

## Ali José Mashtizadeh

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### CONTACT INFORMATION

Ali J. Mashtizadeh  
353 Serra Mall, Room #288  
Stanford, CA 94305

Cell: (510) 334-1411  
E-mail: [mashti@cs.stanford.edu](mailto:mashti@cs.stanford.edu)  
WWW: [www.mashtizadeh.com](http://www.mashtizadeh.com)

### EDUCATION

**Stanford University**, Stanford, California

Ph.D. Candidate, Computer Science, Started September 2011

Advisor: David Mazières

**Massachusetts Institute of Technology**, Cambridge, Massachusetts

M.Eng. Electrical Engineering and Computer Science, June 2007

Thesis title: PHDL: A Python Hardware Design Framework

Advisor: Steve Ward

B.S. Electrical Engineering, June 2006

**Saint Mary's College High School**, Berkeley, California

High School Diploma with high honors, June 2002

### RESEARCH INTERESTS

Operating Systems, Distributed Systems, and Storage

### WORK EXPERIENCE

**Stanford Computer Science**, Stanford, CA

*Research Assistant*

**January, 2012 – Present**

Researching distributed file systems, operating systems, and security. I designed and built the Ori file system, a replicated and versioned file system for end user devices. Created Cryptographic Control Flow Integrity (CCFI), a defense against buffer overflow attacks. Led the development of Castor, a multicore record/replay system with low enough overhead to run in production. Currently exploring Castor's applications to build reliable services and diagnosing failures. I also contributed to other projects including Dune, and the blind return oriented programming (BROP) attack.

**Stanford Computer Science Department, RAMCloud**, Stanford, CA

*Research Assistant Rotation*

**September, 2011 – December, 2011**

Worked on the RAMCloud distributed storage system. Created a cluster monitoring and membership service.

**VMware, Live Migration Group**, Palo Alto, CA

*Engineering Consultant*

**August, 2011 – August, 2012**

Consulting on various live migration technologies.

**VMware, Resource Management Group**, Palo Alto, CA

*Staff Engineer*

**June, 2007 – July, 2011**

Technical lead of the Storage vMotion and vMotion products. These two products allow users to move the virtual machines between physical hosts or storage devices. Responsibilities include architecting Storage vMotion, researching and designing optimizations and features for vMotion and Storage vMotion. Researched and developed VMware's memory compression cache that reduces the performance penalty associated with hypervisor level swapping. Assisted with the early development of VProbes (a dynamic performance inspection and debugging tool). Mentored four interns in research projects.

**Media Modifications Ltd**, Cambridge, MA  
*Software Developer* **February, 2007 – April, 2007**  
Developed core video remixing tools for the XO-1 laptop created by the One Laptop Per Child (OLPC) Foundation.

**CSAIL, Computer Architecture Group**, Cambridge, MA  
*Master's Thesis Project* **June, 2006 – June, 2007**  
Developed a digital hardware design framework written in python. The Framework addresses some of the shortcomings of today's Hardware Descriptive Languages(HDLs).

**Bricolage Learning**, Cambridge, MA  
*Firmware Developer* **June, 2004 – October, 2004**  
Designed and built a bytecode virtual machine and firmware for a modular hardware prototype platform built on the 8051 processor.

**MIT Media Lab, Grassroots Invention Group**, Cambridge, MA  
*Undergraduate Researcher* **September, 2002 – June, 2004**  
Worked on multiple projects to support the main research focus of the group. Wrote virtual machines, which could execute programs written in the Logo language, in C and 8051 Assembly. Designed several electronic boards for the research group's modular hardware platform, including the 8051 CPU board.

TEACHING  
EXPERIENCE

**Stanford University**, Stanford, CA **January, 2015 – March, 2015**  
Instructor – CS140: Operating Systems  
Co-lectured the course with Prof. David Mazières and Adam Belay. Revised much of the storage and file system lectures to cover modern systems. Helped develop parts of the exam.

**Stanford University**, Stanford, CA **September, 2014 – December, 2014**  
Teaching Assistant – CS244b: Distributed Systems  
Head teaching assistant helped develop exam and projects for the course. As well as managing the other teaching assistants.

**MIT EECS Dept.**, Cambridge, MA **February, 2007 – June, 2007**  
Teaching Assistant – 6.004: Architecture  
Led recitations and helped students with lab assignments in MIT's course on computer architecture; covered topics on digital design, computer architecture, and operating systems.

**Stanford University**, Stanford, CA **December, 2016**  
Guest Lecturer – CS242: Concepts in Programming Languages  
Lectured on the Castor record/replay system.

**Stanford University**, Stanford, CA **December, 2014**  
Guest Lecturer – CS244b: Distributed Systems  
Lectured on the Ori File System work.

## PUBLICATIONS

- [1] A. J. Mashtizadeh, T. Garfinkel, D. Terei, D. Mazieres and M. Rosenblum, ‘Castor: Towards Practical Default-On Multi-Core Record/Replay’, in *Proceedings of the 22nd international conference on architectural support for programming languages and operating systems*, ser. ASPLOS XXII, Xi’an, China: ACM, 2017.
- [2] R. Koller, A. J. Mashtizadeh and R. Rangaswami, ‘Centaur: Host-Side SSD Caching for Storage Performance Control’, in *Proceedings of the 2015 IEEE International Conference on Autonomic Computing*, ser. ICAC ’15, Washington, DC, USA: IEEE Computer Society, 2015, pp. 51–60. [Online]. Available: <http://dx.doi.org/10.1109/ICAC.2015.44>.
- [3] A. J. Mashtizadeh, A. Bittau, D. Boneh and D. Mazires, ‘CCFI: Cryptographically Enforced Control Flow Integrity’, in *Proceedings of the 22Nd ACM SIGSAC Conference on Computer and Communications Security*, ser. CCS ’15, Denver, Colorado, USA: ACM, 2015, pp. 941–951. [Online]. Available: <http://doi.acm.org/10.1145/2810103.2813676>.
- [4] A. Bittau, A. Belay, A. Mashtizadeh, D. Mazires and D. Boneh, ‘Hacking Blind’, in *Proceedings of the 2014 IEEE Symposium on Security and Privacy*, ser. SP ’14, Washington, DC, USA: IEEE Computer Society, 2014, pp. 227–242. [Online]. Available: <http://dx.doi.org/10.1109/SP.2014.22>.
- [5] A. J. Mashtizadeh, M. Cai, G. Tarasuk-Levin, R. Koller, T. Garfinkel and S. Setty, ‘XvMotion: Unified Virtual Machine Migration over Long Distance’, in *Proceedings of the 2014 USENIX Conference on USENIX Annual Technical Conference*, ser. USENIX ATC’14, Philadelphia, PA: USENIX Association, 2014, pp. 97–108. [Online]. Available: <http://dl.acm.org/citation.cfm?id=2643634.2643645>.
- [6] A. J. Mashtizadeh, A. Bittau, Y. F. Huang and D. Mazires, ‘Replication, History, and Grafting in the Ori File System’, in *Proceedings of the Twenty-Fourth ACM Symposium on Operating Systems Principles*, ser. SOSP ’13, Farmington, Pennsylvania: ACM, 2013, pp. 151–166. [Online]. Available: <http://doi.acm.org/10.1145/2517349.2522721>.
- [7] A. Belay, A. Bittau, A. Mashtizadeh, D. Terei, D. Mazires and C. Kozyrakis, ‘Dune: Safe User-level Access to Privileged CPU Features’, in *Proceedings of the 10th USENIX Conference on Operating Systems Design and Implementation*, ser. OSDI’12, Hollywood, CA, USA: USENIX Association, 2012, pp. 335–348. [Online]. Available: <http://dl.acm.org/citation.cfm?id=2387880.2387913>.
- [8] I. Ahmad, A. Gulati and A. Mashtizadeh, ‘vIC: Interrupt Coalescing for Virtual Machine Storage Device IO’, in *Proceedings of the 2011 USENIX Conference on USENIX Annual Technical Conference*, ser. USENIXATC’11, Portland, OR: USENIX Association, 2011, pp. 4–4. [Online]. Available: <http://dl.acm.org/citation.cfm?id=2002181.2002185>.
- [9] A. Mashtizadeh, E. Celebi, T. Garfinkel and M. Cai, ‘The Design and Evolution of Live Storage Migration in VMware ESX’, in *Proceedings of the 2011 USENIX Conference on USENIX Annual Technical Conference*, ser. USENIXATC’11, Portland, OR: USENIX Association, 2011, pp. 14–14. [Online]. Available: <http://dl.acm.org/citation.cfm?id=2002181.2002195>.
- [10] I. Ahmad, A. Gulati, A. Mashtizadeh and M. Austruy, ‘Improving Performance with Interrupt Coalescing for Virtual Machine Disk IO in VMware ESX Server’, *Vmware inc., palo alto, ca*, vol. 94304, 2009.
- [11] A. Mashtizadeh, ‘PHDL: A Python Hardware Design Framework’, PhD thesis, Massachusetts Institute of Technology, 2007.

TALKS *CCFI: Cryptographic Control Flow Integrity*. Work-in-Progress USENIX Security 2014.  
*Storage vMotion Deep Dive*. VMworld 2011.  
*Enhanced Storage VMotion in vSphere 4*. VMworld 2009.

PATENTS A. Mashtizadeh and G. Tarasuk-Levin. *Robust Live Migration using Shared Filesystem* U.S. Patent 9141578, Sep 22, 2015.  
I. Ahmad, G. Tarasuk-levin, and A. Mashtizadeh. *Method of allocating referenced memory pages from a free list* U.S. Patent 9092318, Jul 28, 2015.  
A. Mashtizadeh and K. Colbert. *Method and System for Performing Live Migration of Persistent Data of a Virtual Machine (revised)* U.S. Patent 8880470, Nov 4, 2014.  
A. Mashtizadeh, M. Cai, and E. Celebi. *Method and System for Optimizing Live Migration of Persistent Data of Virtual Machine Using Disk I/O Heuristics* U.S. Patent 8560791, Oct 15, 2013.  
A. Mashtizadeh and I. Ahmed. *Memory Compression Policies* U.S. Patent 8484405, Jul 9, 2013.  
A. Mashtizadeh and K. Colbert. *Method and System for Performing Live Migration of Persistent Data of a Virtual Machine* U.S. Patent 8478725, Jul 2, 2013.  
A. Mashtizadeh, M. Cai, and E. Celebi. *Method and System for Optimizing Live Migration of Persistent Data of Virtual Machine Using Disk I/O Heuristics* U.S. Patent 8386731, Feb 26, 2013.  
Inventor on several other patent applications from VMware.

AWARDS Stanford Graduate Fellowship in Science and Engineering (SGF), 2011 - 2013  
Mentored Best Intern Project at VMware, Summer 2010  
MIT 6.152 Ink Jet Cartridge Project Design Contest, Spring 2005  
MIT 6.302 Magnetic Levitator: Best Design, Fall 2005  
MIT 6.004 Top Five Students Award, Fall 2004  
MIT 6.001 Scheme Project Contest, Spring 2003

PROFESSIONAL ACTIVITIES Program Committee, Workshop on I/O Virtualization 2011 (WIOV 2011)

HOBBIES Hiking, Photography, Piano, and Collecting and Restoring Old Computers

LANGUAGES English, Spanish, and Farsi

REFERENCES Prof. David Mazières  
Stanford University CS Department  
353 Serra Mall, Room 290  
Stanford, CA 94305  
(415) 409-8767  
mashtirec@nospam.scs.stanford.edu

Prof. Dan Boneh  
Stanford University CS Department  
353 Serra Mall, Room 475  
Stanford, CA 94305  
(650) 725-3897  
dabo@cs.stanford.edu

Prof. Mendel Rosenblum  
Stanford University CS Department  
353 Serra Mall, Room 309  
Stanford, CA 94305  
(650) 723-0474  
mendel@cs.stanford.edu

Dr. Carl Waldspurger  
CloudPhysics, Inc.  
3979 Freedom Circle, Suite 540  
Santa Clara, CA 95054  
carl@waldspurger.org