

Raymond PL Buse

Ph.D. Candidate

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Programming Languages, Software Engineering

Education

- 2007 – 2012
(expected) **Dissertation Research**, *Department of Computer Science*, The University of Virginia, Charlottesville, VA
<http://www.cs.virginia.edu>
advisor Westley Weimer
dissertation title *Automatically Describing Program Structure and Behavior*
url <http://arrestedcomputing.com/proposal>
description Professional software developers spend over 75% of their time trying to understand code, yet software comprehension is poorly understood by both researchers and practitioners. My research seeks to model aspects of program understandability and to generate documentation artifacts for the purposes of measuring and improving the quality of software. My research lies at the intersection of Programming Languages and Software Engineering. I utilize PL techniques (e.g., symbolic execution, test case generation, repository mining, specification mining, bug finding, etc.) toward emerging challenges for engineers. I develop algorithms and tools that scale to large systems often by leveraging machine learning and statistical methods.
- 2007 **Master of Computer Science**, *Department of Computer Science*, The University of Virginia, Charlottesville, VA.
advisor Westley Weimer
project title *Automatic Documentation for Exceptions*
- 2006 **Bachelor of Computer Science**, *Department of Computer Science*, The Johns Hopkins University, Baltimore, MD
<http://cs.jhu.edu>
advisor Yair Amir

Industry Experience

- 2010 **Internship**, Microsoft Research, Redmond, WA
<http://research.microsoft.com/>
mentor Thomas Zimmermann
description Findings from a large-scale study of managers and developers at Microsoft assisted us in developing guidelines for *software analytics*: the application of analysis, data, and systematic reasoning to make decisions related to software development. We constructed a prototype tool based on those guidelines. The analytics tool was well-received by many potential clients within Microsoft. Our collaboration has led to one publication so far.

Peer-Reviewed Publications

10 publications +1 under review: 8 conference papers (InfoVis, ICSE, ISSTA - best paper award, ASE, OOPSLA), 1 journal article (TSE) +1 submitted, 1 workshop paper (FoSER)
<http://arrestedcomputing.com/publications>

- TOCE '12 (submitted) **Raymond P. L. Buse**, Mark Sherriff, and Westley R. Weimer. Female Students Outperform Their Expectations: Perception vs. Reality in Introductory Classes In *ACM Transactions on Computing Education*.
- ICSE '12 **Raymond P. L. Buse** and Westley R. Weimer. Synthesizing API Usage Examples. In *International Conference on Software Engineering*, Zurich, Switzerland 2012. *Acceptance Rate: 20%*
- ICSE '12 **Raymond P. L. Buse** and Thomas Zimmermann. Information Needs for Software Development Analytics. In *International Conference on Software Engineering Software — Engineering in Practice Track*, Zurich, Switzerland 2012. *Acceptance Rate: 18%*
- OOPSLA '11 **Raymond P. L. Buse**, Caitlin Sadowski, and Westley R. Weimer. Benefits and Barriers of User Evaluation in Software Engineering Research. *Conference on Object Oriented Programming Systems, Languages, and Applications*, Portland, OR, USA 2011. *Acceptance Rate: 36%*
- TSE '10 **Raymond P. L. Buse** and Westley R. Weimer. Learning a metric for code readability. *IEEE Transactions on Software Engineering*, 36(4):546–558, 2010.
- FoSER '10 **Raymond P. L. Buse** and Thomas Zimmermann. Analytics for software development. In *FSE/SDP Workshop on the Future of Software Engineering Research*, Santa FE, NM, USA, 2010.
- ASE '10 **Raymond P. L. Buse** and Westley R. Weimer. Automatically documenting program changes. In *Proceedings of the IEEE/ACM international conference on Automated software engineering*, pages 33–42, Antwerp, Belgium, 2010. *Acceptance Rate: 18%*
- ICSE '09 **Raymond P. L. Buse** and Westley R. Weimer. The road not taken: Estimating path execution frequency statically. In *International Conference on Software Engineering*, Vancouver, CA, 2009. *Acceptance Rate: 13%*
- ISSTA '08 **Raymond P. L. Buse** and Westley R. Weimer. Automatic documentation inference for exceptions. In *International Symposium on Software Testing and Analysis*, pages 273–282, Seattle, WA, USA, 2008. *Acceptance Rate: 26%*
- ISSTA '08 **Best Paper** **Raymond P. L. Buse** and Westley R. Weimer. A metric for software readability. In *International Symposium on Software Testing and Analysis*, pages 121–130, Seattle, WA, USA, 2008. *Acceptance Rate: 26%, Cited 30 times.*
- InfoVis '06 Jason Eisner, Michael Kornbluh, Gordon Woodhull, **Raymond P. L. Buse**, Samuel Huang, Constantinos Michael, and George Shafer. Visual navigation through large directed graphs and hypergraphs. In *Proceedings of the IEEE Symposium on Information Visualization (InfoVis'06)*, Baltimore, October 2006.

Funding Awards

- 2011 National Science Foundation Grant. *Synthesizing Human-Readable Documentation*. Award Number 1116289. Principal Investigator: Westley Weimer. Awarded July, 2011. Amount: \$470,955 This grant proposal was based on a subset of my dissertation work. I contributed significantly to underlying ideas and proposal text.

Teaching Experience

- 2011 **Guest Lectures**, *CS2220: Software Development Methods*, I presented three lectures for this course. Introduced data abstraction, specifications, and invariants.
- 2009 - 2011 **Guest Lectures**, *CS615: Graduate Programming Languages*, Introduction to Machine Learning for Programming Language research.
- 2008 **Tutor**, *CS220: Engineering Software*, Tutored a group of students at request of the faculty member teaching the course.
- 2007 **Teaching Assistant**, *CS410: Distributed Systems*, University of Virginia.
- 2006 **Teaching Assistant**, *CS414: Operating Systems*, University of Virginia.
- 2004 **Teaching Assistant**, *CS205: Data Structures*, Johns Hopkins University.

Activities

- 2008–present **Diversity Committee**, *Department of Computer Science*, I work on projects related to promoting diversity in computer science: Organized many talks including Turing award winner Barbara Liskov (over 500 attendees), Conducted long-term surveys to measure impact of diversity programs (over 2,000 responses).
- 2009–present **Publicity Chair**, *Association for Women in Computing, University of Virginia*, I promote events of the ACM-W who's primary goal is to encourage women to pursue an education and career in computer science.
- 2008–2010 **Theory Lunch Coordinator**, I solicited, organized, and promoted bi-weekly talks for a group of approximately 25 students and faculty members interesting in theoretical computer science.
- 2008–2009 **Graduate Student Representative**, *Department of Computer Science*, Elected by peers. Responsibilities included organizing graduate student orientation, graduate student liaison to faculty, etc.

Mentor Experience

- 2008–2009 **Mentored undergraduate student**, *Elizabeth Soechting*, Now a graduate student in Computer Science at *The University of Wisconsin–Madison*.

Awards

- 2009-2010 **Graduate Service Award**, *University of Virginia Department of Computer Science*, Voted on by the faculty. Awarded to the student who made the most significant service contributions that year. Given to 1 of approximately 100 graduate students.
- 2008-2009 **Graduate Researcher Award**, *University of Virginia Department of Computer Science*, Voted on by the faculty. Awarded to the student with the most outstanding research that year. Given to 1 of approximately 100 graduate students.
- 2008 **ACM Distinguished Paper Award**, *International Symposium on Software Testing and Analysis*.

References

Letters of referral from the following people can be provided on request.

Advisor **Westley Weimer**, *The University of Virginia*, weimer@cs.virginia.edu.
Thomas Zimmermann, *Microsoft Research*, tzimmer@microsoft.com.
Paul F. Reynolds, *The University of Virginia*, pfr@virginia.edu.
Kevin J. Sullivan, *The University of Virginia*, sullivan@cs.virginia.edu.