

# Michael Ferdman

## Curriculum Vitae - April 2012

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## Research Interests

Computer architecture, with particular emphasis on the design of efficient server systems. My primary research objective is to understand the fundamental properties and interactions of application software, operating systems, networks, processor microarchitecture, and datacenter dynamics, to enable software and hardware co-design of high-performance, power-efficient, and compact servers.

## Education

**Carnegie Mellon University**

*PhD in Electrical and Computer Engineering*

*MS in Electrical and Computer Engineering*

*BS in Electrical and Computer Engineering*

*BS in Computer Science*

Pittsburgh, PA

June 2012 (expected)

December 2002

December 2002

May 2002

## Honors and Awards

**Best Paper Award** at the 17th International Conference on Architectural Support for Programming Languages and Operating Systems for "Clearing the Clouds: A Study of Emerging Scale-out Workloads on Modern Hardware."

**Best Paper Finalist** at the 17th International Symposium on High-Performance Computer Architecture for "Cuckoo Directory: A Scalable Directory for Many-Core Systems."

**Paper Award** from the European Network of Excellence on High Performance and Embedded Architecture and Compilation (HiPEAC) for "Cuckoo Directory: A Scalable Directory for Many-Core Systems."

**IEEE Micro Top Picks** from Computer Architecture Conferences of 2009, "R-NUCA: Data Placement in Distributed Shared Caches."

**IEEE Micro Top Picks** from Computer Architecture Conferences of 2009, "Practical Off-chip Meta-data for Temporal Memory Streaming."

**2005 DARPA Grand Challenge** driverless desert race, 2nd and 3d place autonomous vehicles for RedTeam.

## Publications

Peer-reviewed Conference Papers

[2012] **Scale-Out Processors**

Pejman Lotfi-Kamran, Boris Grot, Michael Ferdman, Stavros Volos, Onur Kocberber, Javier Picorel Obando, Almutaz Adileh, Djordje Jevdjic, Sachin Idgunji, Emre Ozer, Babak Falsafi, *In 39th International Symposium on Computer Architecture (ISCA)*, 2012.

[2012] **Clearing the Clouds: A Study of Emerging Scale-out Workloads on Modern Hardware**

Michael Ferdman, Almutaz Adileh, Onur Kocberber, Stavros Volos, Mohammad Alisafae, Djordje Jevdjic, Cansu Kaynak, Adrian Daniel Popescu, Anastasia Ailamaki, Babak Falsafi, *In 17th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, 2012. (recognized

as Best Paper by the program committee)

- [2011] **Proactive Instruction Fetch**  
Michael Ferdman, Cansu Kaynak, Babak Falsafi, *In 44th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO)*, 2011.
- [2011] **Cuckoo Directory: A Scalable Directory for Many-Core Systems**  
Michael Ferdman, Pejman Lotfi-Kamran, Ken Balet, Babak Falsafi, *In 17th IEEE International Symposium on High Performance Computer Architecture (HPCA)*, 2011. (selected by the program committee for Best Student Papers session)
- [2010] **TurboTag: lookup filtering to reduce coherence directory power**  
Pejman Lotfi-Kamran, Michael Ferdman, Daniel Crisan, Babak Falsafi, *In International Symposium on Low Power Electronics and Design (ISLPED)*, 2010.
- [2009] **Reactive NUCA: near-optimal block placement and replication in distributed caches**  
Nikos Hardavellas, Michael Ferdman, Babak Falsafi, Anastasia Ailamaki, *In 36th International Symposium on Computer Architecture (ISCA)*, 2009. (recognized as Top Picks of 2009 by IEEE Micro)
- [2009] **Practical Off-Chip Meta-Data for Temporal Memory Streaming**  
Thomas F. Wenisch, Michael Ferdman, Anastasia Ailamaki, Babak Falsafi, Andreas Moshovos, *In 15th International Symposium on High Performance Computer Architecture (HPCA)*, 2009. (recognized as Top Picks of 2009 by IEEE Micro)
- [2008] **Temporal Instruction Fetch Streaming**  
Michael Ferdman, Thomas F. Wenisch, Anastasia Ailamaki, Babak Falsafi, Andreas Moshovos, *In 41st Annual IEEE/ACM International Symposium on Microarchitecture (MICRO)*, 2008.
- [2008] **Cache bursts: A new approach for eliminating dead blocks and increasing cache efficiency**  
Haiming Liu, Michael Ferdman, Jaehyuk Huh, Doug Burger, *In 41st Annual IEEE/ACM International Symposium on Microarchitecture (MICRO)*, 2008.
- [2008] **Temporal Streams in Commercial Server Applications**  
Thomas F. Wenisch, Michael Ferdman, Anastasia Ailamaki, Babak Falsafi, Andreas Moshovos, *In 2008 IEEE International Symposium on Workload Characterization (IISWC)*, 2008.
- [2007] **Last-Touch Correlated Data Streaming**  
Michael Ferdman, Babak Falsafi, *In 2007 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, 2007.
- [2003] **Analysis of IC Manufacturing Process Deformations: An automated approach using SRAM bit fail maps**  
Thomas Zanon, Michael Ferdman, Kambiz Komeyli, Wojciech P. Maly, *In 29th International Symposium for Testing and Failure Analysis*, 2003.

#### Journal Articles

- [2011] **Toward Dark Silicon in Servers**  
Nikos Hardavellas, Michael Ferdman, Babak Falsafi, Anastasia Ailamaki, *In IEEE Micro*, volume 31, 2011.
- [2011] **Spatial Memory Streaming**  
Stephen Somogyi, Thomas F. Wenisch, Michael Ferdman, Babak Falsafi, *In Journal of Instruction-Level Parallelism (JILP)*, volume 13, 2011.
- [2010] **Near-Optimal Cache Block Placement with Reactive Nonuniform Cache Architectures**  
Nikos Hardavellas, Michael Ferdman, Babak Falsafi, Anastasia Ailamaki, *In IEEE Micro's Top Picks*, volume 30, 2010. (original at ISCA'09)

- [2010] **Making Address-Related Prefetching Practical**  
 Thomas F. Wenisch, Michael Ferdman, Anastasia Ailamaki, Babak Falsafi, Andreas Moshovos, *In IEEE Micro's Top Picks*, volume 30, 2010. (original at ISCA'09)
- [2006] **SimFlex: Statistical Sampling of Computer System Simulation**  
 Thomas F. Wenisch, Roland E. Wunderlich, Michael Ferdman, Anastasia Ailamaki, Babak Falsafi, James C. Hoe, *In IEEE Micro*, volume 26, 2006.

## Teaching Assistantships

<b>Ecole Polytechnique Fédérale de Lausanne</b>	Lausanne, Switzerland
<i>Advanced Topics on Memory Systems (graduate)</i>	Spring 2009 (Babak Falsafi)
<i>Multiprocessor Architecture (graduate)</i>	Fall 2008 (Babak Falsafi)
<b>Carnegie Mellon University</b>	Pittsburgh, PA
<i>Multiprocessor Architecture (graduate)</i>	Spring 2006 (Babak Falsafi)
<i>Advanced Techniques in Microprocessors (PhD)</i>	Fall 2005 (Babak Falsafi)
<i>Operating Systems (undergraduate)</i>	Fall 2001 (Gregory Kesden)
<i>Embedded Systems (undergraduate)</i>	Fall 2001 (Raj Rajkumar)

## Employment History

<b>Cadence Design Systems</b>	Pittsburgh, PA
<i>Software Engineer</i>	April 2004-August 2004
<b>Neoliner, Inc. (acquired startup)</b>	Pittsburgh, PA
<i>Software Engineer</i>	March 2003-April 2004
<ul style="list-style-type: none"> <li>• VLSI CAD software implementation, troubleshooting, and maintenance</li> </ul>	
<b>Automatika, Inc.</b>	Pittsburgh, PA
<i>Independent Contractor</i>	September 2002-January 2003
<ul style="list-style-type: none"> <li>• Wrote software for sensor data acquisition and wireless communication</li> </ul>	
<b>National Robotics Engineering Consortium</b>	Pittsburgh, PA
<i>Circuit Designer and Software Engineer</i>	February 2001-May 2002
<ul style="list-style-type: none"> <li>• Worked in a small team to create a robot for underground gas pipe inspection for NY State Gas</li> <li>• Designed micro-controller boards, real-time kernel, and software for communication, control, and vision</li> </ul>	

## Professional Service

Co-developer and public release manager of *FLEXUS*, a scalable, full-system, cycle-accurate multi-processor and multi-core simulation framework, currently in its 4th public release.

External reviewer for *HPCA'12*, *IISWC'11*, *MICPRO/DSD'11*, *ICS'11*, *ISCA'11*, *HPCA'11*, *HiPEAC'10*, *ISCA'10*, *HPCA'10*, *JPDC'09*

*SIMFLEX and ProtoFlex: Fast, Accurate, and Flexible Simulation of Computer Systems* Tutorial at

- 2010 IEEE International Symposium on Workload Characterization (IISWC). Atlanta, GA, December 2010 with Eric Chung, Pejman Lotfi-Kamran, and Michael Papamichael.
- 42st Annual IEEE/ACM International Symposium on Microarchitecture (MICRO). New York, NY, December 2009 with Eric Chung and Michael Papamichael.
- 17th International Conference on Parallel Architectures and Compilation Techniques (PACT), Toronto, Canada, October 2008 with Eric Chung and Nikos Hardavellas.

Organizer of the Fall 2009 weekly seminar of the Systems Labs at Ecole Polytechnique Fédérale de Lausanne.

Organizer of the Fall 2007 weekly seminar of the Computer Architecture Lab at Carnegie Mellon (CALCM).

Student member, IEEE Computer Society and ACM SIGARCH.

## References

- **Babak Falsafi** (EPFL - babak.falsafi@epfl.ch)
- **Anastasia Ailamaki** (EPFL - anastasia.ailamaki@epfl.ch)
- **Doug Burger** (Microsoft Research - dburger@microsoft.com)
- **Andreas Moshovos** (University of Toronto - moshovos@eecg.toronto.edu)
- **Todd C. Mowry** (CMU - tcm@cs.cmu.edu)