

Alexandra FEDOROVA

Phone: (778) 782-6904
Fax: (778) 782-3045
E-mail: fedorova@cs.sfu.ca

School of Computing Science
Simon Fraser University,
8888 University Drive,
Burnaby, BC V5A 1S6

RESEARCH AREA:

SYSTEMS – Shared resource management on multicore processors, parallel computing, video game parallelization, memory management on embedded processors, data center cluster management

EDUCATION:

- 2006** **Ph.D. in Computer Science, *Harvard University, Cambridge, MA, USA***
Thesis title: Operating System Scheduling for Chip Multithreaded Processors
Thesis advisor: Margo Seltzer
Degree granted: November 7, 2006
- 2002** **M.S. in Computer Science, *Harvard University, Cambridge, MA, USA***
- 1999** **B.A. in Computer Science and Economics, *Smith College, Northampton, MA, USA***

WORK EXPERIENCE:

- December 2006 - present** **Assistant Professor (tenure track), *Simon Fraser University, Vancouver, Canada***
- Head of Systems research group
 - Co-founder/co-director of SYNAR lab
- 2010-present** **Technical advisor, *Energy Czar***
- 2003-2006** **Research intern, *Scalable Synchronization Group, Iceberg Group***
Sun Microsystems Laboratories, Burlington, MA, USA
- Participated in design and evaluation of Hybrid Transactional Memory (HyTM)
 - Participated in the implementation and validation of Sun UltraSPARC T1® (Niagara) processor simulator
 - Published ten internal technical reports
 - An inventor on nine US patent applications
- 1999-2000** **Software engineer, *EMC Corporation, Westboro, MA, USA***
- Design and development of application for remote management of storage and server systems (C++)
- Summer 1998** **Research assistant, *Smith College, Northampton, MA, USA***
- Design and implementation of a Video-On-Demand (VoD) system (early stages)

PUBLICATIONS:

Peer-reviewed conference, journal, and workshop papers

I use Computer Science conference and journal rankings provided by Microsoft Academic Search (MAS)

Refereed and invited articles in journals:

- [6] Juan Carlos Saez, Daniel Shelepov, Alexandra Fedorova and Manuel Prieto, Leveraging Workload Diversity through OS Scheduling to Maximize Performance on Single-ISA Heterogeneous Multicore Systems, *Journal of Parallel and Distributed Computing*, vol. 71, issue 1, January 2011. **MAS Rank: 182/688 (top 26%)**
- [5] Sergey Blagodurov, Sergey Zhuravlev and Alexandra Fedorova, Contention Aware Scheduling on Multicore Systems, *ACM Transactions on Computer Systems*, vol. 30, issue 4, December 2010. **MAS Rank: 7/688 (top 1%)**
- [4] Alexandra Fedorova, Sergey Blagodurov and Sergey Zhuravlev, Managing Contention for Shared Resources on Multicore Processors. *Communications of the ACM (CACM)*, vol 53, no 2, pp. 49-57. February 2010, *Invited*. **MAS Rank: 13/688 (top 2%)**
- [3] Alexandra Fedorova, Juan Carlos Saez, Daniel Shelepov and Manuel Prieto, Maximizing Performance per Watt with Asymmetric Multicore Systems. *Communications of the ACM (CACM)* vol. 52, no. 12, pp. 48-57. December 2009, *Invited*. **MAS Rank: 13/688 (top 2%)**
- [2] Viren Kumar and Alexandra Fedorova, Towards Better Performance Per Watt in Virtual Environments on Asymmetric Single-ISA Multi-core Systems, *ACM Operating Systems Review*, vol. 43, issue 3, July 2009. **MAS Rank: 35/688 (top 5%)**
- [1] Daniel Shelepov, Juan Carlos Saez, Stacey Jeffery, Alexandra Fedorova, Nestor Perez, Zhi Feng Huang, Sergey Blagodurov, Viren Kumar, HASS: A Scheduler for Heterogeneous Multicore Systems, to appear in *ACM Operating Systems Review, Special Issue on the Interaction among the OS, Compilers, and Multicore Processors*, April 2009. **MAS Rank: 35/688 (top 5%)**

Refereed Conference Proceedings:

- [19] Sergey Blagodurov, Sergey Zhuravlev, Mohammad Dashti and Alexandra Fedorova, A Case for NUMA-Aware Contention Management on Multicore Systems, in *USENIX Annual Technical Conference (USENIX)*, 2011. Acceptance rate 20%. **MAS rank: 31/1645 (top 2%)**
- [18] Micah J Best, Shane Mottishaw, Craig Mustard, Mark Roth, Alexandra Fedorova, Andrew Brownsword, Synchronization via Scheduling: Techniques For Efficiently Managing Shared State in Video Games, *32nd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, 2011. Acceptance rate 23%. **MAS rank: 11/1645 (top 1%)**
- [17] Kishore Kumar, David Vengerov, Alexandra Fedorova and Vana Kalogeraki, FACT: a Framework for Adaptive Contention-Aware Thread Migrations, *ACM International Conference on Computing Frontiers (CF)*, 2011. Acceptance rate 22%. **MAS rank: 196/1645 (top 12%)**

- [16] Ananth Narayan S, Somshubra Sharangi, Alexandra Fedorova, Global Cost-Diversity Aware Dispatch Algorithm for Heterogeneous Data Centers, *2nd ACM/SPEC Conference on Performance Engineering (ICPE)*, 2011. **MAS rank: 473/1645 (top 29%)**
- [15] Eric Matthews, L. Shannon, A. Fedorova, A Configurable Framework for Investigating Workload Execution, *International Conference on Field-Programmable Technology (FPT)*, 2010. **MAS rank: 700/1645 (top 43%)**
- [14] Sergey Zhuravlev, Sergey Blagodurov and Alexandra Fedorova, AKULA: A Toolset for Experimenting and Developing Thread Placement Algorithms on Multicore Systems, *International Conference on Parallel Architectures and Compilation Techniques (PACT)*, 2010. Acceptance rate 17%. **MAS rank: 113/1645 (top 7%)**
- [13] Juan Carlos Saez, Alexandra Fedorova, Manuel Prieto and Hugo Vegas, Operating System Support for Mitigating Software Scalability Bottlenecks on Asymmetric Multicore Processors. *ACM International Conference on Computing Frontiers (CF)*, 2010. Acceptance rate 27%. **MAS rank: 196/1645 (top 12%)**
- [12] Vahid Kazempour, Ali Kamali and Alexandra Fedorova, AASH: An Asymmetry-Aware Scheduler for Hypervisors. *ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (VEE)*, 2010. Acceptance rate 27%. **MAS rank: 204/1645 (top 12%)**
- [11] Juan Carlos Saez, Manuel Prieto, Alexandra Fedorova and Sergey Blagodurov, A Comprehensive Scheduler for Asymmetric Multicore Processors, *5th ACM European Conference on Computer Systems (EuroSys)*, 2010. Acceptance rate 19%. **MAS rank: 51/1645 (top 3%)**
- [10] Sergey Zhuravlev, Sergey Blagodurov, and Alexandra Fedorova. Addressing Cache Contention in Multicore Processors via Scheduling, *Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, 2010. Acceptance rate 17%. **MAS rank: 18/1645 (top 1%)**
- [9] Walter Maldonado, Patrick Marlier, Pascal Felber, Adi Suissa, Danny Hendler, Alexandra Fedorova, Julia Lawall, Gilles Muller, Scheduling Support for Transactional Memory Contention Management. *15th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, 2010. Acceptance rate 17%. **MAS rank: 76/1645 (top 5%)**
- [8] James Charles, Preet Jassi, Ananth Narayan S, Abbas Sadat and Alexandra Fedorova, Evaluation of the Intel Core i7 Turbo Boost Feature. *IEEE International Symposium on Workload Characterization, (IISWC)*, 2009. Acceptance rate unknown. **MAS rank: 263/1645 (top 16%)**
- [7] Micah J Best, Alexandra Fedorova, Ryan Dickie, Andrea Tagliasacchi, Alex Couture-Beil, Craig Mustard, Shane Mottishaw Aron Brown, Zhi Feng Huang, Xiaoyuan Xu, Nasser Ghazali and Andrew Brownsword, Searching for Concurrent Design Patterns in Video Games: Practical lessons in achieving parallelism in a video game engine, in *15th European Conference on Parallel and Distributed Computing (EUROPAR)*, 2009. Acceptance rate 33%. **MAS rank: 380/1645 (top 23%)**
- [6] Vahid Kazempour, Alexandra Fedorova, and Pouya Alagheband, Performance Implications of Cache Affinity on Multicore Processors, *14th International European Conference on Parallel and Distributed Computing (EUROPAR)*, 2008. Acceptance rate 33%. **MAS rank: 380/1645 (top 23%)**

- [5] Alexandra Fedorova, Margo Seltzer and Michael D. Smith, Improving Performance Isolation on Chip Multiprocessors via an Operating System Scheduler, *Sixteenth International Conference on Parallel Architectures and Compilation Techniques (PACT)*, 2007. Acceptance rate 19%. **MAS rank: 113/1645 (top 7%)**
- [4] Peter Damron, Alexandra Fedorova, Yosef Lev, Victor Luchangco, Mark Moir and Daniel Nussbaum. Hybrid Transactional Memory, *Twelfth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, 2006. Acceptance rate 22%. **MAS rank: 18/1645 (top 1%)**
- [3] Alexandra Fedorova, Margo Seltzer, Christopher Small and Daniel Nussbaum. Performance Of Multithreaded Chip Multiprocessors And Implications For Operating System Design, in *Proceedings of the USENIX 2005 Annual Technical Conference (USENIX)*, 2005. Acceptance rate unknown. **MAS rank: 31/1645 (top 2%)**
- [2] Kostas Magoutis, Salimah Addetia, Alexandra Fedorova, Margo I. Seltzer. Making the Most out of Direct Access Network-Attached Storage, in *Second USENIX Conference on File and Storage Technologies (FAST)*, 2003. Acceptance rate unknown. **MAS rank: 137/1645 (top 8%)**
- [1] Kostas Magoutis, Salimah Addetia, Alexandra Fedorova, Margo I. Seltzer, Jeffrey S. Chase, Andrew J. Gallatin, Richard Kisley, Rajiv G. Wickremesinghe, Eran Gabber. Structure and Performance of the Direct Access File System, *USENIX Annual Technical Conference (USENIX)*, 2002. **Best paper award**. Acceptance rate unknown. **MAS rank: 31/1645 (top 2%)**

Refereed Workshop Proceedings

- [15] Micah Best, Shane Mottishaw, Craig Mustard, Mark Roth, Parsiad Azimzadeh, Alexandra Fedorova and Andrew Brownsword, Schedule Data not Code, *Third USENIX Workshop on Hot Topics on Parallelism (HotPar)*, 2011.
- [14] Micah Best, Shane Mottishaw, Craig Mustard, Mark Roth, Alexandra Fedorova and Andrew Brownsword, Synchronization via Scheduling: Managing Shared State in Video Games, in *Second USENIX Workshop on Hot Topics on Parallelism (HotPar)*, 2010.
- [13] Jon Hourd, Chaofei Fan, Jiasi Zeng, Qiang (Scott) Zhang, Micah J Best, Alexandra Fedorova and Craig Mustard, Exploring Practical Benefits of Asymmetric Multicore Processors, in *Proceedings of the 2009 Workshop on Parallel Execution of Sequential Programs on Multi-core Architectures*, ISCA-36.
- [12] Kishore Kumar Pusukuri, David Vengerov, and Alexandra Fedorova, A Methodology for Developing Simple and Robust Power Models Using Performance Monitoring Events, in *Proceedings of the Workshop on the Interaction between Operating Systems and Computer Architecture*, 2009
- [11] Bo Chen, William Pak Tun Ma, Yan Tan, Alexandra Fedorova and Greg Mori, GreenRT: A Framework for the Design of Power-Aware Soft Real-Time Applications, in *Proceedings of the Workshop on the Interaction between Operating Systems and Computer Architecture*, China, 2008
- [10] Daniel Shelepov and Alexandra Fedorova, Scheduling on Heterogeneous Multicore Processors Using Architectural Signatures, in *Proceedings of the Workshop on the Interaction between Operating Systems and Computer Architecture*, 2008

- [9] Andrea Tagliasacchi, Ryan Dickie, Alex Couture-Beil, Micah J. Best, Alexandra Fedorova, and Andrew Brownsword, Cascade: A Parallel Programming Framework for Video Game Engines, in *Proceedings of the Workshop on Parallel Execution of Sequential Programs on Multi-core Architectures (PESPMA)*, 2008
- [8] Alexandra Fedorova, Viren Kumar, Vahid Kazempour, Suprio Ray, and Pouya Alagheband, Cypress: A Scheduling Infrastructure for a Many-Core Hypervisor , in *Proceedings of the Workshop on Managed Multi-Core Systems (MMCS'08) held in conjunction with the 17th International Symposium on High Performance Distributed Computing (HPDC-17)*, 2008
- [7] Alexandra Fedorova, David Vengerov and Daniel Doucette, Operating System Scheduling on Heterogeneous Core Systems, In *Proceedings of the First Workshop on Operating System Support for Heterogeneous Multicore Architectures*, 2007
- [6] Daniel Doucette and Alexandra Fedorova, Base Vectors: A Potential Technique for Microarchitectural Classification of Applications, in *Proceedings of the Workshop on the Interaction between Operating Systems and Computer Architecture (WIOSCA)*, 2007
- [5] Sven Bachthaler, Fernando Belli and Alexandra Fedorova, Desktop Workload Characterization for CMP/SMT and Implications for Operating System Design, in *Proceedings of the Workshop on the Interaction between Operating Systems and Computer Architecture (WIOSCA)*, 2007
- [4] Alexandra Fedorova, Margo Seltzer, and Michael D. Smith. A Non-Work-Conserving Operating System Scheduler for SMT Processors, in *Proceedings of the Workshop on the Interaction between the Operating Systems and Computer Architecture (WIOSCA)*, 2006
- [3] Aaron B. Brown, Anupam Chanda, Rik Farrow, Alexandra Fedorova, Petros Maniatis, and Michael L. Scott. The Many Faces of Systems Research - and How to Evaluate Them, in *Proceedings of HotOS X, Tenth Workshop on Hot Topics in Operating Systems*, 2005
- [2] Alexandra Fedorova, Christopher Small, Daniel Nussbaum and Margo Seltzer. Chip Multithreading Systems Need a New Operating System Scheduler, in *Proceedings of 11th ACM SIGOPS European Workshop*, 2004
- [1] Alexandra Fedorova, Margo Seltzer, Kostas Magoutis, and Salimah Addetia. Application Performance on the Direct Access File System, in *Proceedings of Workshop on Software and Performance 2004 (WOSP'04)*, 2004

Thesis:

Alexandra Fedorova. Operating System Scheduling for Chip Multithreaded Processors, *Harvard University*, September 2006

Patents:

Alexandra Fedorova and Christopher Small, Cache-aware scheduling for a chip multithreading processor, *US Patent No. 7,487,317*, February 3, 2009

Alexandra Fedorova. Method and apparatus for estimating multithreaded processor throughput based on processor cache performance. *US Patent No. 7,363,450*, April 25, 2008

Alexandra Fedorova, Method and apparatus for estimating the effect of processor cache memory bus delays on multithreaded processor throughput , *US Patent No. 7,457,931*, November 25, 2008

MENTION OF RESEARCH IN THE NEWS

SFU NEWS Newsletter, March 24, 2011. Mentioned with respect to the grant awarded by BCIC Natural Resources and Applied Sciences (NRAS) endowment.

MIT Technology Review featured research on data center request distribution based on electricity prices in different regions. The research was led by my student Ananth Narayan S.

INVITED TALKS AND PUBLIC APPEARANCES:

Oregon State University

Multicore Software Systems Research Challenges, CRA-W workshop on Multicore Systems for women and minorities, co-located with ASPLOS 2011

A Case for NUMA-Aware Contention Management on Multicore Systems, Oracle, December 2010

The Joys of Scheduling on Large Multicore Systems, Google, Fall 2010

Managing All Kinds of Contention on Multicore Systems, Vancouver Systems Colloquium, October 20, 2010

The Joys of Scheduling on Large Multicore Systems, IEEE Victoria Chapter, September 2010.

Appeared on Intel Parallel Programming Talk, Managing Contention for the Shared Resources on Multicore Processors, August 10, 2010

The Joys of Scheduling on Large Multicore Systems, VMWare, Fall 2009

The Joys of Scheduling on Large Multicore Systems, Sun Microsystems, Fall 2009

Interviewed by Sun Microsystems' Eric Saxe on the launch of OpenSolaris 2009.06, May 2009

Unleashing the Potential of Asymmetric Multicore Processors Through Operating System Support, Séminaire REGAL, Laboratoire d'Informatique de Paris 6, May 2009

Unleashing the Potential of Asymmetric Multicore Processors Through Operating System Support, AMD Computer Engineering Lecture Series, Cornell University, April 2009

How I Got into the Operating Systems and Why I Decided to Stay, PLOSA Workshop, co-located with ASPLOS 2009, Washington, DC

How to Succeed in Grad School, Diversity Workshop co-located with OSDI, 2008, San Diego, CA

How to Succeed in Grad School, Srivastava Graduate Workshop, University of British Columbia, May 2008

What Every Developer Should Know About Software Performance on Multicore Processors, IEEE Vancouver Section, UBC, October 4, 2007

Software Hardware Interaction on Multicore and Multithreaded Processors, PMC Sierra, Burnaby, May 5, 2007

Operating System Scheduling for Multicore Processors, Intel, Santa Clara, May 11, 2006

Cache-fair Thread Scheduling for Multicore Processors, Sun Microsystems Laboratories Seminar Series, February 3, 2006

Operating System Methods For Improved Resource Sharing On Chip Multiprocessors. Harvard Industrial Partnership Symposium, October 21, 2005

A High-Performance Cache Model. Cider Seminar, University of Toronto, Canada, June 21, 2005

Operating System Scheduling for Chip Multithreaded Processors. Sun Microsystems, Burlington, MA, June 6, 2005

Throughput-Oriented Scheduling on Chip Multithreading Systems, Performance Strategic Working Group, Sun Microsystems, Burlington, MA, September 2, 2004

PROFESSIONAL ACTIVITIES:

Technical Program committees

ASPLOS 2012	HotPar 2011	EuroSys 2011
USENIX 2011	HiPEAC 2011	PACT 2010
PPoPP 2011	PESPMA 2009	WIOSCA 2009
EuroSys 2010	ACM Op. Syst. Review	ASPLOS 2009
MMCS 2009	WIOSCA 2008	MMCS 2008
HotPar 2009	SPAA 2008	WIOSCA 2007

Other conference organization:

- Chair, Provocative Ideas Session, ASPLOS 2012
- Local arrangements chair, High Performance Graphics 2011
- PC Co-chair, HotPar 2009
- Steering Committee, HotPar 2009-present

Outreach Activities:

- ScienceAlive mentor (2009-2010): Gave introduction to research on multicore systems to 4-7th graders
- Mentor in the Canadian Distributed Mentorship Program (2008)
- Seminar Leader at the Srivatsava Graduate Workshop for Women and Minorities (2008)
- Invited speaker at the 2008 Diversity Workshop, co-located with OSDI 2008