MUSTAFA M. TIKIR

PMaC Laboratory,
San Diego Supercomputer Center,
9500 Gilman Drive, 0505
La Jolla, CA 92093

mtikir@sdsc.edu
http://users.sdsc.edu/~mtikir

Office : (858) 822-0886

RESEARCH INTERESTS

High Performance Computing, Programming Languages, Operating Systems

EDUCATION

Ph.D., Computer Science, December 2005
University of Maryland, College Park, MD, USA

M.S., Computer Science, December 2002
University of Maryland, College Park, MD, USA

B.S., Computer Science, June 1996
Middle East Technical University, Ankara, Turkey

RESEARCH EXPERIENCE

Sep 05 – Present

Programmer/Analyst IV, PMaC Lab, San Diego Supercomputer Center, San Diego, CA, USA
Supervised by Prof. Allan Snavely.

Participating on research to bring scientific rigor to the prediction and understanding of factors affecting the performance of current and projected HPC platforms. The research focuses on incorporating traditional techniques, such as benchmarking and cycle-accurate simulators, in combination to enable more quantitative modeling of performance for HPC applications.

Fall 99 – Fall 05

Research Assistant, University of Maryland, College Park, MD, USA
Supervised by Prof. Jeffrey K. Hollingsworth.

Worked on automatic performance tuning of HPC applications at runtime using online profiling data gathered from hardware performance counters. Designed and implemented several runtime techniques to dynamically increase the locality of memory accesses in both scientific and Java server applications running on multiprocessor systems with non-uniform memory access latencies (cc-NUMA). These techniques are currently implemented on the Sun Fire 6800 servers with embedded Sun Fire Link hardware counters.

Participated in design and implementation of the Dyninst library that provides a machine independent interface to permit the creation of tools and applications that use runtime code patching. Implementations of Dyninst are currently available for Alpha, Sparc, Power, Mips, x86 and IA64 architectures.

Designed and evaluated several runtime techniques for efficient online computation of statement coverage testing using Dyninst library. The techniques dynamically insert code and remove it when it does not produce any additional coverage information. They also use more sophisticated binary analysis to reduce the number of instrumentation points. The statement coverage tools work on Sparc platform.

Summer 00

Summer Intern, MRL Programming Systems Lab, Intel Corporation, Santa Clara, CA, USA
Supervised by Dr. Guei-Yuan Lueh.

Worked on debugging support in Java Virtual Machines when Just-In-Time compilers are used. Designed and evaluated several techniques using dynamic re-compilation for runtime generation of debugging information required by the Java Virtual Machine Debugger Interface implementation.

Summer 99   **Summer Intern**, Computer and Communications Research Lab, NEC, San Jose, CA, USA

Supervised by Dr. Wen-Syan Li.

Designed and implemented the categorization component of the NetTopix Focused Search Engine.

Spring 98 –   **Research Assistant**, University of Maryland, College Park, MD, USA
Summer 98   Supervised by Prof. V.S. Subrahmanian.

Implemented a prototype for the IMPACT Agent Development Environment to build agent programs.

JOURNAL PUBLICATIONS & BOOK CHAPTERS

- ❑ **Mustafa M. Tikir** and Jeffrey K. Hollingsworth. Hardware Monitors for Dynamic Page Migration. *The Journal of Parallel and Distributed Computing*, 68 (2008) pp. 1186-1200, 2008.

- ❑ Tzu-Yi Chen, Omid Khalili, Roy L. Campbell, Jr., Laura Carrington, **Mustafa M. Tikir**, and Allan Snavely. Performance Prediction and Ranking of Supercomputers. *Chapter 3 in book on High Performance Computing in series Advances in Computers*. volume 72: 137-170, Academic Press, 2008.

- ❑ Jack Dongarra, Robert Graybill, William Harrod, Robert F. Lucas, Ewing L. Lusk, Piotr Luszczek, Janice McMahon, Allan Snavely, Jeffery Vetter, Katherine A. Yelick, Sadaf Alam, Roy L. Campbell, Laura Carrington, Tzu-Yi Chen, Omid Khalili, Jeremy Meredith, **Mustafa M. Tikir**. DARPA's HPCS Program-History, Models, Tools, Languages. *Advances in Computers 72: 1-100*, Academic Press, 2008.

- ❑ **Mustafa M. Tikir** and Jeffrey K. Hollingsworth. Efficient Online Computation of Statement Coverage Testing. *The Journal of Systems and Software*, Volume: 78/2 pp: 146-165, 2005.

CONFERENCE PUBLICATIONS

- ❑ Michael A. Laurenzano, **Mustafa M. Tikir**, Laura Carrington, and Allan Snavely. PEBIL: Efficient Static Binary Instrumentation for Linux. *The IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS'10)*, White Plains, NY, March 2010.

- ❑ Catherine Mills Olschanowsky, **Mustafa M. Tikir**, Laura Carrington, and Allan Snavely. PSnAP: Accurate Synthetic Address Streams Through Memory Profiles. *The International Workshop on Languages and Compilers for Parallel Computing (LCPC'09)*, Newark, DE, October 2009.

- ❑ **Mustafa M. Tikir,** Michael Laurenzano, Laura Carrington and Allan Snavely. PSINS: An Open Source Event Tracer and Execution Simulator for MPI Applications. *The Euro-Par 2009 Conference*, Delft, The Netherlands, August 2009.

- ❑ Dimitri Komatitsch, Laura Carrington, Michael Laurenzano, **Mustafa M. Tikir**, David Michea, Nicolas Le Goff, Allan Snavely, and Jeroen Tromp. High-frequency Simulations of Seismic Wave Propagation in the Whole Earth on 150,000 Processor Cores of a Petaflop Machine. *The 9th International Conference on Mathematical and Numerical Aspects of Waves Propagation (WAVES'09)*, Pau, France, June 2009.

- ❑ Laura Carrington, Dimitri Komatitsch, Michael Laurenzano, **Mustafa M. Tikir**, David Michea, Nicolas Le Goff, Allan Snavely, and Jeroen Tromp. High-frequency Simulations of Global Seismic Wave Propagation using SPECFEM3D_GLOBE on 62K Processors. *ACM Gordon Bell Prize Finalist, IEEE/ACM Supercomputing 2008 (SC'08),* Austin, TX, November 2008.

- ❑ **Mustafa M. Tikir,** Laura Carrington, Erich Strohmaier and Allan Snavely. A Genetic Algorithms Approach to Modeling the Performance of Memory-bound Computations. In proceedings of the *IEEE/ACM Supercomputing 2007 (SC'07)*, Reno, NV, November 2007.

- ❑ **Mustafa M. Tikir,** Michael Laurenzano, Laura Carrington and Allan Snavely. PMaC Binary Instrumentation Library for PowerPC/AIX. In proceedings of the *Workshop on Binary Instrumentation and Applications (WBIA'06)*, San Jose, CA, October 2006.

- ❑ **Mustafa M. Tikir** and Jeffrey K. Hollingsworth. NUMA-Aware Java Heaps for Server Applications. In proceedings of the *19th IEEE International Parallel & Distributed Processing Symposium (IPDPS'05)*, Denver, CO, April 2005.

- ❑ **Mustafa M. Tikir** and Jeffrey K. Hollingsworth. Using Hardware Counters to Automatically Improve Memory Performance. In proceedings of the *IEEE/ACM Supercomputing 2004 (SC'04)*, Pittsburgh, PA, November 2004.

- **Mustafa M. Tikir**, Guei-Yuan Lueh and Jeffrey K. Hollingsworth. Recompilation for Debugging Support in a JIT-Compiler. In proceedings of the *ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE'02)*, Charleston, SC, November 2002.
- **Mustafa M. Tikir** and Jeffrey K. Hollingsworth. Efficient Instrumentation for Code Coverage Testing. In proceedings of the *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA'02)*, Rome, Italy, July 2002.
- Tatiana Shpeisman and **Mustafa M. Tikir**. Generating Efficient Stack Code for Java. *Technical Report CS-TR-4069*, University of Maryland, College Park, MD, October 1999.

OTHER PAPERS

- Nicholas J. Wright, Laura Carrington, **Mustafa M. Tikir**, Michael Laurenzano and Allan Snavely. Understanding and Achieving Good Performance on Teragrid Resources: From Simple Performance Monitoring to Sophisticated Performance Models. *The 2009 TeraGrid Conference*, Arlington, VA, June 2009.
- Bronis R. de Supinski, Sadaf Alam, David H. Bailey, Laura Carrington, Chris Daley, Anshu Dubey , Todd Gamblin, Dan Gunter, Paul D. Hovland, Heike Jagode, Karen Karavanic, Gabriel Marin, John Mellor-Crummey, Shirley Moore, Boyana Norris, Leonid Oliker, Catherine Olschanowsky, Philip C. Roth, Martin Schulz, Sameer Shende, Allan Snavely, Wyatt Spear, **Mustafa M. Tikir**, Jeff Vetter, Pat Worley, and Nicholas Wright. Modeling the Office of Science Ten Year Facilities Plan: The PERI Architecture Tiger Team. *Scientific Discovery through Advanced Computing Program (SciDAC) Conference,* San Diego, CA, June 2009.
- **Mustafa M. Tikir**, Michael A. Laurenzano, Laura Carrington, Allan Snavely. PSINS: An Open Source MPI Event Tracer and Execution Simulator. *2009 DoD HPCMP Users Group Conference (UGC)*, San Diego, CA, June 2009.

TEACHING EXPERIENCE

Spring 99	**Teaching Assistant**, University of Maryland, College Park, MD, USA	
	TA for CMSC 430, Undergraduate/graduate course in *Theory of Language Translation*	
Fall 98	**Teaching Assistant**, University of Maryland, College Park, MD, USA	
	TA for CMSC 330, Undergraduate course in *Organization of Programming Languages*	
Fall 97	**Teaching Assistant**, University of Maryland, College Park, MD, USA	
	TA for CMSC 106, Undergraduate course in *Introduction to C Programming*	
Spring 97	**Teaching Assistant**, Middle East Technical University, Ankara, Turkey	
	TA for CENG 444, Undergraduate course in *Language Processors*	
Fall 96	**Teaching Assistant**, Middle East Technical University, Ankara, Turkey	
	TA for CENG 230, Undergraduate service source, *Introduction to C Programming*	
Spring 95	**Student Teaching Assistant**, Middle East Technical University, Ankara, Turkey	
	TA for CENG 352, Undergraduate course in *Database Management Systems*	

RELEVANT COURSEWORK

High Performance Computing, Performance Evaluation of Computer Systems, Implementing Java, Programming Language Implementation, Analysis of Algorithms, Database Systems Implementation, Multimedia Database Systems, Machine Learning, Artificial Intelligence

SOFTWARE EXPERIENCE

C, C++, Java, Fortran, Perl, Python, ML, Lisp, Prolog, Linux, Unix, Solaris, AIX, Windows, PVM, MPI, OpenMP, X11/Xlib, Tcl/Tk, Lex, Yacc

AWARDS, HONORS AND SERVICES

- Program Committee Member, Workshop on Binary Instrumentation and Applications. Held in Conjunction with MICRO-42. New York, NY, December, 2009
- Member of Research Team, Finalist to the ACM Gordon Bell Prize in Supercomputing 2008 (SC'08)

- ❑ Member of Developer Team, IMPACT Agent Development System, Finalist to the Invention of the Year Award, Office of Technology Commercialization, University of Maryland (1999)
- ❑ Fellowship for Graduate Studies, Middle East Technical University (Fall 1997)
- ❑ Assistant Secretary, NATO-ASI on Verification of Digital and Hybrid Systems, May 1997, Antalya, Turkey
- ❑ Member of Organizing Committee, 11th International Symposium on Computer and Information Sciences, November 1996, Antalya, Turkey
- ❑ Ranked 1st in the Department of Computer Engineering (July 1996)
- ❑ Ranked 2nd in the Middle East Technical University (July 1996)
- ❑ Scholarship for Undergraduate Studies, MNG Holding (August 1995-August 1996)
- ❑ Scholarship for Undergraduate Studies, NETAS Telecommunication Company (August 1995-August 1996)
- ❑ Dean's High Honor List, Middle East Technical University (Fall 1992-Spring 1996)

MEMBERSHIPS

- ❑ ACM Member