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Olatunji Ruwase

Research Interests

I am broadly interested in compilers, operating systems, and computer architecture techniques for addressing reliability and performance issues in computing systems.

Education

- 2006–2013 **PhD in Computer Science**, *Carnegie Mellon University*, Pittsburgh, PA,
Thesis: Improving Device Driver Reliability Through Decoupled Dynamic Binary Analyses.
Advisor: Prof. Todd C. Mowry
- 2001–2003 **Masters of Science in Computer Science**, *Stanford University*, Palo Alto, CA,
Research Areas: Compilers and Software Reliability.
Advisor: Prof. Monica S. Lam
- 1995–2000 **Bachelors of Science in Computer Science**, *University of Ibadan*, Ibadan, Nigeria.

Awards and Honors

- 2010–2011 **Intel PhD Fellowship**

Publications

Journals

- MICRO TOP PICKS 2009 S. Chen, M. Kozuch, T. Strigkos, B. Falsafi, P.B. Gibbons, T.C. Mowry, V. Ramachandran, O. Ruwase, M. Ryan, and E. Vlachos. *Flexible Hardware Acceleration for Instruction-grain Program Monitoring*. In IEEE Micro's Top Picks in Computer Architecture Conferences, Jan/Feb 2009 Special Issue.

Peer Reviewed Conferences

- PLDI 2010 O. Ruwase, S. Chen, P.B. Gibbons, and T.C. Mowry. *Decoupled Lifeguards: Enabling Path Optimizations for Dynamic Correctness Checking Tools*. In Proceedings of the 2010 ACM SIGPLAN Conference on Programming Language Design and Implementation, 2010.

- SPAA 2008 O. Ruwase, P.B. Gibbons, T.C. Mowry, V. Ramachandran, S. Chen, M. Kozuch and M. Ryan. *Parallelizing Dynamic Information Flow Tracking*. In Proceedings of the 20th Annual Symposium on Parallelism in Algorithms and Architectures, 2008.
- ISCA 2008 S. Chen, M. Kozuch, T. Strigkos, B. Falsafi, P.B. Gibbons, T.C. Mowry, V. Ramachandran, O. Ruwase, M. Ryan, and E. Vlachos. *Flexible Hardware Acceleration for Instruction-grain Program Monitoring*. In Proceedings of the 35th Annual International Symposium on Computer Architecture, 2008.
- MOBICOM 2008 F. Dogar, A. Phanishayee, H. Pucha, O. Ruwase, and D. Andersen. *Ditto: A System for Opportunistic Caching in Multi-Hop Wireless Mesh Networks*. In Proceedings of the 14th ACM International Conference on Mobile Computing and Networking, 2008.
- NDSS 2004 O. Ruwase and M.S. Lam. *A Practical Dynamic Buffer Overflow Detector*. In Proceedings of the 11th Annual Network and Distributed System Security Symposium, 2004.

Technical Reports

O. Ruwase, P.B. Gibbons, M.A. Kozuch, T.C. Mowry. *Guardrail: High Fidelity Correctness Checking of Device Drivers for Safeguarding I/O Operations*. Carnegie Mellon University Tech Report: CMU-CS-12-149, 2012.

E. Vlachos, M. Goodstein, M. Kozuch, S. Chen, B. Falsafi, P.B. Gibbons, T.C. Mowry and O. Ruwase. *Parallel LBA: Coherence-based Parallel Monitoring of Multithreaded Applications*. Carnegie Mellon University Tech Report: CMU-CS-09-108, 2009.

Research Experience

- Fall 2006–2013 **Graduate Student Researcher**, *Carnegie Mellon University*, Advisor: Todd C. Mowry. Improving the performance and effectiveness of dynamic analyses for user-mode and kernel-mode bug detection using Compilers, Operating Systems, and Computer Architecture approaches.
- Summer 2010 **Summer Fellow**, *CMU/Intel Research Pittsburgh*, Supervisor: Phil Gibbons. Developed a dynamic data race detector for kernel-mode device drivers.
- Summer 2008 **Summer Fellow**, *CMU/Intel Research Pittsburgh*, Supervisor: Phil Gibbons. Studied techniques for accelerating runtime correctness checking by optimizing how hot program paths are monitored. Presented results at PLDI 2010.
- Summer 2007 **Summer Intern**, *Intel Research Pittsburgh*, Supervisor: Phil Gibbons. Developed a framework for parallelizing runtime bug detection tools. Parallelizing *Taint Analysis* yielded up to 3X speedup on **Log-Based Architectures** systems. Presented results at SPAA 2008.
- Fall 2002–
Spring 2003 **Research Assistant**, *Stanford University*, Advisor: Prof. Monica S. Lam. Developed *CRED*, a dynamic buffer overflow detector for C programs. Publicly available as a GCC extension. Presented at NDSS 2004.

Teaching Experience

- Spring 2011 **Optimizing Compilers**, *CMU 15-745 (graduate)*. Developed and graded homeworks and projects, supervised projects, lectured, held office hours, and handled administrative tasks.

Fall 2008 **Operating Systems Design and Implementation, CMU 15-410 (undergraduate).**

Held office hours, and graded homeworks, projects and exams.

Fall 2007 **Computer Architecture, CMU 15-740 (graduate).**

Developed and graded homeworks, and projects, held office hours, lectured and handled administrative tasks.

Professional Experience

Summer 2009 **Summer Intern, Google Inc,** Supervised by Ian Lance Taylor.

Contributed to the GCC Plugins project by prototyping sophisticated plugin tools, such as a bounds checker (based on *mudflap*) and a static error checker (for internal use).

May 2005–
August 2006 **Member of Technical Staff, Sun Microsystems.**

- o Developed compiler frontend, code generator, and debugger support to improve debuggability of optimized code.
- o Developed GCC-to-Sun IR translation in GCCFSS compiler (GCC frontend + Sun backend).
- o Maintained Sun Studio Compiler's Code Generator.

August 2003–
April 2005 **Member of Technical Staff, Transmeta.**

- o Maintained GNU based compiler tool chain for Efficeon and Crusoe processors.
- o Maintained static VLIW code scheduler for Efficeon and Crusoe processors.
- o Developed dynamic code cache management algorithm to avoid pathological interrupt latencies in Crusoe processors.

August 2000–
August 2001 **Software Developer, Systemspecs, Nigeria.**

Development and maintenance of Human Resource Management Software (**HumanManager 3.0**)

Service

Spring 2008–
2013 **Member, Speakers Club,** Computer Science Department, CMU.

Evaluate talks given by students for completing the Speaking skills requirement of the PhD program.

Spring 2007–
2013 **Member, Doctoral Review Committee,** Computer Science Department, CMU.

Served as a student representative on the advisory committee to the Director of Graduate Programs and the Department Head.