

Sergey Blagodurov

Contact information: mailto: blagodurov@gmail.com
 skype: sergey.blagodurov
 web: <http://blagodurov.net>

Research interests: general area of Computer Systems.

Professional experience:

2013 – **MTS**

present Advanced Micro Devices (AMD) Research – *Seattle, WA*

I work on [FastForward](#) team with [Gabriel Loh](#). We are re-designing systems for Exascale era. The coverage of the project spans many IT news websites worldwide, such as [DatacenterDynamics](#), [HPCwire](#), [eWeek](#), [Street Insider](#), and [The Verge](#).

2010 – 2013 **Research Associate**

Hewlett-Packard Laboratories – *Calgary, AB, Canada*

Under the careful guidance of [Martin Arlitt](#) and [Daniel Gmach](#), I worked on a few projects:

3. [Net-Zero Energy Data Center](#) which has made headlines at [InfoWorld](#), [ZDNet](#), [Silicon Republic](#), [Information Management](#), [The Register](#), [Tech Week](#), among many others.
2. Designing Smart Meter Data Assurance rules for HP Vertica and their visualization with Tableau.
1. [Improving the Efficiency of Information Collection and Analysis in Widely Used IT Applications](#), now is [part](#) of [the Bro Network Security Monitor](#).

2006 – 2008 **Software developer**

The Federal Financial Monitoring Service of Russia – *Moscow, Russia*

Developed a system for large-scale text recognition in ABBYY FlexiCapture.

2004 – 2005 **Web developer**

ArtXGroup Company – *Moscow, Russia*

Developed a web-based content management system in C#, PHP, and MySQL.

Education:

2008 – 2013 **PhD in Computer Science**

Advisor: [Alexandra \(Sasha\) Fedorova](#)

Simon Fraser University – *Vancouver, BC, Canada*

Thesis: [Addressing shared resource contention in datacenter servers](#)

Selected for the Dissertation showcase at SuperComputing 2013.

Thesis summary:

Servers are major energy consumers in datacenters. Much of that energy is wasted because programs compete for shared resources and suffer severe performance penalties due to resource contention. My Thesis addresses the contention problem.

GPA: 4.05 (out of 4.33)

2002 – 2008 **MSc with Honors in Computer Engineering**

Moscow Engineering Physics Institute (State University) – *Moscow, Russia*

GPA: 5.00 (out of 5.00)

Peer-reviewed scientific publications:

To help assess the quality of publications, I provide **Microsoft Academic Search (MAS)** ranks for Computer Science conferences and journals. MAS delivered the most complete and reliable ranks as compared with CORE (ARC), Arnetminer, Citeseer. MAS also most accurately reflected prestige of publication venues as perceived by my colleagues. Ranks are obtained based on the "last 10 years" at the time of publication. For the journal articles, I also include the **Journal Impact Factor**. My Google Scholar citation index is [1689](#).

- [P15] Amro Awad, Sergey Blagodurov, Yan Solihin, [Write-Aware Management of NVM-based Memory Extensions](#), in *International Conference on Supercomputing (ICS)*, 2016. Acceptance rate 24%. MAS rank: 89/3524 (top 3%).
- [P14] Sergey Blagodurov, Alexandra Fedorova, Evgeny Vinnik, Tyler Dwyer, and Fabien Hermenier, [Multi-Objective Job Placement in Clusters](#), in *SuperComputing Conference (SC)*, 2015. Acceptance rate 22%. MAS rank: 55/3524 (top 2%).
- [P13] Mitesh Meswani, Sergey Blagodurov, David Roberts, John Slice, Mike Ignatowski, Gabriel Loh, [Heterogeneous Memory Architectures: A HW/SW Approach for Mixing Die-stacked and Off-package Memories](#), in *IEEE International Symposium on High Performance Computer Architecture (HPCA)*, 2015. Acceptance rate 23%. MAS Rank: 9/102 (top 9%). **Selected as a Best Paper Nominee.**
- [P12] Sergey Blagodurov, Daniel Gmach, Martin Arlitt, Yuan Chen, Chris Hyser, Alexandra Fedorova, [Maximizing Server Utilization while Meeting Critical SLAs via Weight-Based Collocation Management](#), in *IFIP/IEEE Integrated Network Management Symposium (IM)*, 2013. Acceptance rate 27%. MAS Rank: 310/3509 (top 9%). **This work is part of HP's Net-Zero Energy Data Center architecture, which was [named](#) a 2013 Computerworld Honors Laureate.**
- [P11] Martin Arlitt, Cullen Bash, Sergey Blagodurov, Yuan Chen, Tom Christian, Daniel Gmach, Chris Hyser, Niru Kumari, Zhenhua Liu, Manish Marwah, Alan McReynolds, Chandrakant Patel, Amip Shah, Zhikui Wang, Rongliang Zhou, [Towards the Design and Operation of Net-Zero Energy Data Centers](#), in *InterSociety Thermal Conference (ITherm)*, 2012. MAS rank: 77/1229 (top 6%).
- [P10] Tyler Dwyer, Alexandra Fedorova, Sergey Blagodurov, Mark Roth, Fabien Gaud, and Jian Pei, [A Practical Method for Estimating Performance Degradation on Multicore Processors and its Application to HPC Workloads](#), in *SuperComputing Conference (SC)*, 2012. Acceptance rate 21%. MAS rank: 51/2872 (top 2%).
- [P9] Sergey Zhuravlev, Juan Carlos Saez, Sergey Blagodurov, Alexandra Fedorova, and Manuel Prieto, [Survey of Energy-Cognizant Scheduling Techniques](#), in *Transactions on Parallel and Distributed Systems (TPDS)*, 24(7), pp. 1447-1464. July 2013. MAS Rank: 71/1233 (top 6%), Impact Factor: 2.8.
- [P8] 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 15%. MAS rank: 31/1645 (top 2%).
- [P7] Sergey Zhuravlev, Juan Carlos Saez, Sergey Blagodurov, Alexandra Fedorova, and Manuel Prieto, [Survey of Scheduling Techniques for Addressing Shared Resources in Multicore Processors](#), in *ACM Computing Surveys (CSUR)*, vol. 45, issue 1 (Article 4), November 2012. MAS Rank: 66/762 (top 9%), Impact Factor: 7.6.
- [P6] Sergey Blagodurov, Sergey Zhuravlev, and Alexandra Fedorova, [Contention Aware Scheduling on Multicore Systems](#), in *ACM Transactions on Computer Systems (ACM TOCS)*, vol. 30, issue 4, December 2010. MAS Rank: 7/762 (top 1%), Impact Factor: 2.3.

- [P5] Sergey Zhuravlev, Sergey Blagodurov, and Alexandra Fedorova, [AKULA: A Toolset for Developing Scheduling Algorithms on Multicore Systems](#), in *International Conference on Parallel Architectures and Compilation Techniques (PACT)*, 2010. Acceptance rate 17%. MAS rank: 113/1645 (top 7%).
- [P4] Juan Carlos Sáez Alcaide, Manuel Prieto Matias, Alexandra Fedorova, Sergey Blagodurov, [A Comprehensive Scheduler for Asymmetric Multicore Systems](#), in *ACM European Conference on Computer Systems (EuroSys)*, 2010. Acceptance rate 19%. MAS rank: 51/1645 (top 3%).
- [P3] Alexandra Fedorova, Sergey Blagodurov, and Sergey Zhuravlev, [Managing Contention for Shared Resources on Multicore Processors](#), Invited to *Communications of the ACM (CACM)*, vol 53, issue 2, February 2010. MAS Rank: 13/762 (top 2%), Impact Factor: 2.3.
- [P2] Sergey Zhuravlev*, Sergey Blagodurov,* and Alexandra Fedorova, [Addressing Shared Resource Contention in Multicore Processors via Scheduling](#), in *International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, 2010. Acceptance rate 17%. MAS rank: 18/1645 (top 1%).
*A coin toss decided the order of the first two authors.
- [P1] 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](#), in *ACM Operating Systems Review (SIGOPS)*, vol. 43, issue 2, April 2009. MAS Rank: 35/762 (top 5%), Impact Factor: 2.5.

Peer-reviewed industrial experience publications:

- [I3] Martin Arlitt, Cullen Bash, Sergey Blagodurov, Yuan Chen, Tom Christian, Daniel Gmach, Chris Hyser, Niru Kumari, Zhenhua Liu, Manish Marwah, Alan McReynolds, Chandrakant Patel, Amip Shah, Zhikui Wang, The Net-Zero Energy Data Center, in *HP Annual Technical Conference (HP TECHCON)*, 2012. Acceptance rate < 10%.
- [I2] Sergey Blagodurov and Alexandra Fedorova, [User-level scheduling on NUMA multicore systems under Linux](#), in *Ottawa Linux Symposium (OLS)*, 2011.
- [I1] Sergey Blagodurov and Martin Arlitt, [Improving the efficiency of information collection and analysis in widely-used IT applications](#), in *ACM/SPEC Conference on Performance Engineering (ICPE)*, Industrial Applications and Experience track 2011.

Patents:

- [A21] S. Blagodurov, **Dynamic Configuration of Inter-Chip and On-Chip Networks In Cloud Computing System**, filed: 15/265402.
- [A20] A. Awad, S. Blagodurov, **Wear-Limiting Non-Volatile Memory**, filed: 15/267092.
- [A19] S. Blagodurov, A. Kegel, **Using Multiple Memory Elements in an IO Memory Management Unit for Performing Virtual Address to Physical Address Translations**, filed: 15/167038.
- [A18] S. Blagodurov, **Method and Apparatus for Workload Placement on Heterogeneous Systems**, filed: 14/880713.
- [A17] S. Blagodurov, T. Siddiqua, V. Sridharan, **NVM as Checkpointing Storage**, filed: 15/207943.
- [A16] A. Basu, D. Yudanov, D. Roberts, M. Meswani, S. Blagodurov, **Multi-Processor Apparatus and Method of Detection and Acceleration of Lagging Tasks**, filed: 15/191355.
- [A15] S. Blagodurov, G. Loh, John Slice, **Pinning Objects in Multi-Level Memory Hierarchies**, filed: 15/040195.
- [A14] D. Yudanov, S. Blagodurov, D. Roberts, M. Meswani, N. Jayasena, M. Ignatowski, **Computation Along A Datapath Between Memory Blocks**, filed: 14/952517.

- [A13] M. Meswani, D. Roberts, D. Yudanov, A. Basu, S. Blagodurov, **Method And Apparatus For Performing Inter-Lane Power Management**, filed: 14/963352.
- [A12] S. Blagodurov, G. Loh, M. Meswani, **Hot Page Selection in Multi-Level Memory Hierarchies**, filed: [US20160378655](#).
- [A11] S. Blagodurov, **A mechanism of identifying available memory resources in a ring of multi-level memory modules (ring of MLMs)**, filed: [US20160380921](#).
- [A10] D. Roberts, S. Blagodurov, **Memory Module With Embedded Access Metadata**, filed: [US20160378668](#).
- [A9] D. Roberts, M. Meswani, S. Blagodurov, I. Paul, D. Yudanov, **Independent Between-Module Prefetching For Processor Memory Modules**, filed: [US20160378667](#).
- [A8] D. Yudanov, S. Blagodurov, A. Basu, S. Puthoor, J. Greathouse, **Instruction Context Switching**, filed: [US20160371082](#).
- [A7] S. Blagodurov, A. Kegel, **Scheduling of Data Migration**, filed: [US20160246540](#).
- [A6] S. Blagodurov, G. Loh, M. Breternitz, **NVRAM-Aware Data Processing System**, filed: [US20160188456](#).
- [A5] S. Blagodurov, M. Meswani, G. Loh, M. Breternitz, M. Nutter, J. Slice, D. Roberts, M. Ignatowski, M. Oskin, **Techniques For Changing Management Modes of Multilevel Memory Hierarchy**, filed: [US20160179382](#).
- [A4] S. Blagodurov, G. Loh, Y. Eckert, **Traffic Rate Control For Inter-Class Data Migration In A Multiclass Memory System**, filed: [US20160170919](#).
- [A3] D. Gmach, S. Blagodurov, M. Arlitt, Y. Chen, C. Hyser, **Weight-Based Collocation Management**, filed: [US20140282503](#), granted: [US9178763](#).
- [A2] S. Blagodurov, M. Arlitt, D. Gmach, C. Hyser, C. Bash, **Maximizing Server Utilization within a Data Center**, filed: [US20140040474](#), granted: [US9104498](#).
- [A1] C. Bash, M. Arlitt, S. Blagodurov, Y. Chen, T. Christian, D. Gmach, C. Hyser, N. Kumari, Z. Liu, M. Marwah, A. McReynolds, A. Shah, Z. Wang, C. Patel, **Managing a Facility**, filed: [US20140278692](#), [CN103959190](#), [DE112011105886](#), and [WO2013095625](#).

Technical reports:

- [H4] S. Blagodurov and M. Arlitt, Designing Smart Meter Data Assurance rules for HP Vertica and their visualization with Tableau, HP Labs (internal), 2013.
- [H3] M. Arlitt, C. Bash, S. Blagodurov, Y. Chen, T. Christian, D. Gmach, C. Hyser, N. Kumari, Z. Liu, M. Marwah, A. McReynolds, C. Patel, A. Shah, Z. Wang, R. Zhou, [Towards the Design and Operation of Net-Zero Energy Data Centers](#), HP Labs, 2012.
- [H2] S. Blagodurov and M. Arlitt, [Improving the efficiency of information collection and analysis in widely-used IT applications](#), HP Labs, 2010.
- [H1] S. Blagodurov, S. Zhuravlev, S. Lansiquot, A. Fedorova, [Addressing shared resource contention in multicore processors via scheduling](#), SFU, 2009.

Public software releases:

- [R3] [ClavisMO](#): a multi-objective virtualized scheduling framework for MapReduce and HPC clusters. The source code is available for download from [github repository](#).
- [R2] [Clavis](#): a contention-aware scheduler for multicore processors.
- [R1] A DataSeries logging module of [the Bro Network Security Monitor version 2.1](#).

Professional certification completed:

- [C3] Oracle PL/SQL Developer Certified Associate
- [C2] ABBYY FormReader Enterprise 6.5 Certified Administrator
- [C1] ABBYY FlexiCapture Certified Programmer

Service:

- [S2] Membership chair of the [IEEE Computer Society's STC on Sustainable Computing](#):
 - Developed and successfully executed plan to reach 400 unique members by the end of 2012.
 - Created automated membership tracking (the [source](#) is on GitHub), [visualized it with Tableau](#).
- [S1] Expert reviewer for ACM TAAS '17, ACM TOPC '16, '15, '14, Euro-Par '15, IEEE CompArch Letters '15, IEEE TC '14, ACM TOMPECS '14, IEEE TPDS '13 and '11, Springer Transactions on CS '11, PPOPP '11, PACT '10.

Volunteering:

Mustard Seed, Boys & Girls Clubs of Bellevue

Hobbies:



Competitive dragon boating

References:

Alexandra Fedorova
Associate Professor
UBC
sasha@ece.ubc.ca

Gabriel Loh
AMD Fellow
AMD Research
gabriel.loh@amd.com

Martin Arlitt
Principal Research Scientist
HP Labs
martin.arlitt@hp.com

Daniel Gmach
Research Scientist
HP Labs
daniel.gmach@hp.com