

**Education History**

University of Toronto, Toronto, Ontario, Canada	Computer Science	PhD., 2005
University of Toronto, Toronto, Ontario, Canada	Computer Science	MSc., 1998
McMaster University, Hamilton, Ontario, Canada	Computer Science	BSc., 1993

**Employment Record**

Visiting Researcher	Red Hat Research, Boston, MA	06/23 - current
Associate Professor	Department of Computer Science, Boston University, MA	05/16 - current
Visiting Researcher	Microsoft Research, Bangalore, India	09/17 - 06/18
Assistant Professor	Department of Computer Science, Boston University Boston, MA	09/09 - 05/16
Research Staff Member	Advanced Operating Systems Group, IBM Research, T.J. Watson Research Center, NY	05/03 - 06/09
Head Teaching Assistant	Micro-processor Software Course, University of Toronto	01/03 - 04/03
Head Teaching Assistant	Micro-processor Software Course, University of Toronto	01/02 - 04/02
Summer Intern	Advanced Operating Systems Group, IBM Research, T.J. Watson Research Center, NY	05/98 - 09/98
Systems Engineer	IBM Canada Ltd, Toronto, Ontario, Canada	07/93 - 07/95

**Honors, Awards and Fellowships**

National Science Foundation CAREER Award	06/13 - 02/18
Boston University Rafik B. Hariri Institute Junior Faculty Fellow	2011/2012
IBM Research Fellowship	09/01 - 09/02
Natural Sciences and Engineering Research Council of Canada Scholarship	09/99 - 09/01
Ontario Graduate Scholarship	09/98 - 09/99
University of Toronto Open Masters Fellowship	09/95 - 12/95
McMaster University Top Undergraduate Thesis Award	1993

**Courses Taught**

Seminar on Programmable Smart Machines	Undergraduate and Graduate
Distributed Systems	Undergraduate and Graduate
Introduction to Computer Systems	Undergraduate
Advanced Operating Systems	Undergraduate and Graduate
Seminar on Cloud Computing	Undergraduate and Graduate

**Grants**

RHCOLAB: Towards high performance and energy efficiency in open-source stream processing (2024-01-RH10)	Industry	\$174,876	coPI	01/01/24 - 12/31/24
RHCOLAB: Symbiotes: A New step in Linux's Evolution (2024-01-RH12)	Industry	\$99,927	PI	01/01/24 - 12/31/24
RHCOLAB: Discovering Opportunities for Optimizing OpenShift Energy Consumption (2024-01-RH04)	Industry	\$174,609	PI	01/01/24 - 12/31/24
RHOHLAB: Optimizing Kernel Paths for Performance and Energy (2024-01-RH09)	Industry	\$174,069	PI	01/01/24 - 12/31/24
RHCOLAB: Towards high performance and energy efficiency in open-source stream processing (2023-01-RH14)	Industry	\$149,986	coPI	01/01/23 - 12/31/23
RHCOLAB: Symbiotes: A New step in Linux's Evolution (2023-01-RH07)	Industry	\$73,194	PI	01/01/23 - 12/31/23
RHCOLAB: Foundations in Open Source Education (2023-01-RH08)	Industry	\$73,185	PI	01/01/23 - 12/31/23
RHCOLAB: Towards high performance and energy efficiency in open-source stream processing	Industry	\$149,952	coPI	01/01/22 - 12/31/22
RHCOLAB: Symbiotes: A New step in Linux's Evolution	Industry	\$73,194	PI	01/01/22 - 12/31/22
RHCOLAB: Linux Computational Caching	Industry	\$73,194	PI	01/01/22 - 12/31/22
RHCOLAB: Foundations in Open Source Education	Industry	\$73,185	PI	01/01/22 - 12/31/22
XPS: FULL: CCA: Collaborative Research: Automatically Scalable Computation	NSF	\$399,922.00	coPI	07/01/15 - 06/30/18
XPS: FULL: CCA: Collaborative Research: Automatically Scalable Computation	NSF	\$85,000.00	PI	09/01/14 - 08/31/15
TWC: TTP Option: Frontier: Collaborative: MACS: A Modular Approach to Cloud Security	NSF	\$1,609,797.00	Senior Staff	10/01/14 - 09/30/19
EAGER: Holistic Security for Cloud Computing	NSF	\$299,992.00	coPI	09/01/13 - 02/28/15
CAREER: Programmable Smart Machines	NSF	\$595,021.00	PI	06/01/13 - 05/31/18
Seed Award: Clinical Elastic High Performance Computing	MGHPCC	\$68,830	PI	01/01/12 - 06/31/13
Multi-Institution: A Fault Oblivious Extreme Scale Execution Environment	DOE 3	\$189,999	PI	09/01/10 - 08/31/13
TC: Large: Collaborative Research: Towards Trustworthy Interactions in the Cloud	NSF	\$1,499,986	coPI	09/01/10 - 08/31/15

## Publications

### *Peer-Reviewed Conference Articles*

Dong, Han and Arora, Sanjay and Krieger, Orran and Appavoo, Jonathan “Can OS Specialization give new life to old carbon in the cloud?”. Proceedings of the 17th ACM International Systems and Storage Conference (SYSTOR '24).

Raza, Ali and Unger, Thomas and Boyd, Matthew and Munson, Eric B and Sohal, Parul and Drepper, Ulrich and Jones, Richard and De Oliveira, Daniel Bristot and Woodman, Larry and Mancuso, Renato and Appavoo, Jonathan and Krieger, Orran. “Unikernel Linux (UKL)”. Proceedings of the Eighteenth European Conference on Computer Systems (EuroSys '23).

Cadden, James and Unger, Thomas and Awad, Yara and Dong, Han and Krieger, Orran and Appavoo, Jonathan. “SEUSS: Skip Redundant Paths to Make Serverless Fast”. Proceedings of the Fifteenth European Conference on Computer Systems (EuroSys'20).

Hajinazar, Nastaran and Patel, Pratyush and Patel, Minesh and Kanellopoulos, Konstantinos and Ghose, Saugata and Ausavarungnirun, Rachata and Oliveira, Geraldo F. and Appavoo, Jonathan and Seshadri, Vivek and Mutlu, Onu. “The Virtual Block Interface: A Flexible Alternative to the Conventional Virtual Memory Framework”. Proceedings of the 2020 ACM/IEEE 47th Annual International Symposium on Computer Architecture (ISCA).

Moirra McGregor and Nicola J. Bidwell and Vidya Sarangapani and Jonathan Appavoo and Jacki O'Neill. "Talking about Chat at Work in the Global South: An Ethnographic Study of Chat Use in India and Kenya". Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, CHI 2019, Glasgow, Scotland, UK, May 04-09, 2019.

Ali Raza and Parul Sohal and James Cadden and Jonathan Appavoo and Ulrich Drepper and Richard Jones and Orran Krieger and Renato Mancuso and Larry Woodman. 2019 "Unikernels: The Next Stage of Linux's Dominance", Proceedings of the Workshop on Hot Topics in Operating Systems, HotOS 2019, Bertinoro, Italy, May 13-15, 2019

Andrew Baumann and Jonathan Appavoo and Orran Krieger and Timothy Roscoe. 2019 "A fork() in the road". Proceedings of the Workshop on Hot Topics in Operating Systems, HotOS 2019, Bertinoro, Italy, May 13-15, 2019.

Tusher Chakraborty, Akshay Uttama Nambi, Ranveer Chandra, Rahul Sharma, Manohar Swaminathan, Zerina Kapetanovic, Jonathan Appavoo. 2018 "Fall-curve: A novel primitive for IoT Fault Detection and Isolation". Proceedings of the 16th ACM Conference on Embedded Networked Sensor Systems, SenSys 2018, Shenzhen, China, November 4-7, 2018 SenSys 2018: 95-107

Dan Schatzberg, James Cadden, Han Dong, Orran Krieger, and Jonathan Appavoo. 2016 “EbbRT: A Framework for Building Per-Application Library Operating Systems”. In the proceedings of the 12th USENIX Symposium on Operating Systems Design and Implementation (OSDI ’16). Nov 2-4, 2016 Savannah, GA.

Schuyler Eldridge., Thomas Unger, Marcia Sahaya Louis, Amos Waterland, Margo Seltzer, Jonathan Appavoo, and Ajay Joshi, “Neural Networks as Function Primitives: Software/Hardware Support with X-FILES/DANA”, Boston Area Architecture Workshop (BARC) 2016.

Schuyler Eldridge, Amos Waterland, Margo Seltzer, Jonathan Appavoo and Ajay Joshi. 2015. “Towards General Purpose Neural Network Computing”. In Proceedings of the 24th International Conference on Parallel Architectures and Compilation Techniques (PACT’15). October 18-21, San Francisco, CA.

Jonathan Appavoo, Amos Waterland, Schuyler Eldridge, Katherine Zhao, Ajay Joshi, Steven Homer, and Margo Seltzer. 2014. “Programmable Smart Machines: A Hybrid Neuromorphic approach to General Purpose Computation”. Neuromorphic Architectures (NeuroArch) Workshop. Minneapolis, Minnesota during June 17, 2014 (co-located with ISCA-2014).

Dan Schatzberg, James Cadden, Orran Krieger, and Jonathan Appavoo. 2014. “A way forward: enabling operating system innovation in the cloud”. In Proceedings of the 6th USENIX conference on Hot Topics in Cloud Computing (HotCloud’14). USENIX Association, Berkeley, CA, USA, 4-4.

Amos Waterland, Elaine Angelino, Ryan P. Adams, Jonathan Appavoo, and Margo Seltzer, "ASC: Automatically Scalable Computation", in proceedings of the nineteenth international International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS’14). ACM, March 1-5, Salt Lake City, UT. \* Honorable Mention in IEEE Micro Top Picks 2015 \*

Amos Waterland, Elaine Angelino, Ekin D. Cubuk, Efthimios Kaxiras, Ryan P. Adams, Jonathan Appavoo, and Margo Seltzer, "Computational caches". in proceedings of the sixed International Systems and Storage Conference (SYSTOR ’13). ACM, New York, NY.

Vatche Ishakian, Raymond Sweha, Azer Bestavros, and Jonathan Appavoo, “CloudPack: Exploiting Workload Flexibility Through Rational Pricing”, in proceedings of the ACM/IFIP/USENIX 13th International Middleware Conference, December 3-7, 2012, Montreal, Quebec, Canada \* Best Paper Award \*

Jonathan Appavoo, Dan Schatzberg, James Cadden, and Orran Krieger, “EbbRT”, in online proceeding of the OS/R Workshop, DOE, Oct 4-5, 2012, Washington, DC.

Amos Waterland, Jonathan Appavoo, and Margo Seltzer, “Parallelization by Simulated Tunneling”, in proceedings of the 4th Workshop on Hot Topics in Parallelism (HotPar ’12), USENIX, June 7-8, 2012, Berkeley, CA.

Dan Schatzberg, Jonathan Appavoo, Orran Krieger, and Eric Van Hensbergen, “Scalable Elastic Systems Architecture”, in proceedings of the ASPLOS RESoLVE 2011 Workshop, ACM, March 5, 2011, Newport Beach, California.

Jan Stoess, Jonathan Appavoo, Udo Steinberg, Amos Waterland, Volkmar Uhlig, and Jens Kehne, “A light-weight virtual machine monitor for Blue Gene/P”, in proceedings of the 1st International Workshop on Runtime and Operating Systems for Supercomputers (ROSS’11), ACM, May 31, 2011, Tucson, Arizona.

Jonathan Appavoo, Volkmar Uhlig, Jan Stoess, Amos Waterland, Bryan Rosenburg, Robert Wisniewski Dilma Da Silva, Eric Van Hensbergen, and Udo Steinberg, “Providing a Cloud Network Infrastructure on a Supercomputer”, in proceedings of Science Cloud 2010: 1st Workshop on Scientific Cloud Computing, ACM, June 21, 2010, Chicago, Illinois.

Jonathan Appavoo, Volkmar Uhlig and Dilma Da Silva, “Scalability: The software problem”, in proceedings of the 2nd Workshop on Software Tools for Multi-core Systems, March 2007, San Jose, CA, USA.

Glenn Ammons, Jonathan Appavoo, Maria Butrico, Dilma Da Silva, David Grove, Kiyokuni Kawachiya, Orran Krieger, Bryan Rosenburg, Eric Van Hensbergen, and Robert W. Wisniewski, “Libra: a library operating system for a JVM in a virtualized execution environment”. In proceedings of the ACM 3rd International conference of Virtual Execution Environments, pp 44 - 54, June 13 - 15, 2007, San Diego, California.

Andrew Bauman, Jonathan Appavoo, Robert W. Wisniewski, Dilma Da Silva, Orran Krieger and Gernot Heiser, “Reboots Are for Hardware: Challenges and Solutions to Updating an Operating System on the Fly”, in proceedings of the 2007 USENIX Annual Technical Conference, June 17 - 22, 2007, Sanata Clara, CA, USA.

Orran Krieger, Marc Auslander, Bryan Rosenburg, Robert W. Wisniewski, Jimi Xenidis, Dilma Da Silva, Michal Ostrowski, Jonathan Appavoo, Maria Butrico, Mark F. Mergen, Amos Waterland and Volkmar Uhlig, “K42: building a complete operating system”, in proceedings of the 2006 EuroSys Conference, Apr 18-21, 2006, Leuven, Belgium.

Chris Matthews, Yvonne Coady and Jonathan Appavoo, “Portability events: a programming model for scalable systems infrastructure”, in proceedings of the 3rd Workshop on Programming Languages and Operating Systems: Linguistic Support for Modern Operating Systems (PLOS 2006), Oct 22 2006, San Jose, CA, USA.

Chris Matthews, Owen Stampflee, Yvonne Coady, Jonathan Appavoo, Marc E. Fiuczynski, Robert

Grimm, “HEY...You got your Paradigm in my Operating System!”, 2nd ECOOP Workshop on Programming Languages and Operating Systems (Ecoop-PLOS’05), July 26, 2005, Glasgow, UK.

Andrew Baumann, Jonathan Appavoo, Dilma Da Silva, Jeremy Kerr, Orran Krieger, and Robert W. Wisniewski, “Providing Dynamic Update in an Operating System”, Usenix 2005, pp 279-291, April 2005, Anaheim CA, USA.

Andrew Bauman, Jerney Kerr, Jonathan Appavoo, Dilma Da Silva, Orran Kreiger, and Robert W. Wisniewski, “Module Hot-Swapping for Dynamic Update and Reconfiguration in K42”, in proceedings of the IBM 6th Australia Linux Technology Center Conference, 2005.

Andrew Baumann, Jonathan Appavoo, Dilma Da Silva, Orran Krieger, and Robert W. Wisniewski, “Improving Operating System Availability With Dynamic Update”, OASIS (Workshop on Operating System and Architectural Support for the on demand IT InfraStructure) pp 21-27, October 9, 2004, Boston Massachusetts.

Craig Soules, Jonathan Appavoo, Kevin Hui, Dilma Da Silva, Gregory R. Ganger, Orran Krieger, Michael Stumm, Robert W. Wisniewski, Marc Auslander, Michal Ostrowski, Bryan Rosenburg, and Jimi Xenidis, “System Support for Online Reconfiguration”, in proceedings of the Usenix 2003 Annual Conference, June 9-14, 2003, San Antonio, Texas, USA.

Jonathan Appavoo, Marc Auslander, Dilma Da Silva, David Edelsohn, Orran Krieger, Michal Ostrowski, Bryan Rosenburg, Robert W. Wisniewski, and Jimi Xenidis, “Providing a Linux API on the scalable K42 kernel”, in proceedings of the FREENIX track of the Usenix 2003 Annual Conference, June 9-14, 2003, San Antonio, Texas, USA.

Jonathan Appavoo, Kevin Hui, Michael Stumm, Robert W. Wisniewski, Dilma Da Silva, Orran Krieger, and Craig Soules, “An Infrastructure for Multiprocessor Run-Time Adaptation”, in proceedings of the first workshop on Self-healing systems, Nov 18-19, 2002, Charleston, SC, USA.

Paul E. McKenney, Jonathan Appavoo, Andi Kleen, Orran Krieger, Rusty Russell, Dipankar Sarma, and Maneesh Soni, “Read Copy Update”, in proceedings of the 2001 Ottawa Linux Symposium, July 25-28, 2001, Ottawa, Canada.

Kevin Hui, Jonathan Appavoo, Robert W. Wisniewski, Marc Auslander, David Edelsohn, Ben Gamsa, Orran Krieger, Bryan Rosenburg, and Michael Stumm, “Position Summary: Supporting Hot-Swappable Components for System Software”, in proceedings of the 8th Workshop on Hot Topics in Operating Systems, May 20-23, 2001, Elmau/Oberbayern, Germany.

Ben Gamsa, Orran Krieger, Jonathan Appavoo, and Michael Stumm, “Tornado: Maximizing Locality and Concurrency in a Shared Memory Multiprocessor Operating System”, in proceedings of 3rd Sym-

posium on Operating Systems Design and Implementation, Feb. 22-25, 1999, New Orleans, LA, USA.

*Edited Book Chapters*

Lamia Youseff, Dilma M. Da Silva, Maria Butrico, and Jonathan Appavoo, "Cloud Computing and Software Services: Theory and Techniques: Chapter 1: Understanding the Cloud Computing Landscape", Editor(s): Syed A. Ahson, Microsoft Corporation, Bellevue, Washington, USA; Mohammad Ilyas, ISBN: 9781439803158, ISBN 10: 1439803153, Publication Date: July 19, 2010, Number of Pages: 458.

*Peer-Reviewed Journal Articles*

Jan Stoess, Udo Steinberg, Volkmar Uhlig, Jens Kehne, Jonathan Appavoo, and Amos Waterland, "A Light-Weight Virtual Machine Monitor for Blue Gene/P", International Journal of High Performance Computing Applications, SAGE Publications, March 27th, 2012, pages 95-105.

Jonathan Appavoo, Volkmar Uhlig, Amos Waterland, Bryan Rosenburg, Dilma Da Silva, and Jose Moreira, "Kittyhawk: Enabling Cooperation and Competition in a Global Shared Computational System", IBM Journal of Research and Development, Volume 53, Number 4, 2009.

Jonathan Appavoo, Dilma Da Silva, Orran Krieger, Marc Auslander, Michal Ostrowski, Bryan Rosenburg, Amos Waterland, Robert W. Wisniewski, Jimi Xenidis, Michael Stumm and Livio Soares, "Experience Distributing Objects in an SMMP OS", ACM Transactions on Computer Systems, Vol 25, Number 3, August 2007.

Jonathan Appavoo, Marc Auslander, Maria Burtico, Dilma Da Silva, Orran Krieger, Mark Mergen, Michal Ostrowski, Bryan Rosenburg, Robert W. Wisniewski, Jimi Xenidis, "Experience with K42, an Open-Source Linux-Compatible Scalable operating-system Kernel", IBM Systems Journal pp 427-440 Vol. 44, No 2, 2005.

Jonathan Appavoo, Kevin Hui, Craig A. Soules, Robert W. Wisniewski, Dilma Da Silva, Orran Krieger, Marc Auslander, David Edelsohn, Ben Gamsa, Gregory R. Ganger, Paul E. McKenney, Michal Ostrowski, Bryan Rosenburg, Michael Stumm, and Jimi Xenidis, "Enabling Autonomic Systems Software with Hot-Swapping", IBM Systems Journal Volume 42, Number 1, 2003.

*Non-peer Reviewed Articles*

Han Dong and Sanjay Arora and Yara Awad and Tommy Unger and Orran Krieger and Jonathan Appavoo. 2021 "Slowing Down for Performance and Energy: An OS-Centric Study in Network Driven Workloads". Available at <https://doi.org/10.48550/arXiv.2112.07010>

James Cadden and Thomas Unger and Yara Awad and Han Dong and Orran Krieger and Jonathan Appavoo. 2019 "SEUSS: Rapid serverless deployment using environment snapshots". Available at <http://arxiv.org/abs/1910.01558>



Dan Schatzberg, James Cadden, Han Dong, Orran Kriger, Jonathan Appavoo, “EbbRT: A Framework for Building Per-Application Library Operating Systems”, BUCS Technical Reports;BUCS-TR-2016-002, February 23, 2016. <http://www.cs.bu.edu/techreports/pdf/2016-002-ebbrt.pdf>

Dan Schatzberg, James Cadden, Han Dong, Orran Krieger, Jonathan Appavoo, “EbbRT: A Customizable Operating System for Cloud Applications” BUCS Technical Reports;BUCS-TR-2015-007, Creation Date June 28th 2015 submitted as a TR on July 21st 2015. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/BUCS-TR-2015-007.pdf>

Dan Schatzberg, James Cadden, Han Dong, Orran Krieger, Jonathan Appavoo, “EbbRT: Elastic Building Block Runtime - Case Studies” BUCS Technical Reports;BUCS-TR-2015-006, Creation Date October 20th, 2014 submitted as a TR on July 21st 2015. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/BUCS-TR-2015-006.pdf>

Dan Schatzberg, James Cadden, Orran Krieger, Jonathan Appavoo, “EbbRT: Elastic Building Block Runtime - Overview” BUCS Technical Reports;BUCS-TR-2015-005, Creation Date July 7th, 2014 submitted as a TR on July 21st 2015. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/BUCS-TR-2015-005.pdf>

Dan Schatzberg, James Cadden, Orran Krieger, Jonathan Appavoo “MultiLibOS: An OS architecture for cloud computing”, BUCS Technical Reports;BUCS-TR-2012-018, Dec 2012. Available at <http://www.cs.bu.edu/techreports/pdf/2012-018-multilib-os-architecture.pdf>

Dan Schatzberg, James Cadden, Orran Krieger, Jonathan Appavoo “Total Order Broadcast for Fault Tolerant Exascale Systems”, BUCS Technical Reports;BUCS-TR-2013-006, Dec 2012. Available at <http://www.cs.bu.edu/techreports/pdf/2013-006-total-order-broadcast.pdf>

Dan Schatzberg, Jonathan Appavoo, Orran Krieger and Eric Van Hensbergen, “Why Elasticity Matters”, Boston University Technical Report BUCS-TR-2012-006, creation date: Jan 16, 2011, submitted as TR on Feb 14, 2012. Available at <http://www.cs.bu.edu/techreports/pdf/2012-006-elasticity-matters.pdf>

Jonathan Appavoo and Dan Schatzberg, “Scalable Elastic Systems Architecture”, Boston University Technical Report BUCS-TR-2012-008, creation date: July 25, 2011, submitted as TR on Feb 14, 2012. Available at <http://www.cs.bu.edu/techreports/pdf/2012-008-sesa-architecture.pdf>.

Jonathan Appavoo, Amos Waterland, and Dan Schatzberg, “Programmable Smart Machines”, Boston University Technical Report BUCS-TR-2012-007, creation date: Jan 16, 2011, submitted as TR on Feb 14, 2012. Available at <http://www.cs.bu.edu/techreports/pdf/2012-007-programmable-smart-machines.pdf>

Jonathan Appavoo and Dan Schatzberg, “Transistor Scaled HPC Performance”, Boston University Technical Report BUCS-TR-2012-009, creation date: Dec 2, 2010, submitted as TR on Feb 14, 2012. Available at <http://www.cs.bu.edu/techreports/pdf/2012-009-transistor-hpc.pdf>.

Jonathan Appavoo, Volkmar Uhlig, and Amos Waterland, “Project Kittyhawk: Building a Global-Scale Computer”, ACM SIGOPS Operating Systems Review, Vol 42, Issue 1, pages 77-84, January 2008. Available at <http://dl.acm.org/citation.cfm?id=1341326>

Jonathan Appavoo, Marc Auslander, Dilma Da Silva, Orran Krieger, Michal Ostrowski, Bryan Rosenberg, Robert W Wisniewski, Jimi Xenidis, Michael Stumm, Ben Gamsa, Reza Azimi, Raymond Fingas, Adrian Tam, David Tam, “Enabling scalable performance for general purpose workloads on shared memory multiprocessors”, IBM Research Report RC22863, IBM Research, 2003. Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.71.8701&rep=rep1&type=pdf>

Jonathan Appavoo, Marc Auslander, Dilma DaSilva, David Edelsohn, Orran Krieger, Michal Ostrowski, Bryan Rosenberg, Robert W Wisniewski, Jimi Xenidis, “K42 Overview”, IBM White Paper, IBM Research, 2002. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/k42-overview.pdf>

Jonathan Appavoo, Marc Auslander, Dilma DaSilva, David Edelsohn, Orran Krieger, Michal Ostrowski, Bryan Rosenberg, Robert W Wisniewski, Jimi Xenidis “Scheduling in K42”, IBM White Paper, IBM Research, 2002. Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.8.5274&rep=rep1&type=pdf>

Jonathan Appavoo, Marc Auslander, Dilma DaSilva, David Edelsohn, Orran Krieger, Michal Ostrowski, Bryan Rosenberg, Robert W Wisniewski, Jimi Xenidis “Memory management in k42”, IBM White Paper, IBM Research, 2002. Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.9.335&rep=rep1&type=pdf>

### *Patents*

Tusher Chakraborty, Akshay Uttama Nambi Srirangam Narashiman, Ranveer Chandra, Rahul Anand Sharma, Manohar Swaminathan, Jonathan Appavoo, “Sensor Fall Curve Identification”, 16189736, Published date: Thursday, May 14, 2020.

Jonathan Appavoo, Andrew Arnott Baumann, Dilma Menezes da Silva, Orran Yaakov Krieger, Robert William Wisniewski, “Dynamic Update Mechanisms in Operating Systems”, US7818736 B2; Issue date: Oct 19, 2010. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/US7818736.pdf>.

Jonathan Appavoo, Marc Alan Auslander, Kevin Kin-Fai Hui, Orran Yaakov Krieger, Dilma Menezes Da Silva, Robert William Wisniewski, “Achieving autonomic behavior in an operating system via a hot-swapping mechanism”, US7533377, Issue date: May 12, 2009. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/US20050071811.pdf>.

Paul E. McKenny, Orran Y. Krieger, Jonathan Appavoo, Dipankar Sarma, “Read-copy update method”, US7472228; Issue date: Dec 30, 2008. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/US7472228.pdf>.

Paul E. McKenney, Orran Y. Krieger, Jonathan Appavoo, Dipankar Sarma, “Read-Copy Update System and Method”, US 2008/0313238 A1; Filing date: Aug 15, 2008. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/US20080313238.pdf>.

### *Demonstrations*

Prototyped and demonstrated, in conjunction with IBM, a test-bed for exploring the impact of failures for exascale computing as part of the DOE funded Fault Oblivious Extreme Scale Execution Environment Project. Presented at Exascale Research PI meeting, Annapolis, MD, Oct 11 - 13, 2011.

<https://sites.google.com/site/foxxstack/project-updates/kittyhawkfailuretestbeddeployed>

Prototyped and demonstrated, in conjunction with VMWare, Elastic Building Blocks – a system software primitive for constructing elastic software that can automatically span and cooperate across multiple virtual machines. Presented at VMWare Cambridge, MA, August 23, 2011.

Prototyped and demonstrated FOXDev – a new development environment for supercomputer applications constructed from general purpose one source software. Presented to DOE Fault Oblivious Project Team, Boston, MA, April 13, 2011.

Enabled and demonstrated Kittyhawk at Argonne Leadership Computing Facility – Elastic system model for IBM Blue Gene/P supercomputers. <http://kittyhawk.bu.edu/kittyhawk/Demos.html> Presented at Science Cloud 2010, Chicago IL June 21, 2010 and 2nd FastOS Workshop, Boston MA, June 22, 2010.

Demonstrated, “Flexible Transparent Managed Scalability - Turning Blades in to Accelerators” – A Library OS multi-node multi-architecture model for applications. Presented at IBM Research 2006 Commercial Systems Vice-President Review, Yorktown, NY, Sept 12, 2006.

Demonstrated K42 Scalability – Presentation of the K42 Operating system and Scalability result from my doctoral work. Presented at IBM “Afternoon with Computer Science, Electrical Engineering and Math”, Yorktown, NY, June 30, 2005

Prototyped and demonstrated KORE – K42 Object Runtime Executive for visualizing run-time object structure and dynamic object and class based adaptation. Presented at the DARPA IBM PERCS Review, Austin, TX, Feb 08-11, 2005.

### *Theses*

Jonathan Appavoo, (Nov., 2005) “Clustered Objects”, University of Toronto. Advisor Michael Stumm. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/thesis.pdf>.

Jonathan Appavoo, (Oct., 1998) “Clustered Objects: Initial Design, Implementation and Evaluation”, University of Toronto. Advisor Michael Stumm. Available at <http://www.cs.bu.edu/~jappavoo/Resources/Papers/mscthesis.pdf>.

## Program Committees and Reviews

Cloud@MICRO Virtual Workshop 2021	Program Committee
International Conference of Virtual Execution Environments – VEE 2019	Program Committee
ACM Journal: Transactions on Computer Systems (TOCS) 2018	Article Reviewer
ACM Journal: Transactions on Computer Systems (TOCS) 2017	Article Reviewer
International Conference of Virtual Execution Environments – VEE 2016	Program Committee
IEEE Cloud Engineering 2015 - IC2E 2015	Program Committee
International Conference of Virtual Execution Environments - VEE 2015	Program Committee
IEEE Cloud Engineering 2014 - IC2E 2014	
Real-Time and Embedded Technology and Applications Symposium - RTAS 2014	Program Committee
International Conference of Virtual Execution Environments - VEE 2013	Program Committee
IEEE Internet Computing Special Issue on Virtualization, 2012.	Reviewer
The 2nd Workshop on Systems for Future Multi-core Architectures - SFMA 2012	Program Committee
The 5th Annual Haifa Experimental Systems Conference - Systor 2012	Program Committee
The 3rd Annual International Systems and Storage Conference - Systor 2010	Program Committee

## Conference/Workshop Talks and Posters

Poster “Stellux: Exploring Fine-Grain Privilege Access in a Clean-Slate Kernel”, Albert Selpak, Thomas Unger and Jonathan Appavoo	SOSP 2024, Nov 4-6, 2024.
Poster “EbbRT: A Framework for Building Per-Application Library Operating Systems”, Dan Schatzberg, James Cadden, Han Dong, Orran Krieger, and Jonathan Appavoo	OSDI 2016, Nov 2-4, 2016.
Poster X-FILES/DANA: RISC-V Hardware/Software for Neural Networks, S. Eldridge, Dong, H., Unger, T., Sahaya Louis, M., Delshad Tehrani, L., Appavoo, J., and Josh A.	Fourth RISC-V Workshop 2016.
Poster “Learning-on-chip using Fixed Point Arithmetic for Neural Network Accelerators”, S. Eldridge, Sahaya Louis, M., Unger, T., Appavoo, J., and Joshi, A.	Design Automation Conference (DAC) 2016

- Poster “Neural Networks as Function Primitives: Software/Hardware Support with X-FILES/DANA”, S. Eldridge., T. Unger, M. Sahaya Louis, A. Waterland, M. Seltzer, J. Appavoo, and A. Joshi  
Boston Area Architecture Workshop (BARC) 2016
- Talk “Programmable Smart Machines: A Hybrid Neuro- morphic approach to General Purpose Computation”, Jonathan Appavoo  
NeuroArch 2014, June 17, 2014.
- Poster "EbbRT: Building a Distributed Library OS for Datacenter Scale Systems"  
SOSP 2013, Nov 3, 2013.
- Talk “In Pursuit of a New Kind of Computer”, Jonathan Appavoo  
First NICTA Software Systems Summer School, Feb 5-6, 2013.
- Poster “System-Level Integration and Exploitation”, Katherine Zhao, Jonathan Appavoo, Amos Waterland, Elaine Angelino, and Margo Seltzer  
OSDI 2012, Oct 8, 2012.
- Talk “EbbRT”  
Department of Energy Workshop on Exascale Operating Systems and Runtime Software, Oct 4-5, 2012.
- Talk “High Performance Fetal Neuro-imaging”,  
MGHPCC Seed Fund Workshop, Sept 14, 2012.
- Poster “MultiLibOS: An OS architecture for Cloud Computing”, Dan Schatzberg, James Cadden, Orran Krieger, and Jonathan Appavoo  
USENIX 2012 Annual Technical Conference, June 13-15, 2012, Boston, MA.
- Poster “First Class Event-Driven Software Primitives”, Dan Schatzberg, James Cadden, Orran Krieger, and Jonathan Appavoo  
USENIX 2012 Annual Technical Conference, June 13-15, 2012, Boston, MA.
- Poster “FOX: A Fault-Oblivious Extreme Scale Execution Environment”, Ron Minnich, Curtiss Janssen, Sriram Krishnamoorthy, Andres Marquez, Wenjing Ma, Maya Gokhale, P. Sadayappan, Eric Van Hensbergen, Jonathan Appavoo, Jim Mckie  
SuperComputing 2011, Nov 15, 2011
- Talk “Scalable Elastic Systems Architecture (SESA)”, Dan Schatzberg, Jonathan Appavoo, Boston University, Orran Krieger VMWare, Eric Van Hensbergen, IBM Research Austin  
ASPLOS RESoLVE Workshop, March 5, 2011
- Poster “The CONSCIOUS Virtual Machine Model: Transparently Exploiting Probability Processors”, Jonathan Appavoo, Dan Schatzberg, and Mark Reynolds, Boston University, Amos Waterland, Harvard University  
OSDI 2010, Oct 4, 2010
- Talk “Kittyhawk”, Jonathan Appavoo and Dan Schatzberg  
2nd FastOS Workshop June 22, 2010

- Talk    “Providing a Cloud Network Infrastructure on a Supercom-    1st Workshop on Scientific  
puter”, Jonathan Appavoo, Volkmar Uhlig, Jan Stoess, Amos    Cloud Computing, June 21,  
Waterland, Bryan Rosenburg, Robert Wisniewski Dilma Da    2010  
Silva, Eric Van Hensbergen, and Udo Steinberg

## Invited Talks and Panel Participation

Panel Discussion at The New England Systems Day (NESysDay), “When Systems Meet AI” <a href="https://khoury-srg.github.io/ned25/">https://khoury-srg.github.io/ned25/</a>	February 3, 2025, Boston, MA
Red Hat Research Tech Talk, “What is an Operating System (OS)? And does it matter anymore?” <a href="https://research.redhat.com/events/red-hat-research-tech-talk-jonathan-appavoo/">https://research.redhat.com/events/red-hat-research-tech-talk-jonathan-appavoo/</a> ,	Mar 12, 2024, Boston, MA
Interview, “No more gatekeepers: Why technological ignorance is radically dangerous and how an open world will help” <a href="https://research.redhat.com/blog/issue/november-2023/">https://research.redhat.com/blog/issue/november-2023/</a>	Red Hat Research Quarterly, Vol 5:3, Nov 2023
Lecture at BU’s Artemis Project, a 5-week program for middle school girls to promote the creative thinking and problem-solving skills that are at the core of computer science and engineering	July 14, 2023, Boston, MA
Joint Talk at 2023 MOC Alliance Workshop with Valsia Kalavri (BU), “Towards high performance and energy efficiency in open-source stream processing” <a href="https://www.youtube.com/watch?v=oYClqR_wkpc&amp;list=PLKNUArbT35cBlXM2qsSFhST7KMIgk1EZ8&amp;index=5">https://www.youtube.com/watch?v=oYClqR_wkpc&amp;list=PLKNUArbT35cBlXM2qsSFhST7KMIgk1EZ8&amp;index=5</a>	Mar 23, 2023, Boston, MA
Joint Talk at 2023 MOC Alliance Workshop with Danni Shi (Red Hat), “Open Education Project” <a href="https://www.youtube.com/watch?v=NRP5w2I09SE&amp;list=PLKNUArbT35cD1vmyZEI9G9p4D8Vqlm8K&amp;index=8">https://www.youtube.com/watch?v=NRP5w2I09SE&amp;list=PLKNUArbT35cD1vmyZEI9G9p4D8Vqlm8K&amp;index=8</a>	Mar 23, 2023, Boston, MA
Invited Youtube presentation “Boston University elevates learning with Red Hat OpenShift” <a href="https://www.youtube.com/watch?v=VE9Dxu-PYeA">https://www.youtube.com/watch?v=VE9Dxu-PYeA</a>	Jan 10, 2023 Online
Talk to Council of Australian University Directors of Information Technology, “Open Source Education”	Jun 2, 2022 Zoom
Talk at Red Hat Research Days event, “Steps Toward Open Source Education”	Oct 28, 2021 Boston, MA
THERE IS A GAP IN MY RECORDS	HERE
Lecture at BU’s Artemis Project, a 5-week program for middle school girls to promote the creative thinking and problem-solving skills that are at the core of computer science and engineering	July 13, 2016, Boston, MA
Talk and Demonstration “SESA and the MOC”, MOC Annual Workshop Hosted by the Hariri Institute for Computing	Nov 19, 2015, Boston MA
Lecture at BU’s Artemis Project, a 5-week program for middle school girls to promote the creative thinking and problem-solving skills that are at the core of computer science and e	July 23, 2015, Boston, MA
Lecture at BU’s Artemis Project, a 5-week program for middle school girls to promote the creative thinking and problem-solving skills that are at the core of computer science and engineering	July 17, 2014, Boston, MA
“In Pursuit of a New Kind of Computer: Giving Computers Intuition”	July 22, 2013, Boston, MA, BU UROP Talk

“Hariri Institute Distinguished Lecture: EbbRT”	April 10, 2013, Boston, MA
“In Pursuit of a New Kinds of Computer” invited talk at the first NICTA Software Systems Summer School, Supported by UNSW, Oracle and ANU, Sydney	Feb 5, 2013,
“A Modern Approach to Building OS function for future large scale systems and the Lessons it Builds On”, Jonathan Appavoo and Orran Krieger	Jan 18, 2013, Argonne National Labs
Lecture at BU’s Artemis Project, a 5-week program for middle school girls to promote the creative thinking and problem-solving skills that are at the core of computer science and engineering	July 10, 2012, Boston, MA
Lecture at BU’s Artemis Project, a 5-week program for middle school girls to promote the creative thinking and problem-solving skills that are at the core of computer science and engineering	July 5, 2011, Boston, MA
Speaker and panelist, “Job Choices: Academia versus Industry”, Workshop on Supporting Diversity in Systems Research	Oct 2, 2010, Vancouver, BC, Canada
“Towards a Global Scale Public Computer”, Center for Computational Science, Boston University	Feb 19, 2010, Boston, MA
Annual Wharton Business Technology Conference panel discussion on Cloud Computing	Feb 27, 2009, Philadelphia, PA
“Towards a Global-Scale Public Computer Project Kittyhawk at IBM Research”, Annual Meeting of the IBM Deep Computing Institute - External Advisory Board	Feb 24, 2009, Austin, TX
“Towards a Global-Scale Public Computer”, Stanford EE Computer Systems Colloquium (EE380)	Sept 24, 2008 Stanford, CA
“Exposing and Exploiting Structure in Computation: A Unification Principle of Information Processing Systems : Programmable Smart Machines”, DARPA Summer Research Conference	July 15, 2008, Santa Cruz, CA
“A New Kind of Global Scale General Purpose System – Re-thinking the Plumbing – The Advantages of Super-Computers for the Rest of Us”, IBM Industry Solutions Lab Seminar	June 25, 2008, Hawthorne, NY
“General Purpose Execution as Parallel Search”, IBM Research Software Strategy Multi-core Workshop	June 17, 2008, Yorktown, NY
“Web2.0 – Commercial SuperComputing”, IBM Research Super-Computing Professional Interest Community Seminar	Aug 17, 2007, Yorktown, NY
“Is there structure in Computation?”, IBM Research System Software Strategy Day Workshop	Oct 18, 2007, Yorktown, NY
“Virtualization and OS”, IBM 2007 Multi-Core Forum	Oct 9, 2007, Yorktown, NY



“Commodity Commercial Computing: Profiting from Efficiency”, IBM Rochester Tech Talk	June 20, 2007, Rochester, MN
“Separating Computation from Computers – Globally Selling Cycles not Computers”, IBM Research Commercial Systems Software Friday Seminar Series	May, 2007, Yorktown, NY
“Commodity Commercial Computing: Profiting from Efficiency”, IBM Research Blue Gene Workshop	March 22, 2007, Yorktown, NY
“Scalability Through Locality”, Intel Multi-Core Forum 2006: OS Architecture for Multi-core and Many-core Platforms	Nov 9, 2006, Portland, OR
“Flexible Transparent Managed Scalability – Turning Blades into Accelerators”, IBM Research Commercial Scale-Out Project Update	Sept 12, 2006, Yorktown, NY
“Clustered Objects”, Princeton Computer Science Systems Seminar	Sept 2005
“Object Oriented Programming for Multiprocessor Performance”, 4th EurOpen/Usenix Conference	Feb 22, 2002, Helsinki, Finland

### Thesis Committees

1rd reader	PhD	BU	Tommy Unger, “Dynamic Privilege”	2023
2nd reader	PhD.	BU	Ali Raza, “Specializing a General-Purpose Operating System”	2023
3rd reader	PhD.	BU	Ali Raza, “Orchestrating Cloud Resources To Optimize Performance and Cost”	2023
1st reader	PhD.	BU	Han Dong, “A Data-Driven Study of Operating System Energy-Performance Trade-offs Towards System Self Optimization”	2022
1st reader	PhD.	BU	James Cadden, “Fine-Grained Elasticity in Cloud Operating Systems”	2019
4th reader	PhD.	BU	Ahmed Sanaullah, "Towards A High Performance Hardware Development Kit for Transparent FPGA Computing"	2019
Co-examiner	PhD.	ETH	Gerd Zellwenger, “On the Construction of Dynamic and Adaptive Operating Systems”	2017
1st reader	PhD.	Boston University	Dan Schatzberg, “Customization and Reuse in Datacenter Operating Systems”	2017
2nd reader	PhD.	Boston University	Ying Ye, “Real-Time Systems on Multicore Platforms: Managing Hardware Resources For Predictable Execution”	2017
4th reader	PhD.	Boston University	Yuefeng, “Multi-Layer Virtual Transport Network Design and Management”	2016

4th reader	PhD.	Boston University	Schuyler Eldridge, "Neural Network Computing Using On-Chip Accelerators."	2016
3rd reader	PhD.	Boston University	Ye Li, "Leveraging Virtualization Technologies For Resource Partitioning in Mixed Criticality Systems"	2015
Committee Member	PhD.	Boston University	Vatche Ishakian, "Strategic And Operational Services For Workload Management in The Cloud"	2013
Committee Member	PhD.	Boston University	Ray Sweha, "Optimizing On-Demand Resource Deployment For Peer-Assited Content Delivery"	2012
Committee Member	PhD.	Boston University	Mark Reynolds, "Security Analysis of Bytecode Interpreters Using Alloy"	2012
2nd reader	PhD.	Boston University	Jorge Londono, "Embedding Games: Distributed Resource Management with Selfish Users"	2010
External	MSc.	University of Victoria	Chris Matthews, "SCOPE: Scalable Clustered Objects with Portable Events"	2006

### Departmental/University Service

BU	Departmental Director of Graduate Studies	Fall 2020 - Sum 2022
BU	Chair of Hiring Committee	2018
BU	Department Hiring Committee member	2016
BU	Department Corporate Relations Advisor	2016
BU	Director of Lab Operations	Fall 2014
BU	CS Graduate Admissions Committee	Spring 2012
BU	Director of Lab Operations	Spring 2012
BU	CS Merit Review Committee	Spring 2012
BU	CS Graduate Admissions Committee	Spring 2011
BU	CS210 Honors Section Instructor	Fall 2010
BU	CS Graduate Admissions Committee	Spring 2010
BU	CS Colloquium Coordinator	Fall 2009 - Spring 2010
IBM	Advanced Operating Systems Webpage Coordinator	2009
IBM	Exploratory Proposal Reviewer	Fall 2007

### Other Professional Activities

Participated in several media and advertising campaigns for IBM including national televised commercials in 2008 and 2009.

Interviewed by the Economist for my work on Project Kittyhawk covered in the online article “Data centers: Cool it!”.

Work on Project Kittyhawk covered by several internet sites and blogs including, “Rough Type” by Nicholas Carr, theRegister, The Chronicle, and the dailytech.

**Doctoral Advisor**

Michael Stumm (University of Toronto)

**Advisees**

George Pabst	Boston University	BA/MA, April 2010
Katherine Zhao	Boston University	BA/MA, Sept 2012
Dan Schatzberg	Boston University	PhD
Amos Waterland	Harvard University SEAS	co-advisee PhD
James Cadden	Boston University	PhD
Han Dong	Boston University	PhD, expected 2022
Tommy Unger	Boston University	PhD, expected 2022
Yara Awad	Boston University	PhD, expected 2023
Arlo Albelli	Boston University	PhD, expected TBA
Sanskriti Sharma	Boston University	PhD, expected TBA

I have and continue to serve as an academic advisor for several undergraduates at Boston University.