Guoqing (Harry) Xu

Contact Information

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Research Interest

My general research interests are static and dynamic program analyses (from purely mathematical reasoning of program behaviors all the way to runtime systems such as feedback-directed compilation and garbage collection). I am currently interested in developing program analysis techniques to solve *software performance engineering* problems. My Ph.D. thesis focuses on analyses targeting detection, removal, and prevention of runtime bloat in large-scale long-running Java applications.

Education

The Ohio State University, Columbus, OH

Ph.D. in Computer Science, Sept. 2005 - Aug. 2011
Dissertation title: Analyzing large-scale object-oriented applications to find and remove runtime bloat

- Advisor: Prof. Atanas Rountev

The Ohio State University, Columbus, OH

M.S. in Computer Science, Sept. 2005 - June 2010

- Advisor: Prof. Atanas Rountev

East China Normal University, Shanghai, China

M.Eng. in Computer Science, July 2002 - Jan. 2005

- Advisor: Prof. Zongyuan Yang

East China Normal University, Shanghai, China

B.Eng. in Computer Science, Sept. 1998 - July 2002

Professional Experience

IBM T.J.Watson Research Center, Dynamic Optimization Group

Research Intern, June 2008 – June 2009, June 2010 - March 2011
Mentor: Dr. Matthew Arnold

IBM T.J.Watson Research Center, Intelligent Application Analysis Group

Research Intern, June 2009 – June 2010
Mentor: Dr. Nick Mitchell

IBM China Software Development Lab, Beijing

Staff Software Engineer, Dec. 2004 – Mar. 2005

Recent Publications

[PLDI'11] Guoqing Xu, Michael D. Bond, Feng Qin, and Atanas Rountev, LeakChaser: Helping Programmers Narrow Down Causes of Memory Leaks,*ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'11)*, pp. 270-282, San Jose, CA, June 2011. (Acceptance rate: 23%, 55/236)

[ISSTA'11] Dacong Yan, Guoqing Xu, and Atanas Rountev, Demand-Driven Context-Sensitive Alias Analysis for Java, *ACM SIGSOFT International Symposium on Software Testing and Analysis*, pp.155-165, Toronto, Canada, July 2011. (Acceptance rate: 29%, 35/121)

[TSE'11] Raffi Khatchadourian, Phil Greenwood, Awais Rashid, and Guoqing Xu, Pointcut Rejuvenation: Recovering Pointcut Expressions in Evolving Aspect-Oriented Software, *IEEE Transactions on Software Engineering* (TSE), to appear, 2011.

[FoSER'10] Guoqing Xu, Nick Mitchell, Matthew Arnold, Atanas Rountev, and Gary Sevitsky, Software Bloat Analysis: Finding, Removing, and Preventing Performance Problems in Modern Large-Scale Object-Oriented Applications, *ACM SIGSOFT FSE/SDP Workshop on the Future of Software Engineering Research*, Santa Fe, NM, Nov. 2010.

[PLDI'10-b] Guoqing Xu and Atanas Rountev, Detecting Inefficiently-Used Containers to Avoid Bloat, *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'10)*, pp. 160-173, Toronto, Canada, June 2010. (Acceptance rate: 20%, 41/204)

[PLDI'10-a] Guoqing Xu, Nick Mitchell, Matthew Arnold, Atanas Rountev, Edith Schonberg, and Gary Sevitsky, Finding Low-Utility Data Structures, *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'10)*, 174-186, Toronto, Canada, June 2010. (Acceptance rate: 20%, 41/204)

[ECOOP'09] Guoqing Xu, Atanas Rountev, and Manu Sridharan, Scaling CFL-Reachability-Based Points-to Analysis Using Context-Sensitive Must-Not-Alias Analysis, *European Conference on Object-Oriented Programming (ECOOP'09)*, pp. 98-122, Genova, Italy, July 2009. (Acceptance rate: 21%, 25/117)

[PLDI'09] Guoqing Xu, Matthew Arnold, Nick Mitchell, Atanas Rountev, and Gary Sevitsky, Go with the Flow: Profiling Copies to Find Runtime Bloat, *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'09)*, pp. 419-430, Dublin, Ireland, June 2009. (Acceptance rate: 21%, 41/196)

[ASE'09-Short] Raffi Khatchadourian, Phil Greenwood, Awais Rashid, and Guoqing Xu, Pointcut Rejuvenation: Recovering Pointcut Expressions in Evolving Aspect-Oriented Software, short paper, In Proc. *the 24th IEEE/ACM International Conference on Automated Software Engineering (ASE'09)*, Auckland, New Zealand, Nov. 2009.

[ISSTA'08] Guoqing Xu and Atanas Rountev, Merging Equivalent Contexts for Scalable Heap-Cloning-Based Context-Sensitive Points-to Analysis, *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA'08)*, pp. 225-236, Seattle, Washington, July 2008. (Acceptance rate: 26%, 26/100)

[ICSE'08] Guoqing Xu and Atanas Rountev, Precise Memory Leak Detection for Java Using Container Profiling, *ACM/IEEE International Conference on Software Engineering (ICSE'08)*, pp. 151-160, Leipzig, Germany, May 2008. **Won an ACM SIGSOFT Distinguished Paper Award**. (Acceptance rate: 15%, 56/371)

[AOSD'08] Guoqing Xu and Atanas Rountev, AJANA: A General Framework for Source-Code-Level Interprocedural Dataflow Analysis of AspectJ Software, *International Conference on Aspect-Oriented Software Development (AOSD'08)*, pp. 36-47, Brussels, Belgium, March 2008. (Acceptance rate: 22%, 17/79)

[CC'08] Atanas Rountev, Mariana Sharp, and Guoqing Xu, IDE Dataflow Analysis in the Presence of Large Object-Oriented Libraries, *International Conference on Compiler Construction (CC'08)*, pp. 53-68, Budapest, Hungary, March 2008. (Acceptance rate: 25%, 18/71)

[FSE'07] Guoqing Xu, Atanas Rountev, Yan Tang, and Feng Qin, Efficient Checkpointing of Java Software Using Context Sensitive Capture and Replay, *the 6th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software*

Engineering (ESEC/FSE'07), pp. 85-94, Dubrovnik, Croatia, Sept 2007. (Acceptance rate: 17%, 43/251)

[ICSE'07] Guoqing Xu and Atanas Rountev, Regression Test Selection for AspectJ Software,*ACM/IEEE International Conference on Software Engineering (ICSE 07)*, pp. 65-74, Minneapolis, MN, May 2007. **Nominated for an ACM SIGSOFT Distinguished Paper Award**. (Acceptance rate: 15%, 50/334)

A detailed paper list can be found on http://www.cse.ohio-state.edu/~xug/research/publications.htm.

Major Presentations

[$PLDI'11$] at PLDI, San Jose, CA, 2011
[$FoSER'10$] at FoSER/FSE, Santa Fe, NM, 2010
[$PLDI'10-b$] at PLDI, Toronto, Canada, 2010
[$PLDI'10-a$] at PLDI, Toronto, Canada, 2010
[$ECOOP'09$] at ECOOP, Genova, Italy, 2009
[$PLDI'09$] at PLDI, Dublin, Ireland, 2009 (A slightly longer talk was given in IBM Research)
Invited talk on [$ICSE'08$] at Indian Software Engineering Conference, Pune, India, 2009
[$ISSTA'08$] at ISSTA, Seattle, Washington, 2008
[$ICSE'08$] at ICSE, Leipzig, Germany, 2008
[$AOSD'08$] at AOSD, Brussels, Belgium, 2008
[$FSE'07$] at FSE, Dubrovnik, Croatia, 2007
[$ICSE'07$] at ICSE, Minneapolis, MN, 2007

Honors and Awards

- 05/10 2010 Distinguished Research Award, OSU Computer Science
- 05/10 Inducted into the Upsilon Pi Epsilon (UPE) honor society for computer science and engineering
- 04/10 Best Poster Award in the 4^{th} OSU/CSE Research Poster Exhibition
- 02/10 2010-2011 IBM Research Ph.D. Fellowship
- 05/08 ACM SIGSOFT Distinguished Paper Award at ICSE'08
- 05/07 ACM SIGSOFT Distinguished Paper Award Nomination at ICSE'07
- 02/05 The Ohio State University Distinguished University Fellowship (DUF), The highest fellowship award for international students (two-year support)
- 01/05 Best Master Thesis of CSD in ECNU
- 2002 Outstanding Graduate Award of Shanghai (among top 1% 2002, the highest honor)
- 2002 Best Undergraduate Thesis of CSD in ECNU

Conference Attendence Awards/Grants

- 05/09, 04/10 ACM SIGPLAN Professional Activities Committee (PAC) Award for PLDI'09, PLDI'10
- 11/04, 07/06 ACM SIGSOFT Conference Attendance Program for Students (CAPS) (FSE'04, ISSTA'06)

External Reviews

Science of Computer Programs (SCP) 2011
International Journal on Computer Science and Technology (JCST) 2010
ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI) 2010
ACM SIGSOFT/IEEE International Conference on Software Engineering (ICSE) 2007, 2008, 2009
Journal on Software, Practice and Experience (SP&E) 2008
IEEE International Conference on Software Maintenance (ICSM) 2007
International Journal on Information and Software Technology (JIST) 2007
IEEE Transactions on Software Engineering (TSE) 2008
ACM SIGSOFT International Symposium on Software Testing and Analyais (ISSTA) 2008, 2010
ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE) 2008

Professional Activities

Student Member ACM, SIGSOFT and SIGPLAN since 2004
Student Volunteer ICSE 2007