

David E. Irwin

CONTACT INFORMATION	University of Massachusetts, Amherst Department of Computer Science 140 Governors Drive Amherst, MA 01003-9264	Voice: (205) 427-2357 Fax: (413) 458-0190 E-mail: irwin@cs.umass.edu URL: http://www.cs.umass.edu/~irwin
INTERESTS	Distributed Systems, Operating Systems, Grid Computing, Sensor Networks, Networks	
EDUCATION	Duke University. Ph.D. in Computer Science, December 2007 Advisor: Jeffrey S. Chase Committee: Landon P. Cox, Carla S. Ellis, and Parthasarathy Ranganathan Dissertation: <i>An Operating System Architecture for Networked Server Infrastructure</i> Duke University. Master of Science in Computer Science, December 2005 Advisor: Jeffrey S. Chase Vanderbilt University. Bachelor of Science, May 2001 (<i>magna cum laude</i>) Double Major: Mathematics and Computer Science	
RESEARCH SUMMARY AND BACKGROUND	I design and build experimental software systems. My graduate work focused on improving resource management for networked collections of physical and virtual hardware spread across networks. My current work investigates similar problems in the context of sensor networks. The research intersects problems from many areas including fault tolerant distributed systems, decentralized resource scheduling and arbitration, autonomic computing, grid computing, databases, and networking. My interests span these areas.	
ACADEMIC APPOINTMENTS	University of Massachusetts, Amherst, Research Fellow, September 2007-present Working in conjunction with the Center for Collaborative Adaptive Sensing of the Atmosphere (CASA) on issues that arise in managing networks of geographically distributed sensors. Duke University, Research Assistant, September 2002-August 2007 Worked with Jeff Chase in the Network/Internet Computing Lab (NICL). Much of this work centered on transferring technology from my thesis research for use in our department's production machine room. This task required integrating new research with the more practical realities of managing a large machine room. Duke University, Research Assistant, May 2002-August 2002 Worked with Jeff Vitter on I/O efficient algorithms for parallel disks. Received a scholarship to attend the EEF Summer School on Massive Data Sets at BRICS in Aarhus, Denmark. The school surveyed the state-of-the-art in the design and analysis of external memory algorithms and data structures.	
PROFESSIONAL APPOINTMENTS	Hewlett-Packard Research Lab, Research Intern, March 2004-September 2004 Worked with Parthasarathy Ranganathan on ensemble-level power management for dense servers aimed at controlling the balance between data center <i>power-usage</i> and <i>performance</i> . This work resulted in a publication at ISCA [3] as well as technology to be shipped in commercial blade servers. IBM T.J. Watson Research Center, Research Intern, May 2003-August 2003 Worked with Lisa Amini investigating techniques for leveraging emerging Grid technologies, such as the Globus toolkit, for adaptive load-shedding between Grid sites.	

CONFERENCE
PUBLICATIONS

Works in this category are refereed standard-length conference papers (10-16 pages) presented in conferences with acceptance ratios below 25%.

1. Lavayna Ramakrishnan, Laura Grit, Adriana Iamanitchi, David Irwin, Aydan Yumerefendi, and Jeff Chase. Toward a Doctrine of Containment: Grid Hosting with Adaptive Resource Control. In *Proceedings of the Nineteenth International Conference on Supercomputing (SC)*, Tampa, Florida, November 2006. Acceptance Ratio: $54/239 = 23\%$.
2. David Irwin, Jeff Chase, Laura Grit, Aydan Yumerefendi, David Becker, and Kenneth G. Yocum. Sharing Networked Resources with Brokered Leases. In *Proceedings of the USENIX Annual Technical Conference (USENIX)*, pages 199–212, Boston, Massachusetts, June 2006. Acceptance Ratio: $21/153 = 14\%$.
3. Parthasarathy Ranganathan, Phil Leech, David Irwin, and Jeffrey Chase. Ensemble-level Power Management for Dense Blade Servers. In *Proceedings of the Thirty-third Annual International Symposium on Computer Architecture (ISCA)*, pages 66–77, Boston, Massachusetts, June 2006. Acceptance Ratio: $31/234 = 13\%$.
4. David E. Irwin, Laura E. Grit, and Jeffrey S. Chase. Balancing Risk and Reward in a Market-based Task Service. In *Proceedings of the Thirteenth Annual Symposium on High Performance Distributed Computing (HPDC)*, pages 160–169, Honolulu, Hawaii, June 2004. Acceptance Ratio: $24/153 = 16\%$.
5. Jeffrey S. Chase, David E. Irwin, Laura E. Grit, Justin D. Moore, and Sara E. Sprenkle. Dynamic Virtual Clusters in a Grid Site Manager. In *Proceedings of the Twelfth Annual Symposium on High Performance Distributed Computing (HPDC)*, pages 90–100, Seattle, Washington, June 2003. Acceptance Ratio: $25/121 = 21\%$.

OTHER
PUBLICATIONS

Works in this category are other papers published in refereed workshops and conferences.

6. Aydan Yumerefendi, Piyush Shivam, David Irwin, Pradeep Gunda, Laura Grit, Azbayar Demberel, Jeff Chase, and Shivnath Babu. Towards an Autonomic Computing Testbed. In *Proceedings of the Second Workshop on Hot Topics in Autonomic Computing (HotAcII)*, Jacksonville, Florida, June 2007. Acceptance Ratio: $5/17 = 29\%$.
7. Laura Grit, David Irwin, Varun Marupadi, Piyush Shivam, Aydan Yumerefendi, Jeff Chase, and Jeannie Albrecht. Harnessing Virtual Machine Resource Control for Job Management. In *Proceedings of the First Workshop on System-level Virtualization for High Performance Computing (HPCVirt)*, Lisbon, Portugal, March 2007.
8. Laura Grit, David Irwin, Aydan Yumerefendi, and Jeff Chase. Virtual Machine Hosting for Networked Clusters: Building the Foundations for “Autonomic” Orchestration. In *Proceedings of the First International Workshop on Virtualization Technology in Distributed Computing (VTDC)*, Tampa, Florida, November 2006.
9. David Irwin, Jeff Chase, Laura Grit, and Aydan Yumerefendi. Self-Recharging Virtual Currency. In *Proceedings of the Third Workshop on Economics of Peer-to-Peer Systems (ECONP2P)*, pages 93–98, Philadelphia, Pennsylvania, August 2005. Acceptance Ratio: $11/38 = 29\%$.

SUBMITTED WORK
AND TECHNICAL
REPORTS

Works in this category are selected papers of standard conference length (10 pages or more) reporting on significant research activities not reflected in the papers listed above.

10. Piyush Shivam, Shivnath Babu, Songyun Duan, Pradeep Gunda, Azbayar Demberel, David Irwin, and Jeff Chase. Experiment-Driven Query Processing for System Management. In *Submission*, November 2007.
11. Aydan Yumerefendi, David Irwin, Varun Marupadi, Matt Sayler, Laura Grit, and Jeff Chase. Robust Leasing for Virtual Infrastructure. In *Submission*, October 2007.
12. Justin Moore, David Irwin, Laura Grit, Sara Sprenkle, and Jeff Chase. Managing Mixed-Use Clusters with Cluster-on-Demand. Technical report, Duke University CS-2002-07, November 2002.

- WORK-IN-PROGRESS POSTERS AND DEMONSTRATIONS *Works in this category are short refereed summaries presented as short presentations, posters, or public software demonstrations at conferences.*
13. Piyush Shivam, Azbayer Demberel, Pradeep Gunda, David Irwin, Laura Grit, Aydan Yumerefendi, Shivanath Babu, and Jeff Chase. Automated and On-Demand Provisioning of Virtual Machines for Database Applications. In *Demonstration Proceedings of the Twenty-sixth ACM SIGMOD Conference on Management of Data (SIGMOD)*, pages 1079–1081, Beijing, China, June 2007.
 14. Laura Grit, David Irwin, Aydan Yumerefendi, and Jeff Chase. Shirako: Virtual Machine Hosting for Networked Clusters. In *Poster Session Proceedings of the Seventh USENIX Symposium on Operating System Design and Implementation (OSDI)*, Seattle, Washington, November 2006.
- PANELS AND PRESENTATIONS
- “Adaptive Virtual Machine Hosting with Shirako” at UCSD, August 2006.
 - “Sharing Networked Resources with Brokered Leases” at USENIX, June 2006.
 - “Self-Recharging Virtual Currency” at ECONP2P, August 2005.
 - “Design and Implementation of Shirako” at UCSD, June 2005.
 - “Balancing Risk and Reward in a Market-based Task Scheduler” at HPDC, June 2004.
 - “Dynamic Virtual Clusters in a Grid Site Manager” at HPDC, June 2003.
- INSTITUTIONAL SERVICE
- Service for Duke University Department of Computer Science: Graduate Student Recruitment Committee (2002,2003).*
- PROFESSIONAL AFFILIATIONS
- I am a member of the Association for Computing Machinery (ACM), the ACM Special Interest Group on Operating Systems (SIGOPS), the USENIX Association, and the IEEE Computer Society.
- TEACHING EXPERIENCE
- Teaching Assistant, CPS130 Design and Analysis of Algorithms, Spring 2002**
 TA for Dr. Lars Arge. The class covered topics such as divide-and-conquer, recursion analysis, sorting, amortization, graph theory, and NP-completeness. I designed homework and test questions, graded assignments, and lectured at three hour-long classroom discussion sections per week. The class size was approximately 90 students.
- Teaching Assistant, CPS130 Design and Analysis of Algorithms, Fall 2002**
 TA for Dr. Donald Rose. The class covered typical algorithm’s topics with a special emphasis on discrete mathematics and numerical analysis. I wrote homework and test questions, graded assignments, and lectured at three hour-long discussion sections per week. The class size was approximately 30 students.
- REFERENCES
- Available upon request.