

# Aaron Block, Ph.D.

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## Research & Career Interests

Multiprocessor/multicore systems, real-time systems, adaptive systems, parallel and distributed algorithms, operating systems, program management and medical informatics.

## Teaching Interests

Parallel algorithms, introductory classes, programming languages, technical writing, algorithms, operating systems, feedback control, theory of computation, and discrete math

## Education

- University of North Carolina at Chapel Hill — Ph.D. in Computer Science, August 2008
- University of North Carolina at Chapel Hill — M.S. in Computer Science, May 2005
- Haverford College — B.S. in Math & Computer Science, May 2002

## Dissertation

### **Adaptive Multiprocessor Real-Time Systems — Published August 2008**

Developing and analyzing mechanisms for allowing multiprocessor scheduling algorithms for real-time systems to adapt to workload changes. These mechanisms include (but are not limited to): redistributing spare computational capacity in a relatively fair manner; changing the processor share of running tasks with minimal overhead; and using feedback-control loops to adjust system parameters. Currently, these adaptive techniques are being integrated into both the Whisper human motion tracking system and the Virtual Exposure Camera video-correction system in order to improve their responsiveness to external stimuli.

Available at <http://www.aaronblock.com/aarondiss.pdf>.

## Fellowships

- National Science Foundation Graduate Research Fellow — 2004-2007
- University of North Carolina at Chapel Hill Computer Science Alumni Fellow — 2007

## Academic Appointments

- Visiting Lecturer in Computer Science, The University of North Carolina at Chapel Hill — Spring 2010

## Work Experience

### **Program Manager, Microsoft — 2008-Present**

Working on the *Team Foundation Server* (TFS) product, a suite of enterprise-grade collaborative development tools comprising version control, work item tracking, reporting, and document sharing. Responsibilities involve: designing administrative features (including, but not limited to, authentication, disaster recovery, client-certificate interoperability, installation); managing the escalation of customer problems from Microsoft's support origination to the TFS product group; overseeing security requirements for TFS; producing customer facing technical documents; and working with customers to solicit feedback.

*Promotion(s)*: September 2009. *Supervisor*: Doug Neumann

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## Work Experience (Continued)

### Research Assistant to James H. Anderson in Real-Time Systems — 2002-2008

Responsibilities include developing original research, presenting this research at international conferences, and assisting in the preparation of various documents, e.g., proposals.

*Supervisor:* James H. Anderson.

### Research Intern, IBM Almaden Research Center — Summer 2006

Worked with the *Interoperable Health Information Infrastructure* group to develop the Regional Health Information Organizations Directory Service, which is an extension of the Lightweight Directory Access Protocol (LDAP) designed to provide a directory of medical applications. Also helped to develop the basics of translating between different medical terminologies.

*Supervisor:* James Kaufman.

### Software Design Engineer in Test Intern, Microsoft — Summer 2001

Worked with *RTC.NET* to develop the packet capture and pump testing application that recorded packets transmitted over the Internet from one RTC.NET application to another and could replay them to construct testing scenarios. Also participated in standard testing duties.

*Supervisor:* Leonidas Rigas.

### Software Engineer in Test Intern, Microsoft — Summer 2000

Worked with *NetMeeting* to develop a whiteboard testing application, which allowed a developer to construct specific testing scenarios using simple scripting tools. Also participated in standard testing duties.

*Supervisor:* Roger Harrison.

## Teaching Experience

### Computer Science 110: Introduction to Programming—Spring 2010

Introduction to computer use. Topics include: approaches to problem-solving; algorithms and their design; fundamental programming skills.

*Course webpage:* <http://www.cs.unc.edu/~block/comp110>.

### Computer Science 524: Program Language Concepts — Spring 2007

High-level programming concepts and their realization in specific languages. Topics include data types, scope, control structures, procedural abstraction, classes, concurrent, and run-time implementation. In end-of-year survey, *13 out of 15 students stated that “[Aaron Block] was one of the best teachers I have had at UNC, fully deserving a teaching award.”*

*Course webpage:* <http://www.cs.unc.edu/~block/comp524>.

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## Books

- *Feedback Control for Computer Scientists*, In Progress.

## Journal Publications

- A. Block, J. Anderson, and G. Bishop, "Fine-Grained Task Reweighting on Multiprocessors," *Journal of Embedded Computing*, special issue on multiprocessor real-time scheduling, in press.
- A. Block, J. Anderson, and U. Devi, "Task Reweighting under Global Scheduling on Multiprocessors," *Real-Time Systems*, special issue on selected papers from the 18th Euromicro Conference on Real-Time Systems, Volume 39, Number 1-3, pp. 123-167, August 2008.

## Conference & Workshop Publications

- A. Block, B. Brandenburg, J. Anderson, and S. Quint, "Adaptive Multiprocessor Real-Time Scheduling with Feedback Control," *Proceedings of the 20th Euromicro Conference on Real-Time Systems*, pp. 23-33, Prague, Czech Republic, July 2008.
- B. Brandenburg, J. Calandrino, A. Block, H. Leontyev, and J. Anderson, "Real-Time Synchronization on Multiprocessors: To Block or Not to Block, to Suspend or Spin?," *Proceedings of the 14th IEEE Real-Time and Embedded Technology and Applications Symposium*, pp. 342-353, St. Louis, Missouri, April 2008.
- B. Brandenburg, A. Block, J. Calandrino, U. Devi, H. Leontyev, and J. Anderson, "LITMUSRT:A Status Report," *Proceedings of the 9th Real-Time Linux Workshop, Proceedings of the 9th Real-Time Linux Workshop*, pp. 107-123, Linz, Austria, November 2007.
- A. Block, H. Leontyev, B. Brandenburg, and J. Anderson, "A Flexible Real-Time Locking Protocol for Multiprocessors," *Proceedings of the 13th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications*, pp. 47-57, Daegu, South Korea, August 2007.
- R. Hamm, S. Knoop, P. Schwarz, A. Block, and W. Davis, "Harmonizing Clinical Terminologies: Driving Interoperability in Healthcare," *Proceedings of the 12th World Congress on Health (Medical) Informatics (Medinfo 2007)*, pp. 660-663, Brisbane, Australia August 2007.
- J. Calandrino, H. Leontyev, A. Block, U. Devi, and J. Anderson, "LITMUS-RT: A Testbed for Empirically Comparing Real-Time Multiprocessor Schedulers," *Proceedings of the 27th IEEE Real-Time Systems Symposium*, pp. 111-123, Rio De Janeiro, Brazil, December 2006.

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## Conference & Workshop Publications (Continued)

- A. Block and J. Anderson, "Accuracy versus Migration Overhead in Real-Time Multiprocessor Reweighting Algorithms," *Proceedings of the 12th International Conference on Parallel and Distributed Systems*, pp. 355-364, Minneapolis, Minnesota, July 2006.
- A. Block, J. Anderson, and U. Devi, "Task Reweighting under Global Scheduling on Multiprocessors," *Proceedings of the 18th Euromicro Conference on Real-Time Systems*, pp. 128-139, Dresden, Germany, July 2006.
- A. Block, J. Anderson, and G. Bishop, "Fine-Grained Task Reweighting on Multiprocessors," *Proceedings of the 11th IEEE Conference on Embedded and Real-Time Computing Systems and Applications*, pp. 429-435, Hong Kong, China, August 2005.
- A. Block and J. Anderson, "Task Reweighting Multiprocessors: Efficiency versus Accuracy," *Proceedings of 13th International Workshop on Parallel and Distributed Real-time Systems*, Denver, Colorado April 2005. (On CD ROM)
- J. Anderson, A. Block, and A. Srinivasan, "Quick-release Fair Scheduling," *Proceedings of the 24th IEEE Real-time Systems Symposium*, pp. 130-141, Cancun, Mexico, December 2003.

## Talks

- "Adaptive Multiprocessor Real-Time Scheduling with Feedback Control," *The 20th Euromicro Conference on Real-Time Systems*, July 2008.
- "Adaptive Multiprocessor Real-Time Systems" invited talk *Haverford College*, December 2007.
- "Adaptive Multiprocessor/Multicore Real-Time Systems and Multimedia Applications," *IBM Almaden Research Center*, August 2006
- "Accuracy versus Migration Overhead in Real-Time Multiprocessor Reweighting Algorithms," *The 12th International Conference on Parallel and Distributed Systems*, July 2006.
- "Task Reweighting under Global Scheduling on Multiprocessors," *The 18th Euromicro Conference on Real-Time Systems*, July 2006.
- "Fine-Grained Task Reweighting on Multiprocessors", *The 11th IEEE Conference on Embedded and Real-Time Computing Systems and Applications*, August 2005.
- "Task Reweighting Multiprocessors: Efficiency versus Accuracy", *International Workshop on Parallel and Distributed Real-time Systems*, April 2005.

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## **Academic Activities**

- Invited Program Committee Member: *22th Euromicro Conference on Real-Time Systems*, Brussels, Belgium.
- Reviewed submissions for: *Euromicro Journal of Systems Architecture (JSA)*
- Graduate and Student Fellowship senator (Fall 2004-Spring 2005): representing the computer science department at the University of North Carolina at Chapel Hill.
- Chairman of the Appropriations Committee for the University of North Carolina at Chapel Hill Graduate and Student Fellowship (Fall 2004-Spring 2005).
- Organized Systems Tea at the University of North Carolina at Chapel Hill (Spring 2005), in which a guest speaker gives a presentation to the local faculty and students.
- Organized Real-Time Lunch at UNC-CH (Summer 2002-Spring 2004), in which members of UNC-CH's real-time group give presentation to faculty and students.

## **Referrals**

References available upon request.