

Godmar Back
Department of Computer Science
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EDUCATION **PhD Computer Science**, University of Utah 1994 to 2002
Cumulative GPA 3.96

Dissertation Topic: "Isolation, Resource Management and Sharing in the KaffeOS Java Runtime System." (2003 ACM SIGPLAN Doctoral Dissertation Award)

Study of Computer Science, Technical University of Berlin 1992 to 1994

Study of Mathematics and Computer Science, Vordiplom, 1989 to 1992
Humboldt University of Berlin

RESEARCH **Associate Professor** 2010 to present
EXPERIENCE **Assistant Professor** 2004 to 2010
Virginia Polytechnic and State University, Department of Computer Science

Current research interests include: operating and runtime systems, virtualization, software engineering, software visualization, web technology, cloud-based systems, high-performance computing, domain-specific languages, and library technology.

Postdoctoral Scholar 2001 to 2004
Stanford University, Computer Systems Laboratory

*Research on static analysis tools for systems: developed MJ system for checking properties and implementing bug-finding analyses in Java code.
Design and implementation of DataScript, an input description language that supports code generation. Published in GPCE'02.*

Research Assistant 1995 to 2001
University of Utah, Computer Systems Laboratory

*Dissertation research on runtime systems that support multiple applications. Published in OSDI'00, Usenix'00, and HotOS'99.
Research on component-based operating systems (OSKit) and microkernel systems (Fluke). Published in OSDI'96 and SOSP'97. This research was supported in part by the Defense Advanced Research Projects Agency..*

TEACHING **Associate Professor** 2010 to present
EXPERIENCE **Assistant Professor** 2004 to 2010
Virginia Polytechnic and State University

*Fall 2016: taught undergraduate course CS3984, "Cloud Software Engineering."
Spring 2013, 2015, 2017: taught undergraduate course CS4284, "Systems and Networking Capstone."
Fall 2012, 2013, 2014, 2015, 2016: taught undergraduate ACM ICPC programming team class.
Spring 2011, 2014: taught graduate course CS6204, "Execution Environments for Cloud Applications." Developed course material for this class.
Spring 2010: taught undergraduate course CS1114, "Introduction to Software Design."*

Fall 2009, Spring 2010, Fall 2010, Fall 2011, Fall 2014, Spring 2016: taught undergraduate course CS3214, "Computer Systems." Developed project software and course material for this class.

Fall 2004, 2005, 2007, 2012, 2013, 2015: taught graduate course CS5204, "Operating Systems." Developed course material for this class.

Spring 2005, 2006, 2009, 2012: taught graduate course CS5565, "Network Architectures and Protocols." Developed project software and course materials for this class.

Spring 2006, Fall 2006, Spring 2007, Fall 2007, Fall 2008: taught undergraduate course CS3204, "Operating Systems." Developed course material and lecture notes for this class.

Spring 2007: taught graduate course CS6304, "Advanced Topics in Program Analysis." Developed course material for this class.

Frequent guest lectures in CS2204, CS4414, CS6604, CS5984, CS3214, ECE2574.

Instructor 2002 to 2003
Stanford University

Taught systems elective CS143, "Introduction to Compilers." Designed projects and course materials for class.

Guest lecturer in CS240, "Advanced Operating Systems."

Teaching Assistant 1994 to 1995
University of Utah, Department of Computer Science

Helped teach senior-level undergraduate/entry-level graduate courses: operating systems, networking, and compilers. Developed and graded assignments and course projects for students.

Guest lecturer in CS3510 "Advanced Algorithms and Data Structures."

INDUSTRIAL EXPERIENCE **Internship** Summer 1999
Compaq Western Research Laboratory, Palo Alto

Research on Java virtual machines running on low-power devices. Published in SIGMETRICS'00.

Internship Summer 1994
Konrad-Zuse-Institut in Berlin, Germany

Research on parallel programming models for branch-and-cut algorithms on the Cray T3D.

Consultant 1991 to 1994
Mummert+Partner Unternehmensberatung GmbH, Berlin, Germany

Developed client/server software with SAP R/3, Oracle, AIX. Administered Internet site.

STUDENTS GRADUATED **PhD**
Ruslan Nikolaev, 2013
Mehmet Belgin, 2010
Shahrooz Feizabadi, 2006

MS
Xiaozhong Pan, 2015
Sushrut Shirole, 2014
Sony Vijay, 2013
Brian McDaniel, 2012
Brian Nicholson, 2011

Tilottama Gaat, 2008
Nathan Baker, 2007
Abhijit Deodhar, 2007
Vijay Kumar Muthukumaraswamy Sivakumar, 2007
Prasad Gopal, 2006
Veena Basavaraj, 2006

REFEREED PUBLICATIONS

BOOK CHAPTERS

- [1] Annette Bailey and Godmar Back. Streamlining access to library resources with LibX. In Edward Iglesias, editor, *Robots in Academic Libraries: Advancements in Library Automation*, Advances in Library and Information Science (ALIS) Book Series, pages 62–90. IGI Global, April 2013.
- [2] Godmar Back and Annette Bailey. Tools and technologies: Visualizing research activity in the discovery layer in real-time. In Lauren Magnuson, editor, *Data Visualization: A Guide to Visual Storytelling for Librarians*, pages 45–65. Rowman & Littlefield, Lanham, MD, 2016.

JOURNALS

- [1] Godmar Back and Wilson C. Hsieh. The KaffeOS Java runtime system. *ACM Transactions on Programming Languages and Systems*, 27(4):583–630, July 2005.
- [2] Annette Bailey and Godmar Back. LibX - a firefox extension for enhanced library access. *Library Hi Tech*, 24(2):290–304, 2006.
- [3] Annette Bailey and Godmar Back. Retrieving known items with LibX. *The Serials Librarian*, 53(4):125–140, 2007.
- [4] Shahrooz Feizabadi and Godmar Back. Garbage collection-aware utility accrual scheduling. *Real-Time Systems*, 36(1-2):3–22, 2007.
- [5] Krishnaraj Varma, Hima B. Damecharla, Amy E. Bell, Joan E. Carletta, and Godmar Back. A fast JPEG2000 encoder that preserves coding efficiency: The split arithmetic encoder. *IEEE Transactions on Circuits and Systems I*, 55(11):3711–3722, December 2008.
- [6] Godmar Back and Annette Bailey. Web services and widgets for library information systems. *Information Technologies and Libraries*, 29(2):76–86, June 2010.
- [7] Mehmet Belgin, Godmar Back, and Calvin J. Ribbens. Operation stacking for ensemble computations with variable convergence. *International Journal of High Performance Computing Applications*, 24(2):194–212, 2010.
- [8] Mehmet Belgin, Godmar Back, and Calvin J. Ribbens. A library for pattern-based sparse matrix vector multiply. *International Journal of Parallel Programming*, 39(1):62–87, 2011.
- [9] Godmar Back and Annette Bailey. Hacking Summon 2.0 the elegant way. *code4lib Journal*, (26), October 2014.

CONFERENCE PAPERS

- [1] Bryan Ford, Mike Hibler, Jay Lepreau, Patrick Tullmann, Godmar Back, and Stephen Clawson. Microkernels meet recursive virtual machines. In *Proceedings of the Second Symposium on Operating Systems Design and Implementation (OSDI)*, pages 137–151, Seattle, WA, October 1996. USENIX Association.
- [2] Bryan Ford, Godmar Back, Greg Benson, Jay Lepreau, Albert Lin, and Olin Shivers. The Flux OSKit: A substrate for OS and language research. In *Proceedings of the 16th ACM Symposium on Operating Systems Principles (SOSP)*, pages 38–51, St. Malo, France, October 1997.
- [3] Godmar Back, Wilson C. Hsieh, and Jay Lepreau. Processes in KaffeOS: Isolation, resource management, and sharing in Java. In *Proceedings of the Fourth Symposium on Operating Systems Design and Implementation (OSDI)*, pages 333–346, San Diego, CA, October 2000. USENIX Association.
- [4] Godmar Back, Patrick Tullmann, Leigh Stoller, Wilson C. Hsieh, and Jay Lepreau. Techniques for the design of java operating systems. In *Proceedings of the USENIX 2000 Annual Technical Conference*, pages 197–210, San Diego, CA, June 2000. USENIX Association.

- [6] Wilson C. Hsieh, Dawson R. Engler, and Godmar Back. Reverse-engineering instruction encodings. In *Proceedings of the USENIX 2001 Annual Technical Conference*, pages 133–146, Boston, MA, June 2001. USENIX Association.
- [7] Godmar Back. Datascript - a specification and scripting language for binary data. In *Proceedings of the ACM Conference on Generative Programming and Component Engineering Proceedings (GPCE 2002)*, published as LNCS 2487, pages 66–77, Pittsburgh, PA, October 2002. ACM.
- [8] Shahrooz Feizabadi and Godmar Back. Automatic memory management in utility accrual scheduling environments. In *Proceedings of the 9th IEEE International Symposium on Object and component-oriented Real-time distributed Computing (ISORC 2006)*, pages 11–19, Gyeongju, South Korea, April 2006. IEEE.
- [9] Ted Kremenek, Paul Twohey, Godmar Back, Dawson Engler, and Andrew Ng. From uncertainty to belief: Inferring the specification within. In *accepted to Seventh Symposium on Operating Systems Design and Implementation (OSDI '06)*, pages 161–176, Seattle, WA, November 2006. USENIX Association.
- [10] Mehmet Belgin, Calvin J. Ribbens, and Godmar Back. An operation stacking framework for large ensemble computations. In *ICS '07: Proceedings of the 21st annual international conference on Supercomputing*, pages 83–92, Seattle, Washington, 2007. ACM Press.
- [11] Jaishankar Sundararaman and Godmar Back. HDPV: interactive, faithful, in-vivo runtime state visualization for C/C++ and Java. In *Proceedings of the 4th ACM Symposium on Software Visualization (SoftVis'08)*, pages 47–56, Ammersee, Germany, September 2008. ACM Press.
- [12] Eli Tilevich and Godmar Back. Program, enhance thyself! demand-driven pattern-oriented program enhancement. In *AOSD '08: Proceedings of the Seventh International Conference on Aspect-Oriented Software Development*, pages 13–25, Brussels, Belgium, April 2008. ACM Press.
- [13] Mehmet Belgin, Godmar Back, and Calvin J. Ribbens. Pattern-based sparse matrix representation for memory-efficient smvm kernels. In *ICS '09: Proceedings of the 23rd international conference on Supercomputing*, pages 100–109, New York, NY, USA, 2009. ACM.
- [14] Ben Pfaff, Anthony Romano, and Godmar Back. The Pintos instructional operating system kernel. In *Proceedings of the 40th ACM Technical Symposium on Computer Science Education (SIGCSE 2009)*, pages 453–457, Chattanooga, TN, March 2009.
- [15] Mehmet Belgin, Godmar Back, and Calvin J. Ribbens. Applicability of pattern-based sparse matrix representation for real applications. In *Proceedings of International Conference on Computational Science, ICCS 2010*, pages 203–211. Elsevier, Procedia Computer Science, 2010.
- [16] Evan K. Maxwell, Godmar Back, and Naren Ramakrishnan. Diagnosing memory leaks using graph mining on heap dumps. In *Proceedings of the 16th ACM SIGKDD international conference on Knowledge discovery and data mining, KDD '10*, pages 115–124, New York, NY, USA, 2010. ACM.
- [17] Ruslan Nikolaev and Godmar Back. Perfctr-Xen: a framework for performance counter virtualization. In *Proceedings of the 7th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments, VEE '11*, pages 15–26, New York, NY, USA, 2011. ACM.
- [18] Brian McDaniel and Godmar Back. The cloudbrowser web application framework. In *Proceedings of the 3rd annual conference on Systems, programming, and applications: software for humanity (Wavefront Track), SPLASH '12*, pages 141–156, New York, NY, USA, 2012. ACM.
- [19] Ruslan Nikolaev and Godmar Back. Virtuos: an operating system with kernel virtualization. In *Proceedings of the Twenty-Fourth ACM Symposium on Operating Systems Principles, SOSP '13*, pages 116–132, New York, NY, USA, 2013. ACM.
- [20] Hung-Ching Change, Bo Li, Godmar Back, Ali R. Butt, and Kirk W. Cameron. LUC: Limiting the unintended consequences of power scaling on parallel transaction-oriented workloads. In *Proceedings of the 29th IEEE Parallel and Distributed Processing Symposium, IPDPS '15*, pages 324–333. IEEE, May 2015.

WORKSHOPS

- [21] Xiaozhong Pan and Godmar Back. Rich cloud-based web applications with cloudbrowser 2.0. In *Proceedings of the 31st Annual ACM Symposium on Applied Computing, SAC '16*, pages 758–765. acm, April 2016. Best Paper Award.
- [1] Patrick Tullmann, Jeff Turner, John McCorquodale, Jay Lepreau, Ajay Chitturi, and Godmar Back. Formal methods: A practical tool for OS implementors. In *Proceedings of the Sixth Workshop on Hot Topics in Operating Systems (HOTOS)*, pages 20–25, Cape Cod, MA, May 1997. IEEE Computer Society.
- [2] Godmar Back and Wilson C. Hsieh. Drawing the red line in java. In *Proceedings of the Seventh Workshop on Hot Topics in Operating Systems (HOTOS)*, pages 116–121, Rio Rico, Arizona, March 1999. IEEE Computer Society.
- [3] Shahrooz Feizabadi and Godmar Back. Java garbage collection scheduling in utility accrual scheduling environments. In *The 3rd Workshop on Java Technologies for Real-time and Embedded Systems, OOPSLA 2005*. ACM, October 2005.
- [4] Craig Bergstrom, Srinidhi Varadarajan, and Godmar Back. The distributed open network emulator: Using relativistic time for distributed scalable simulation. In *Proceedings of the 20th Workshop on Principles of Advanced and Distributed Simulation*, pages 19–28, Singapore, May 2006. IEEE Computer Society.
- [5] Godmar Back and Dimitrios S. Nikolopoulos. Application-specific system customization on many-core platforms: The VT-ASOS framework. In *STMCS: Second Workshop on Software Tools for Multi-Core Systems (STMCS)*, San Jose, CA, March 2007.
- [6] Godmar Back and Annette Bailey. Increasing the visibility of web-based information retrieval systems via client-side mash-ups. In *Proceedings of the 8th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL'08)*, page 418, Pittsburgh, PA, June 2008. ACM Press. Demonstration.
- [7] Mehmet Belgin, Godmar Back, and Calvin J. Ribbens. Pattern-based code generation for smvm kernels. Poster at Supercomputing 2008 (SC'08), November 2008.
- [8] Ganesh C.N., Jaishankar Sundararaman, Ali R. Butt, and Godmar Back. Replaycache: Exploiting similarities for predicting the future. Poster at 6th USENIX Conference on File and Storage Technologies (FAST 2008), February 2008.
- [9] Dimitrios S. Nikolopoulos, Godmar Back, Jyotirmaya Tripathi, and Matthew Curtis-Maury. Vt-asos: Holistic system software customization for many cores. In *NSF NGS'08: Workshop on Next Generation Software*, Miami, FL, April 2008.
- [10] Amarjyoti Deka and Godmar Back. Fine-grained isolation in web browsers using script spaces. Poster at Usenix WebApps 2010 (WebApps'10), June 2010.
- [11] Michael Woods, Godmar Back, and Stephen Edwards. An infrastructure for teaching cs1 in the cloud. In *ASEE Southeast Section Annual Conference*, 2010.

AWARDS

Winner of 2007 ALA/LITA Brett Butler Entrepreneurship Award for LibX.

Winner of 2003 ACM SIGPLAN Doctoral Dissertation Award.

Travel scholarship awards from Usenix, ACM, and IEEE for various conferences: SOSP 1997, HotOS 1999, OSDI 1999, Usenix 2000, OSDI 2000.

Member of team that won 1995 Regional Annual ACM Programming Contest in the Mountain Region.

PROFESSIONAL ACTIVITIES

Program Committee Member, SPLASH/Wavefront 2013, Indianapolis, IN.

Program Committee Member, International Workshop on Programming Support Innovations for Emerging Distributed Applications (PSI EtA - ## 2010)

Program Committee Member, ICPP 2008, Portland, OR.

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