

Vu Le

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Research Interests

Programming languages and software engineering: program synthesis, program analysis, and testing. I develop novel and practical techniques to help improve the quality of critical software and make programming accessible for end users.

Our work in compiler validation has led to more than 600 bug reports (and fixes) in GCC and LLVM, the two most widely-used compilers. Our work in program synthesis has shipped in various commercial products.

Education

- 2009-2015 **PhD, Computer Science**, University of California, Davis, USA.
Thesis: *Program Generation for End-User Programming and Compiler Validation*.
Advisors: Prof. Zhendong Su and Dr. Sumit Gulwani.
- 2009-2011 **MSc, Computer Science**, University of California, Davis, USA.
Thesis: *Component-based Programming for End Users and Education*.
Advisors: Prof. Zhendong Su and Dr. Sumit Gulwani.
- 2001-2006 **BEng, Computer Science**, University of Technology - Vietnam National University.

Work Experiences

- 06/2015-present **(Senior) Research Software Engineer**, Microsoft, Redmond, WA.
Working on the Microsoft Program Synthesis using Examples (PROSE) project.
- 10/2014-12/2014 **Consultant**, Microsoft Research, Redmond, WA.
Worked on the FlashM project that combines multiple synthesis paradigms. Improved FlashExtract logics and ranking to serve other product groups in Microsoft.
- 06/2014-09/2014 **Research Intern**, *Dr. Sumit Gulwani*, Microsoft Research, Redmond, WA.
Worked with the PowerShell team to help transfer FlashExtract to PowerShell (**shipped** as part of the Microsoft Windows Management Framework 5.0 Preview).
- 04/2013-09/2013 **Research Intern** (2 internships), *Dr. Sumit Gulwani*, Microsoft Research, Redmond, WA.
Designed and developed FlashExtract, a general program synthesis framework that enables data extraction from semi-structured documents using examples (**published** in PLDI 2014).
- 06/2012-09/2012 **Research Intern**, *Dr. Jonathan de Halleux and Dr. Sumit Gulwani*, Microsoft Research, Redmond, WA.
Designed and developed a natural language front-end for TouchDevelop to synthesize TouchDevelop scripts from English keywords (**integrated** into TouchDevelop).
- 06/2006-06/2009 **Assistant Lecturer**, University of Technology - Vietnam National University
(Co)taught Introduction to Programming and Compiler Construction.

Publications

- OOPSLA 2016 Chengnian Sun, Vu Le, and Zhendong Su. **Finding Compiler Bugs via Live Code Mutation.** *The ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity (OOPSLA/SPLASH)*, Amsterdam, Netherlands, October 2016.
- ISSTA 2016 Chengnian Sun, Vu Le, and Zhendong Su. **Toward Understanding Compiler Bugs in GCC and LLVM.** *The 25th International Symposium on Software Testing and Analysis (ISSTA)*, Saarbrücken, Germany, July 2016.
- ICSE 2016 Chengnian Sun, Vu Le, and Zhendong Su. **Finding and Analyzing Compiler Warning Defects.** *The 38th International Conference on Software Engineering (ICSE)*, Austin, TX, May 2016.
- UIST 2015 Mikaël Mayer, Gustavo Soares, Maxim Grechkin, Vu Le, Mark Marron, Alex Polozov, Rishabh Singh, Ben Zorn, and Sumit Gulwani. **User Interaction Models for Disambiguation in Programming by Example.** *The 28th ACM Symposium on User Interface Software and Technology (UIST)*, Charlotte, NC, November 2015.
- OOPSLA 2015 Vu Le, Chengnian Sun, and Zhendong Su. **Finding Deep Compiler Bugs via Guided Stochastic Program Mutation.** *The ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity (OOPSLA/SPLASH)*, Pittsburg, PA, October 2015.
- ISSTA 2015 Vu Le, Chengnian Sun, and Zhendong Su. **Randomized Stress-Testing of Link-Time Optimizers.** *The 24th International Symposium on Software Testing and Analysis (ISSTA)*, Baltimore, MD, July 2015.
- PLDI 2014 Vu Le, Mehrdad Afshari, and Zhendong Su. **Compiler Validation via Equivalence Modulo Inputs.** *The 35th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Edinburgh, UK, June 2014.
🏆 **ACM SIGPLAN Distinguished Paper Award**
- PLDI 2014 Vu Le and Sumit Gulwani. **FlashExtract: A Framework for Data Extraction by Examples.** *The 35th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Edinburgh, June 2014.
- MobiSys 2013 Vu Le, Sumit Gulwani, and Zhendong Su. **SmartSynth: Synthesizing Smartphone Automation Scripts from Natural Language.** *The 11th International Conference on Mobile Systems, Applications, and Services (MobiSys)*, Taipei, June 2013.
- MobiSys 2013 Vu Le, Jonathan de Halleux, Sumit Gulwani, and Zhendong Su. **Keyword Programming for TouchDevelop.** Video Session, *The 11th International Conference on Mobile Systems, Applications, and Services (MobiSys)*, Taipei, June 2013.
- POPL 2013 Earl Barr, Thanh Vo, Vu Le, and Zhendong Su. **Automatic Detection of Floating-Point Exceptions.** *The 40th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, Rome, January 2013.

Patents

Sumit Gulwani and Vu Minh Le, **Framework for Data Extraction by Examples**. *US Patent 20150254530*.

Sumit Gulwani, Jonathan Paul de Halleux, Vu Minh Le, Zhendong Su, and Nikolai Tillman. **Generating Program Fragments Using Keywords and Context Information**. *US Patent 20140282375*.

Sumit Gulwani, Ted Hart, Vu Minh Le, Henrique Malvar, Mark Marron, James McCaffrey, Gustavo Soares, and Benjamin Zorn. **Interactive Data Manipulation Using Examples and Natural Language**. *US Patent Application 20150254211*.

Sumit Gulwani, Benjamin Zorn, Rishabh Singh, Mark Marron, Oleksandr Polozov, Vu Minh Le, Mikael Mayer, Gustavo Soares, and Maxim Grechkin. **User interaction models for disambiguation in programming-by-example**. *US Patent Application 20170075661*.

Honors and Awards

Distinguished Paper Award, PLDI 2014.

The ACM SIGPLAN Programming Languages Design and Implementation is the flagship conference in the field of programming languages and programming systems research.

Best Graduate Researcher Award, Computer Science Department, UC Davis, 2014. *Awarded to one CS student per year. Each student is awarded at most once.*

Gold Medal, ACM Student Research Competition, PLDI 2013.

Awarded to one student per year. Students present posters and give talk to audiences and judges.

PhD Fellowship, Vietnam Education Foundation, 2009.

Created by the U.S. Congress. Candidates are interviewed by professors from top-tier U.S. universities.

Services

- APLAS 2017 **Program Committee**, The 15th Asian Symposium on Programming Languages and Systems.
- ECOOP 2017 **Program Committee**, The 31st European Conference on Object-Oriented Programming.
- PLDI 2016 **External Review Committee**, The 37th annual ACM SIGPLAN conference on Programming Language Design and Implementation
- FSE SRC 2016 **Judge, Student Research Competition**, The 24th ACM SIGSOFT International Symposium on Foundations of Software Engineering
- PLDI Artifacts 2015 **Artifact Evaluation Committee**, The 36th annual ACM SIGPLAN conference on Programming Language Design and Implementation
- OOPSLA Artifacts 2013 **Artifact Evaluation Committee**, The 2013 ACM SIGPLAN international conference on Object Oriented Programming Systems Languages & Applications
- External Reviewer FSE 2010, FSE 2011, ICSE 2012, ASE 2013, ISSTA 2014, HVC 2014, CAV 2015, FSE 2015, TSE 2016

Teaching

- Spring 2010 **Teaching Assistant**, Programming on Parallel Architectures, UC Davis.
Led weekly discussions, graded homework and programming assignments.
- Fall 2008 **Lecturer**, Introduction to Programming, Vietnam National University.
Designed lectures, class projects, and homework assignments.
- Spring 2008 **Assistant Lecturer**, Compiler Construction, Vietnam National University.
Designed class projects, delivered lectures and led discussions.
- Fall 2007 **Teaching Assistant**, Introduction to Programming, Vietnam National University.
Led weekly discussions, graded homework assignments and class projects.
- Spring 2007 **Teaching Assistant**, Compiler Construction, Vietnam National University.
Co-designed class projects, led discussions, and graded homework assignments.

Selected Press

FlashExtract

- PowerShell Magazine "New kid on the block"
<http://www.powershellmagazine.com/2014/09/09/using-the-convertfrom-string-cmdlet-to-parse-structured-text/>
- LazyWinAdmin "This is super cool!"
<http://www.lazywinadmin.com/2014/09/powershell-convertfrom-string-and.html>
- Development in a Blink "Serious text wrangling"
<http://www.dougfinke.com/blog/index.php/2014/10/25/powershell-convertfrom-string-serious-text-wrangling/>
- Happy SysAdm "...one of the best improvement that came with WMF5.0 and PowerShell v5"
<http://www.happysysadm.com/2014/11/first-look-at-convertfrom-string-in.html>

Compiler Validation

- Embedded in Academia "... very cool and anyone interested in compiler correctness should read the paper."
<http://blog.regehr.org/archives/1161>
- Theory and Practice "... a new bug every 2.3 days!"
<http://rgrig.blogspot.com/2014/06/pldi-2014-compiler-validation-via.html>