

UMUT A. ACAR

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PROFESSIONAL EXPERIENCE

- Assistant Professor, University of Chicago, 11/2005 – present.
- Assistant Professor, Toyota Technological Institute, 11/2004—present.
- Chair, Academic Program Committee, Toyota Technological Institute, 06/2005 – 01/2008.
- Visiting Scientist, Carnegie Mellon University , 09/2004 – 11/2004.
- Research Intern, Microsoft Research-Cambridge, 03 – 06/2003.
Mentor: Simon Peyton Jones
Project: Polymorphic records for Haskell

EDUCATION

- Ph.D., Computer Science, Carnegie Mellon University, May 2005.
Thesis: Self-Adjusting Computation
Advisers: Guy E. Blelloch and Robert Harper
- M.A., Computer Science, University of Texas at Austin, August 1999.
Thesis: Thread Scheduling for Locality
Adviser: Robert D. Blumofe
- B.S., Computer Science, Bilkent University, Turkey, June 1997 (highest honors).

HONORS AND AWARDS

- Nominated for ACM SIGPLAN Dissertation Award. 2005.
- University Fellowship. Carnegie Mellon University, 08/1999 – 09/2004.
- Teaching Award. University of Texas at Austin, 1997.
- NATO Science Fellowship. Ankara, Turkey. 1997.
- University Fellowship. Bilkent University, Turkey, 10/1992 – 06/1997.

JOURNAL PUBLICATIONS

1. Umut A. Acar, Guy Blelloch, Matthias Blume, Robert Harper, Kanat Tangwongsan. An Experimental Analysis of Self-Adjusting Computation. To appear in *ACM Transactions on Programming Languages and Systems (TOPLAS)*. 2009.
2. Umut A. Acar, Guy E. Blelloch, and Robert Harper. Adaptive Functional Programming. *ACM Transactions on Programming Languages and Systems (TOPLAS)*. 2006.
3. Umut A. Acar, Guy E. Blelloch, and Robert D. Blumofe. The Data Locality of Work Stealing. *Theory of Computing Systems (TOCS)*. 2002 (invited paper).

CONFERENCE AND WORKSHOP PUBLICATIONS

4. Ruy Ley-Wild, Umut A. Acar, and Matthew Fluet. A Cost Semantics for Self-Adjusting Computation. *ACM Symposium on Principles of Programming Languages (POPL)*. Savannah, GA. 2009.
5. Umut A. Acar and Ruy Ley-Wild. Self-Adjusting Computation in SaSML. *Advanced Functional Programming Summer School (AFP)*. Nijmegen, Netherlands. Lecture Notes in Computer Science. 2009.
6. Umut A. Acar. Self-Adjusting Computation (An Overview). *ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM)*. Accompanying paper for an invited (plenary) talk. Savannah, GA. 2009.
7. Lukasz Ziarek, Suresh Jagannathan, Matthew Fluet, and Umut A. Acar. Speculative N-Way Barriers. *Workshop on Declarative Aspects of Multicore Programming (DAMP)*. Savannah, GA. 2009.
8. Umut A. Acar, Amal Ahmed, and Matthias Blume. Imperative Self-Adjusting Computation. *ACM Symposium on Principles of Programming Languages (POPL)*. San Francisco, CA. 2008.
9. Ruy Ley-Wild, Matthew Fluet, and Umut A. Acar. Compiling Self-Adjusting Programs with Continuations. *International Symposium on Functional Programming (ICFP)*. Victoria, British Columbia, Canada. 2008.
10. Matthew Hammer and Umut Acar. Memory Management for Self-Adjusting Computation. *International Symposium on Memory Management (ISMM)*. Tucson, AZ. 2008.
11. Matthias Blume, Umut A. Acar, and Wonseok Chae. Exception Handlers as Extensible Cases. *Proceedings of the Sixth Asian Symposium on Programming Languages and Systems (APLAS)*. Bangalore, India. 2008.

12. James Cheney, Amal Ahmed, and Umut A. Acar. Provenance as Dependency Analysis. *International Symposium on Database Programming Languages (DBPL)*. Vienna, Austria. 2007.
13. Umut A. Acar, Guy Blelloch, Kanat Tangwongsan, and Duru Türkoğlu. Robust Kinetic Convex Hulls in 3D. *European Symposium on Algorithms (ESA)*. Karlsruhe, Germany. 2008.
14. Umut A. Acar, Alexander T. Ihler, Ramgopal R. Mettu, Özgür Sümer. Adaptive Inference on General Graphs. *Uncertainty in Artificial Intelligence (UAI)*. Helsinki, Finland. 2008.
15. Umut A. Acar, Matthias Blume, and Jacob Donham. A Consistent Semantics of Self-Adjusting Computation. *European Symposium on Programming (ESOP)*. Braga, Portugal. 2007.
16. Matthew Hammer, Umut A. Acar, Mohan Rajagopalan, and Anwar Ghuloum. A Proposal for Parallel Self-Adjusting Computation. *Workshop on Declarative Aspects of Multicore Programming (DAMP)*. Nice, France. 2007.
17. Umut A. Acar, Alexander Ihler, Ramgopal Mettu, and Özgür Sümer. Adaptive Bayesian Inference. *Neural Information Processing Systems (NIPS)*. Vancouver, BC. 2007.
18. Umut A. Acar, Guy E. Blelloch, and Kanat Tangwongsan. Kinetic 3D Convex Hulls via Self-Adjusting Computation (An Illustration). *ACM Symposium on Computational Geometry (SCG)*. Gyeongju, South-Korea. 2007.
19. Umut A. Acar, Benoit Hudson, Gary L. Miller, and Todd Phillips. SVR: Practical Enginnering of a Fast 3D Meshing Algorithm. *International Meshing Roundtable (IMR)*. Seattle, WA. 2007.
20. Marco D. Santambrogio, Vincenzo Rana, Seda Ogrenci Memik, Umut A. Acar, and Donatella Sciuto A Novel SoC Design Methodology Combining Adaptive Software and Reconfigurable Hardware. *IEEE/ACM International Conference on Computer Aided Design (ICCAD)*. San Jose, CA. 2007.
21. Umut A. Acar, Guy E. Blelloch, Matthias Blume, and Kanat Tangwongsan. An Experimental Analysis of Self-Adjusting Computation. *ACM-SIGPLAN Symposium on Programming Language Design and Implementation (PLDI)*. Ottawa, Canada. 2006.
22. Umut A. Acar, Matthias Blume, and Wonseok Chae. Extensible Programming with First-Class Cases. *International Symposium on Functional Programming (ICFP)*. Portland, Oregon. 2006.
23. Umut A. Acar, Guy E. Blelloch, and Kanat Tangwongsan. Kinetic Algorithms via Self-Adjusting Computation. *European Symposium on Algorithms (ESA)*. Zurich, Switzerland. 2006.

24. Umut A. Acar and Benoit Hudson. Optimal-Time Dynamic Mesh Refinement: Preliminary Results. *Fall Workshop on Computational Geometry*. Northampton, MA. 2006.
25. Umut A. Acar, Guy E. Blelloch, Matthias Blume, Robert Harper, Kanat Tangwongsan. A Library for Self-Adjusting Computation. *The First Workshop on ML (ML)*. Tallinn, Estonia. 2005.
26. Umut A. Acar, Guy E. Blelloch, and Jorge L. Vitti. An Experimental Analysis of Change Propagation in Dynamic Trees. *The Seventh Workshop on Algorithm Engineering and Experiments (ALENEX)*. Vancouver, British Columbia, Canada. 2005.
27. Umut A. Acar, Guy E. Blelloch, Robert Harper, Jorge L. Vitti, and Maverick Woo. Dynamizing Static Algorithms with Applications to Dynamic Trees and History Independence. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*. New Orleans, Louisiana. 2004.
28. Umut A. Acar, Guy E. Blelloch, and Robert Harper. Selective Memoization. *ACM Symposium on Principles of Programming Languages (POPL)*. New Orleans, Louisiana. 2003.
29. Umut A. Acar, Guy E. Blelloch, and Robert Harper. Adaptive Functional Programming. *ACM Symposium on Principles of Programming Languages (POPL)*. Portland, Oregon. 2002.
30. Umut A. Acar, Guy E. Blelloch, and Robert D. Blumofe. The Data Locality of Work Stealing. *ACM Symposium on Parallel Algorithms and Architectures (SPAA)*. Bar Harbor, Maine. 2001.

TECHNICAL REPORTS AND THESIS

1. Ruy Ley-Wild, Umut A. Acar, and Matthew Fluet. A Cost Semantics for Self-Adjusting Computation. Computer Science Department Technical Report. Carnegie Mellon University. 2009.
2. Matthias Blume, Umut A. Acar, and Wonseok Chae. Exception Handlers as Extensible Cases. Computer Science Department Technical Report TR-2008-03. University of Chicago. 2008.
3. Umut A. Acar, Amal Ahmed, and Matthias Blume. Imperative Self-Adjusting Computation. Computer Science Department Technical Report 2007-18. University of Chicago. 2007.
4. Umut A. Acar and Benoit Hudson. Dynamic Mesh Refinement with Quad Trees and Off-Centers. Computer Science Department Technical Report CMU-CS-07-121. Carnegie Mellon University. 2007.

5. Umut A. Acar, Guy E. Blelloch, and Kanat Tangwongsan. Non-oblivious Retroactive Data Structures. Computer Science Department Technical Report CMU-CS-07-169. Carnegie Mellon University. 2007.
6. Umut A. Acar, Guy E. Blelloch, Kanat Tangwongsan, and Jorge Vites. Kinetic Algorithms via Self-Adjusting Computation. Computer Science Department Technical Report CMU-CS-06-115. Carnegie Mellon University. 2006.
7. Umut A. Acar, Matthias Blume, and Jacob Donham. A Consistent Semantics of Self-Adjusting Computation Computer Science Department Technical Report CMU-CS-06-168 Carnegie Mellon University. 2006.
8. Umut A. Acar. Self-Adjusting Computation. PhD Thesis. Computer Science Department Technical Report CMU-CS-05-129. Carnegie Mellon University. 2005.
9. Umut A. Acar, Guy E. Blelloch, Robert Harper. Selective Memoization. Computer Science Department Technical Report CMU-CS-04-155. Carnegie Mellon University. 2004.
10. Umut A. Acar, Guy E. Blelloch, Robert Harper. Adaptive Memoization. Computer Science Department Technical Report CMU-CS-03-208. Carnegie Mellon University. 2003.
11. Umut A. Acar, Guy E. Blelloch, and Robert Harper. Adaptive Functional Programming. Computer Science Department Technical Report CMU-CS-01-161. Carnegie Mellon University. 2001.

WORKING PAPERS

1. James Cheney, Amal Ahmed, Umut A. Acar. Provenance as Dependency Analysis. Submitted for Journal Review.
2. Matthew Hammer, Umut A. Acar, Yan Chen. CEAL: A C-based language for self-adjusting computation. Submitted.
3. Umut A. Acar, Benoit Hudson, and Duru Türkoglu. Maintaining Well-Spaced Point Sets Under Dynamic Changes. Submitted
4. Umut A. Acar, Guy Bleloch, and Kanat Tangwongsan. Composable Retroactive Data Structures. Submitted.
5. Umut A. Acar, Guy Blelloch, Ruy Ley-Wild. A Meta-Language for Self-Adjusting Computation. In preparation.
6. Umut A. Acar, Matthew Hammer. Compiling Efficient Self-Adjusting Programs. In preparation.

TEACHING EXPERIENCE

- Type Systems for Programming Languages (Graduate), Winter 2008.
Professor (co-taught with Amal Ahmed). University of Chicago (CMSC 336).
- Programming Languages (Undergraduate), Fall 2006.
Professor. University of Chicago (CMSC 221).
- Programming Languages (Graduate), Fall 2005, Fall 2006.
Professor. Toyota Technological Institute & the University of Chicago (CMSC 321).
- Algorithms (Undergraduate), Fall 2002.
Teaching Assistant. Carnegie Mellon University (15-451).
Professors: Gary Miller and Klaus Sutner.
Teaching evaluations for weekly recitations: 3.91/4.0.
- Computer Systems (Undergraduate), Spring 2001.
Teaching Assistant. Carnegie Mellon University (15-213).
Professors: Guy Blelloch and Bruce Maggs.
Teaching evaluations for weekly recitations: 3.43/4.0.
- Data Structures (Undergraduate), Spring 1998.
Teaching Assistant. University of Texas at Austin (315).
Professor: Robert Blumofe.
- Introduction to Operating Systems (Undergraduate), Fall 1997.
Teaching Assistant. University of Texas at Austin (372).
Professor: Lorenzo Alvisi.
Won teaching award for my work in this class.

DOCTORAL STUDENTS

- Matthew Hammer, Toyota Technological Institute, 09/2005 – present.
- Ruy Ley-Wild, Carnegie Mellon University, 10/2008 – present.
- Özgür Sümer, University of Chicago, 10/2006 – present.
- Duru Türkoglu, University of Chicago, 05/2007 – present.
- Yan Chen, Toyota Technological Institute, 09/2008 – present.

UNDERGRADUATE STUDENTS

- Jamie Morgenstern, University of Chicago, 9/2008 – present.

- Kanat Tangwongsan, Carnegie Mellon University, 06/2003 – 06/2004.
- Jorge Vittes, Carnegie Mellon University, 06-2002 – 08/2004.

DOCTORAL-THESIS-COMMITTEE SERVICE

- Benoit Hudson. “Dynamic Mesh Refinement.” Carnegie Mellon University. September 2007.

PROJECT AND THESIS SUPERVISION

- Ruy Ley-Wild. “A Cost Semantics for Self-Adjusting Programs.” Toyota Technological Institute. Summer Intern. 2008.
- Ruy Ley-Wild. “Compiling Self-Adjusting Programs.” Toyota Technological Institute. Summer Intern. 2007.
- Kanat Tangwongsan. “Non-oblivious Retroactive Data Structures.” Toyota Technological Institute. Summer Intern. 2007. Kanat won the CMU best undergraduate thesis award for this work.
- Jacob Donham. “A Consistent Semantics of Self-Adjusting Computation.” Toyota Technological Institute. Summer Intern. 2006.
- Benoit Hudson. “Dynamic Meshing via Self-Adjusting Computation.” Toyota Technological Institute.” Summer Intern. 2006.
- Virginia Vassilevska. “ Traceable Data Structures.” Toyota Technological Institute. Summer Intern. 2006.
- Kanat Tangwongsan. “Kinetic Algorithms via Self-Adjusting Computation.” Toyota Technological Institute. Summer Intern 2005. Kanat won the CRA undergraduate student award for this work.
- Kanat Tangwongsan. “Algorithms for Dynamic Point Location with Good Practical Performance.” Carnegie Mellon University. REU. 2004.
- Jorge Vittes “Dynamic Algorithms.” Carnegie Mellon University. REU. 2003.
- Jorge Vittes. “Convex Hulls for Dynamic Data.” Carnegie Mellon University. REU. 2002.

PROFESSIONAL SERVICE

- PROGRAM COMMITTEE MEMBER
ML Workshop. 2009.
Implementation and Application of Functional Languages (IFL). 2008.
- JOURNAL REFEREE SERVICE
ACM Transactions on Programming Languages and Systems (TOPLAS). 2006, 2008.
ACM Transactions on Computer Systems (TOCS). 2007.
Journal of the ACM (JACM). 2001.
Journal of Functional Programming (JFP). 2007, 2008, 2009.
Journal of Information Processing Letters (JIPS). 2006.
- CONFERENCE REFEREE SERVICE
ACM Symposium for Parallel Algorithms and Applications (SPAA). 2006.
ACM Symposium on Principles of Programming Languages (POPL). 2008.
ACM Symposium on Programming Language Design and Implementation (PLDI). 2007, 2009.
European Symposium on Programming (ESOP). 2008.
International Conference on Functional Programming (ICFP). 2002, 2008.
International Symposium on Algorithms and Computation (ISAAC). 2008.
- NSF PANEL MEMBER
Computing Processes and Artifacts Clusters (Fall '05).

EXTERNAL FUNDING

- Intel Faculty Gift, 2007, 2008.

PLENARY TALKS AND INVITED LECTURES

1. "Self-Adjusting Computation." *ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM)*. January 2009. Plenary Talk.
2. "Self-Adjusting Computation in SaSML." *Summer School on Advanced Functional Programming (AFP)*. Nijmegen, Netherlands. May 2008. Six Lectures.
3. "Self-Adjusting Computation." Distinguished Speaker Seminar Series. *Illinois Institute of Technology*. Electrical and Computer Engineering. Chicago, IL. April 2005.

INVITED, CONFERENCE, AND SEMINAR PRESENTATIONS

4. "Self-Adjusting Computation." *Harvard University*. Department of Electrical Engineering and Computer Science. Cambridge, MA. July 2008. Invited Talk. Host: Greg Morrisett.
5. "Self-Adjusting Computation." *University of Maryland*. Department of Computer Science. College Park, MD. July 2008. Invited Talk. Host: Mike Hicks.
6. "Self-Adjusting Computation." " *University of Edinburgh*. School of Informatics. Edinburgh, UK. May 2008. Invited Talk. Host: James Cheney.
7. "Self-Adjusting Computation." *University of Washington*. Department of Computer Science and Engineering. Seattle, WA. May 2008. Invited Talk. Host: Dan Grossman.
8. "Self-Adjusting Computation." *Microsoft Research*. Seattle, WA. May 2008. Invited Talk. Host: Jim Larus.
9. "Self-Adjusting Computation." *Portland State University*. Department of Computer Science. Portland, OR. May 2008. Invited Talk. Host: Andrew Tolmach.
10. "Self-Adjusting Computation." *University of Oregon*. Department of Computer and Information Science. Eugene, OR. May 2008. Invited Talk. Host: Yannis Smaragdakis.
11. "Towards Compiling Imperative Self-Adjusting Programs." *Dagstuhl Seminar on Types, Logics, and Semantics for State*. Dagstuhl, Germany. February 2008. Invited Talk.
12. "Self-Adjusting Computation." *Northwestern University*. Department of Electrical Engineering and Computer Science. Evanston, IL. February 2008. Invited Talk. Host: Seda Ögrenci Memik.
13. "Self-Adjusting Computation." *Intel*. Santa Clara, CA. April 2007. Invited Talk. Host: Anwar Ghuloum.
14. "An Experimental Analysis of Self-Adjusting Computation." *ACM SIGPLAN Symposium on Programming Language Design and Implementation (PLDI)*. Ottawa, Canada. June 2006.
15. "Incremental Computation." *Toyota Technological Institute*. Nagoya, Japan. April 2006. Invited Talk.
16. "A Library for Self-Adjusting Computation." *ACM SIGPLAN ML Workshop*. Tallinn, Estonia. September 2005.
17. *IFIP WG2.8 Meeting*. "Self-Adjusting Computation." West Point, New York. October 2004. Invited Talk.

18. "Self-Adjusting Computation." *Massachusetts Institute of Technology*. Electrical Engineering and Computer Science Department. Boston, MA. October 2004. Invited Talk. Hosts: Butler Lampson and Martin Rinard.
19. "Self-Adjusting Computation." *University of Minnesota at Twin Cities*. Computer Science Department. Minneapolis, MN. April 2004. Invited Talk. Host: Ravi Janardan.
20. "Self-Adjusting Computation." *University of Chicago*. Computer Science Department Chicago, IL. April 2004. Invited Talk. Host: Dave MacQueen.
21. "Self-Adjusting Computation." *Toyota Technological Institute*. Chicago, IL. March 2004. Invited Talk. Host: David McAllester.
22. "Self-Adjusting Computation." *University of Massachusetts*. Computer Science Department. Amherst, MA. March 2004. Invited Talk. Host: Emery Berger.
23. "Self-Adjusting Computation." *University of California*. Computer Science and Engineering Department. San Diego, CA. March 2004. Invited Talk. Host: Brad Calder.
24. "Self-Adjusting Computation." *University of Texas*. Computer Science Department. Austin, TX. March 2004. Invited Talk. Host: Lorenzo Alvisi.
25. "Self-Adjusting Computation." *Northwestern University*. Computer Science Department. Evanston, IL. March 2004. Invited Talk. Host: Peter Dinda.
26. "Dynamizing Static Algorithms." *Carnegie Mellon University*. Theory Seminar. Pittsburgh PA. November 2003.
27. "Self-Adjusting Computation." *Workshop on Dynamic Algorithms and Applications*. January 2004. New Orleans, Louisiana. Invited Talk.
28. "Dynamizing Algorithms with Applications to Dynamic Trees and History Independence." *ACM-SIAM Symposium on Discrete Algorithms (SODA)*. January 2004. New Orleans, Louisiana.
29. "Making Algorithms Dynamic". *Oxford University*. Computer Science Department. Oxford, UK. May 2003. Invited Talk. Host: Oege de Moor.
30. "Algorithms and Languages for Incremental Computation." *Microsoft Research-Cambridge*. Friday Talks. Cambridge, UK. May 2003.
31. "Dynamizing Static Algorithms." *Microsoft Research-Cambridge*. Serious-Talk Series. Cambridge, UK. April 2003.
32. "Thesis Proposal: Stability, Adaptivity, and Dynamic Algorithms." *Carnegie Mellon University*. Pittsburgh, PA. February 2003.

33. "Selective Memoization." *ACM Symposium on Principles of Programming Languages (POPL)*. New Orleans, LA. January 2003.
34. "Adaptive Functional Programming." *Carnegie Mellon University*. Special Seminar on Principles of Programming Languages. Pittsburgh, PA. November 2002.
35. "The Data Locality of Work Stealing." *Carnegie Mellon University*. Student Seminar Series. Pittsburgh, PA. November 2001.
36. "Adaptive Functional Programming." *ACM Symposium on Principles of Programming Languages (POPL)*. Portland, OR. January 2002.
37. "The Data Locality of Work Stealing." *ACM Symposium on Parallel Algorithms and Architectures (SPAA)*. Bar Harbor, Maine. June 2000.