Experimental Validation.* **Carl Mauer**, Weiguo Lu, Dan Lucas, James Zhang, Gustavo Olivera, and Ken Ruchala. In the 49th American Association of Physicists in Medicine Poster Session, July 2007.

- *Simulating a $2M Commercial Server on a $2K PC.* Alaa R. Alameldeen, Milo M.K. Martin, **Carl J. Mauer**, Kevin E. Moore, Min Xu, Daniel J. Sorin, Mark D. Hill and David A. Wood. In IEEE Computer, February 2003.

- *Full-System Timing-First Simulation.* **Carl J. Mauer**, Mark D. Hill and David A. Wood. In the Proceedings of the 2002 ACM Sigmetrics Conference on Measurement and Modeling of Computer Systems, June 2002.

- *Evaluating Non-deterministic Multi-threaded Commercial Workloads.* Alaa R. Alameldeen, **Carl J. Mauer**, Min Xu, Pacia J. Harper, Milo M.K. Martin, Daniel J. Sorin, Mark D. Hill and David A. Wood. In the Proceedings of the Fifth Workshop on Computer Architecture Evaluation Using Commercial Workloads (CAECW), February 2002.

- *Timestamp Snooping: An Approach for Extending SMPs.* Milo M. K. Martin, Daniel J. Sorin, Anastassia Ailamaki, Alaa R. Alameldeen, Ross M. Dickson, **Carl J. Mauer**, Kevin E. Moore, Manoj Plakal, Mark D. Hill, David A. Wood. In the 9th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), November 2000.

Honors and Awards

- **Phi Beta Kappa**, academic honor society
- **Sigma Xi**, scientific research society