

Career Objectives

I have adopted a beginning-to-end approach to improving the maintenance process. This includes developing solutions to known, important maintenance problems while studying the impact such solutions might have on human-centric maintenance concerns. My work emphasizes automation wherever possible as well as strong, concrete, human-centric evaluations to better understand both the problems and their solutions.

Education

Graduate – University of Virginia

- **Ph.D. in Computer science**, expected 2014.
- Ph.D. Thesis: "*Leveraging Light-Weight Analyses to Aid Software Maintenance*," Advisor: Westley Weimer
- **Masters in Computer Science** degree, 2010.
- MCS Thesis: "*Fault Localization using Textual Similarities*," Advisor: Westley Weimer
- Completed Ph.D. qualifying examinations, 2010

Undergraduate – University of Delaware

- **B.S. in Computer Science**, Minor in Business Administration 2008
- Honor's Thesis: "*Improving Automatic Abbreviation Expansion within Source Code to Aid in Program Source Tools*," Advisors: Lori Pollock and K. Vijay-Shanker
- Graduated with Honors Degree with Distinction

Industrial Experience

- Internship – Coverity Inc. – 2011. Supervisor: Andy Chou, Chief Technology Officer. *Focus*: Defect detection tools can erroneously report duplicate defects, causing excess maintenance effort and reducing customer confidence. We developed a defect clustering technique that measures similarity between both the suspected code and additional mined static information. By performing clustering and compacting isomorphic sets of defects, we reduced the size of the raw output of Coverity's Static Analysis tool by over 45% for 18 large open source programs without loss of information.

Publications

▪ Journal

- Eric Schulte, Zachary P. Fry, Ethan Fast, Westley Weimer, Stephanie Forrest, "*Software Mutational Robustness*" **Genetic Programming and Evolvable Machines**, 2013.
- Zachary P. Fry, David Shepherd, Emily Hill, Lori Pollock, K. Vijay-Shanker, "*Analyzing Source Code: Looking for Useful Verb-Direct Object Pairs in All the Right Places*," The Institution of Engineering and Technology (IET) **Software Special Issue on Natural Language in Software Development – Volume 2, Issue 1**, 2007. (Impact Factor: 0.542)

▪ Conference

- Westley Weimer, Zachary P. Fry, Stephanie Forrest, "*Leveraging Program Equivalence for Adaptive Program Repair: Models and First Results*" **Automated Software Engineering (ASE)**, 2013. (Acceptance rate: 23%)

- Zachary P. Fry, Westley Weimer, “*Clustering Static Analysis Defect Reports to Reduce Maintenance Costs*” **Working Conference on Reverse Engineering (WCRE)**, 2013. (Acceptance rate: 39%)
- Zachary P. Fry, Bryan Landau, Westley Weimer, “*A Human Study of Patch Maintainability*” **International Symposium on Software Testing and Analysis (ISSTA)**, 2012. (Acceptance rate: 29%)
- Zachary P. Fry, Westley Weimer, “*A Human Study of Fault Localization Accuracy*” **International Conference of Software Maintenance (ICSM)**, 2010. (Acceptance rate: 26%)
- Emily Hill, Zachary P. Fry, Haley Boyd, Giriprasad Sridhara, Yana Novikova, Lori L. Pollock, K. Vijay-Shanker, “*AMAP: automatically mining abbreviation expansions in programs to enhance software maintenance tools*,” **Working Conference on Mining Software Repositories (MSR)**, 2008. **Best Paper Award** (Acceptance rate: 40%)
- David Shepherd, Zachary P. Fry, Emily Gibson, Kishen Maloor, Lori Pollock, and K. Vijay-Shanker, “*Introducing Natural Language Program Analysis (NLPA)*”, a research group presentation at the **Workshop on Program Analysis for Software Tools and Engineering (PASTE)**, 2007.
- David Shepherd, Zachary P. Fry, Emily Gibson, Lori Pollock, and K. Vijay-Shanker, “*Using Natural Language Program Analysis to Locate and Understand Action-Oriented Concerns*,” **International Conference on Aspect Oriented Software Development (AOSD)**, 2007. (Acceptance rate: 18%)
- **Workshop and Tech Reports**
 - Zachary P. Fry, Westley Weimer, “*Leveraging Light-Weight Analyses to Aid Software Maintenance*” Doctoral Symposium, **International Conference on Software Testing**, 2013.
 - Zachary P. Fry, Westley Weimer, “*Fault Localization Using Textual Similarities*” Tech Report, Computing Research Repository, 2012.

Research Highlights

- *Masters in Computer Science (MCS) Thesis, “Fault Localization Using Textual Similarities”, Advised by Westley Weimer, May 2010*

Abstract: Maintenance is a dominant component of software cost, and localizing reported defects is a significant component of maintenance. We propose a scalable approach that leverages the natural language present in both defect reports and source code to identify files that are potentially related to the defect in question. Our technique is language-independent and does not require test cases. The approach represents reports and code as separate structured documents and ranks source files based on a document similarity metric that leverages inter-document relationships.
- *Senior Honor's Thesis, “Improving Automatic Abbreviation Expansion within Source Code to Aid in Program Source Tools,” Advised by Lori Pollock and K. Vijay-Shanker, April 2008*

Contributions: Intelligent and robust search tools are one method for facilitating program understanding and comprehension. One of the major problems associated with improving search tools is the use of abbreviations within software. This thesis improves upon our previous approach by addressing specific weaknesses. The new approach improved expansion accuracy by 6% overall and had a proportional impact in terms of concrete search task accuracy.

Awards and Distinctions

- Recipient, Donald W. Harward Scholarship, University of Delaware, December 2008
A monetary award given to one senior Honors Degree with Distinction candidate, based on their academic accomplishments, to permit the student's full-time Winter Session research for the senior thesis
- Recipient, Hatem M. Khalil Memorial Award, University of Delaware, May 2007
A monetary award given to one of over one hundred CIS major in recognition of outstanding achievement in software engineering

References

- Westley Weimer, weimer@cs.virginia.edu, 434-924-1021. 85 Engineer's Way, P.O. Box 400740, Charlottesville, VA, 22904.
- Stephanie Forrest, forrest@cs.unm.edu, 505-277-7104. Department of Computer Science, MSC01 1130, 1 University of New Mexico, Albuquerque, NM, 87131.
- John Knight, knight@cs.virginia.edu, 434-982-2216. 85 Engineer's Way, P.O. Box 400740, Charlottesville, VA, 22904.