Tara M. Madhyastha

Work
School of Computer Science
Carnegie Mellon University
5000 Forbes Ave.
Pittsburgh, PA 15213
(412)268–7663

Home
4601 Bayard St., #206
Pittsburgh, PA 15213
(412)683–6874
email: *tara@cs.cmu.edu*
WWW: *http://www.cs.cmu.edu/~tara*

Research Interests

Parallel input/output; adaptive and predictive resource management policies; performance visualization and prediction; input/output characterization.

Education

Ph. D. in Computer Science. University of Illinois at Urbana-Champaign, August 1997.
Thesis title: *Automatic Classification of Input/Output Access Patterns*.
Advisor: Dr. Daniel A. Reed.

M. S. in Computer Science. University of Illinois at Urbana-Champaign, May 1992.
Thesis title: *Porsonify: A Portable Framework for Data Sonification*.
Advisor: Dr. Daniel A. Reed.

B. A. in Computer Science and English. Rutgers College, Rutgers University, New Jersey, May 1990 with Henry Rutgers Honors.

Grants and Awards

NSF CISE Postdoctoral Research Associateship ($42K), 1997-present

NASA Graduate Student Research Program Fellowship, JPL ($16K/year) 1995–1997

NSF Travel Grant, CRA Workshop on Academic Careers for Women in Computer Science and FCRC, 1996

Rutgers College Special Merit Travel Grant, USENIX, 1988–1989

Rutgers University Presidential Scholar (tuition and stipend), 1986–1990

Garden State Distinguished Scholar, 1986–1990

Honors

Phi Beta Kappa, 1989

Rutgers College General Honors Program, 1986–1990

Dean's Award for Academic Excellence, 1987

Experience

1997–present **Postdoctoral Research Fellow** Carnegie-Mellon University.
I am examining new application and system-level interfaces for optimizing I/O intensive access patterns. I am also investigating the use of data mining techniques for I/O workload characterization.

1990–1997 **Research Assistant** University of Illinois at Urbana-Champaign.
My thesis research demonstrated that it is possible to automatically classify certain important parallel I/O access patterns and use this information to tune file system policies. I assisted in the design of a portable user-level parallel file system used to validate this research.

For my M. S. research I developed a portable client/server based sound display system using C, C++ with X11/Motif user interface to map input performance data into audio output on Sun SPARCstations, MIDI, and other audio devices.

While in the Pablo group I contributed to design and implementation of the Pablo Performance Analysis Environment, a system to capture statistics from parallel systems and display the data on user-configured views.

Summer 1993 **Research Assistant** NASA Goddard Space Flight Center, Greenbelt MD.
Characterized file access patterns of I/O bound satellite image data processing codes.

Summer 1992 **Summer Intern** Supercomputing Research Center, Bowie, MD.
Improved usability of the Performance Monitor (PM) System for the Tera simulator.

1986–1990 **Student Systems Programmer** Rutgers University, New Brunswick, NJ.
Provided systems programming and computer systems support for the Math Department/Center for Computer and Information Services. Also installed and configured new Sun computers, trained new system administrators, for Math and other departments. Systems operator (11/86-9/87).

Software Released

Pablo – Performance analysis toolkit. Contributed to design and implementation of various releases; most recently I/O instrumentation.
Available at *http://www-pablo.cs.uiuc.edu/Software/Pablo/pablo.htm*.

Porsonify – A portable data sonification toolkit.
Available at *http://www-pablo.cs.uiuc.edu/Project/Pablo/PabloSonification.htm*.

Professional Activities

Program Committees

Sixth Workshop on Input/Output in Parallel and Distributed Systems, 1999.

Departmental Committees

Graduate Study Committee, 1995–1997.

Referee

Reviewer for The Israel Science Foundation, 1998
5th International Conference on High Performance Computing, 1998
SIGMETRICS, 1998
International Conference on Supercomputing, 1995
IEEE Transactions on Parallel and Distributed Systems, 1993

Publications

Papers Currently Submitted

MADHYASTHA, T. M., AND REED, D. A. Learning to Classify Parallel Input/Output Access Patterns. *Submitted to IEEE Transactions on Parallel and Distributed Systems* (1998).

MADHYASTHA, T. M., GIBSON, G. A., AND FALOUTSOS, C. Informed Prefetching for Collective Input/Output. *Submitted for publication.* (1998).

Papers in Refereed Journals

MADHYASTHA, T. M., AND REED, D. A. Data Sonification: Do You See What I Hear? *IEEE Software* (March 1995).

Papers in Conferences

1. MADHYASTHA, T. M., AND REED, D. A. Input/Output Access Pattern Classification Using Hidden Markov Models. In *Workshop on Input/Output in Parallel and Distributed Systems* (November 1997), pp. 57–67.
2. MADHYASTHA, T. M., AND REED, D. A. Exploiting Global Access Pattern Classification. In *Proceedings of SC'97* (November 1997).
3. MADHYASTHA, T. M., AND REED, D. A. Intelligent, Adaptive File System Policy Selection. In *Proceedings of the Sixth Symposium on the Frontiers of Massively Parallel Computation* (October 1996), pp. 172–179.
4. MADHYASTHA, T. M., ELFORD, C. L., AND REED, D. A. Optimizing Input/Output Using Adaptive File System Policies. In *Fifth NASA Goddard Conference on Mass Storage Systems and Technologies* (September 1996).
5. MADHYASTHA, T. M., AND REED, D. A. A Framework for Sonification Design. In *Auditory Display: Sonification, Audification and Auditory Interfaces* (1992), Addison-Wesley.
6. REED, D. A., OLSON, R. D., AYDT, R. A., MADHYASTHA, T. M., BIRKETT, T., JENSEN, D. W., NAZIEF, B. A. A., AND TOTTY, B. K. Scalable Performance Environments for Parallel Systems. In *Proceedings of the Sixth Distributed Memory Computing Conference* (1991), IEEE Computer Society Press, pp. 562 – 569.
7. REED, D. A., ELFORD, C. L., MADHYASTHA, T., SMIRNI, E., AND LAMM, S. L. The Next Frontier: Interactive and Closed Loop Performance Steering. In *Proceedings of the 1996 International Conference on Parallel Processing Workshop* (August 1996), pp. 20–31.
8. REED, D. A., ELFORD, C. L., MADHYASTHA, T., SCULLIN, W. H., AYDT, R. A., AND SMIRNI, E. I/O, Performance Analysis, and Performance Data Immersion. In *Proceedings of MASCOTS '96* (Feb. 1996), pp. 1–12.

Technical Reports

1. MADHYASTHA, T. M. Automatic Classification of Input/Output Access Patterns. Technical report, University of Illinois at Urbana-Champaign, Department of Computer Science, Aug. 1997.
2. REED, D. A., AYDT, R. A., MADHYASTHA, T. M., NOE, R. J., SHIELDS, K. A., AND SCHWARTZ, B. W. The Pablo Performance Analysis Environment. Technical report, University of Illinois at Urbana-Champaign, Department of Computer Science, Nov. 1992.
3. MADHYASTHA, T. M. Porsonify: A Portable System for Data Sonification. Technical report, University of Illinois at Urbana-Champaign, Department of Computer Science, Apr. 1992.
4. MADHYASTHA, T. M. Porsonify User's Guide. Technical report, University of Illinois at Urbana-Champaign, Department of Computer Science, April 1992.

Invited Seminars

"Automatic Classification of Input/Output Access Patterns," Hewlett-Packard Labs, April 1998.

"Intelligent, Adaptive File System Policies," NASA Jet Propulsion Laboratory, August 1996.

References

Dr. Garth A. Gibson, Associate Professor
School of Computer Science and Dept. of Electrical and Computer Engineering
Carnegie-Mellon University
5000 Forbes Ave., Pittsburgh PA 15213
Phone: (412) 268-5890, email: `garth@cs.cmu.edu`

Dr. Daniel A. Reed, Professor and Head
Department of Computer Science
University of Illinois at Urbana-Champaign
1304 W. Springfield Ave., Urbana IL 61801
Phone: (217) 333-3807, email: `reed@cs.uiuc.edu`

Dr. Christos Faloustos, Associate Professor
School of Computer Science
Carnegie-Mellon University
5000 Forbes Ave., Pittsburgh PA 15213
Phone: (412) 268-1457, email: `christos@cs.cmu.edu`

Dr. David Nagle, Assistant Professor
Department of Electrical and Computer Engineering
Carnegie-Mellon University
5000 Forbes Ave., Pittsburgh PA 15213
Phone: (412) 268-3898, email: `bassoon@ece.cmu.edu`