

# Claire Le Goues

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Institute for Software Research  
School of Computer Science  
Carnegie Mellon University

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## Research Interests and Approach

My research interests span software engineering and programming languages, and especially in how to construct, maintain, evolve, improve/debug, and assure high-quality software systems.

## Appointments

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Carnegie Mellon University ..... Pittsburgh, PA, USA  
2013 – present      Assistant Professor  
                                 School of Computer Science (SCS)  
                                 Institute for Software Research (ISR)

## Education

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University of Virginia ..... Charlottesville, VA, USA  
2013      **Doctor of Philosophy in Computer Science**  
                                 Dissertation: Automatic Program Repair Using Genetic Programming  
                                 Advisor: Westley Weimer  
2009      **Master of Science in Computer Science**  
                                 Thesis: Specification Mining With Few False Positives  
Harvard University ..... Cambridge, MA, USA  
2006      **Bachelor of Arts in Computer Science**  
                                 Thesis: Algebraic Type Isomorphisms  
                                 Advisor: Greg Morrisett

## Industrial Employment

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Microsoft Research ..... Redmond, WA, USA  
2009      **Research Intern**, Research in Software Engineering (RiSE) group  
IBM ..... (*various*)  
2006–2007      **Software Engineer**, XML Technologies/Compilation      Cambridge, MA, USA  
2005      **Research Intern**, Collaborative User Experience (CUE)      Cambridge, MA, USA  
2004      **Research Intern**, Architect’s Workbench      Hawthorne, NY, USA

## Honors and Awards

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2018      ACM Distinguished Paper, Intl. Conference on Software Engineering  
2018      Reliable Rapid Response Reviewer, Intl. Conference on Software Engineering  
2018      National Science Foundation CAREER Award  
2016      Best Reviewer Award, Intl. Symposium on Search-Based Software Engineering  
2015      Featured Article, IEEE Transactions on Software Engineering  
2015      Distinguished Reviewer, Intl. Conference on Automated Software Engineering (ASE)  
2013      Google Faculty Research Award  
2012      Bronze, ACM SIGEVO “Humies” for Human-Competitive Results Produced by Genetic and Evolutionary Computation  
2012      Featured Article, IEEE Transactions on Software Engineering  
2009      Gold, ACM SIGEVO “Humies” for Human-Competitive Results Produced by Genetic and Evolutionary Computation

- 2009 IFIP TC2 Manfred Paul Award, Intl. Conference on Software Engineering
- 2009 ACM Distinguished Paper, Intl. Conference on Software Engineering
- 2009 Best Paper, Genetic and Evolutionary Computation Conference
- 2009 Best Short Paper, Workshop on Search-Based Software Testing
- 2009–2012 Graduate Research Fellowship, National Science Foundation

## Professional Service and Affiliations

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### Local Service at Carnegie Mellon University

- Member, Cylab Director Search Committee ..... 2018
- Member, SCS Undergraduate Review Committee ..... 2016–present
- Co-Director, REUSE@CMU ..... 2016–present
- Director, Undergraduate Minor in Software Engineering ..... 2014–present
- Member, SE Teaching/Tenure Track Faculty Hiring Committees ..... 2015–present
- Member, SE PhD Graduate Admissions Committee ..... 2013–present

### International Service

#### Boards, Organization, and Memberships

- 2018 PC Co-chair, Foundations of Software Engineering, New Ideas and Emerging Results Track (FSE-NIER)
- 2018 Co-organizer, Dagstuhl Seminar 18052 Genetic Improvement of Software
- 2017–present IEEE Transactions on Software Engineering (TSE) Review Board
- 2017–present DARPA ISAT study group member
- 2017 Co-organizer, Dagstuhl Seminar 17022, Automated Program Repair
- 2017 Graduate Track Program Chair, Symposium on Search Based Software Engineering (SSBSE)
- 2016 Review Process Chair, Automated Software Engineering (ASE)
- 2015 Local Arrangements Chair, Systems, Programming, Languages and Applications: Software for Humanity (SPLASH)
- 2014–2017 Steering Committee Member, Symposium on Search Based Software Engineering (SSBSE)
- 2014 PC Co-chair, Symposium on Search Based Software Engineering (SSBSE)

#### Program Committee Membership

- ..... 2019 .....
- ICSE Intl. Conference on Software Engineering (Program Board)
- ..... 2018 .....
- ICSE Intl. Conference on Software Engineering (Rapid Response Reliable Reviewer)
- ASE IEEE/ACM Intl. Conference on Automated Software Engineering
- SSBSE International Symposium on Search Based Software Engineering
- FairWare International Workshop on Software Fairness
- ..... 2017 .....
- ICSE Intl. Conference on Software Engineering
- ESEC/FSE European Software Engineering Conference/Foundations of Software Engineering
- ISSTA-Tools Demonstrations Track, Intl. Symposium on Software Testing and Analysis.
- ..... 2016 .....
- ICSE Intl. Conference on Software Engineering
- ISSTA Intl. Symposium on Software Testing and Analysis
- MSR Working Conference on Mining Software Repositories
- SSBSE Intl. Symposium on Search-Based Software Engineering
- GECCO-GI GECCO Workshop on Genetic Improvement
- ..... 2015 .....
- ASE IEEE/ACM Intl. Conference on Automated Software Engineering
- Onward! Onward! Essays
- SSBSE Intl. Symposium on Search-Based Software Engineering

ICST/Tools	Tools Track, Intl. Conference on Software Testing
ICSME/Tools	Tools Track, Intl. Conference on Software Maintenance and Evolution
ICSME	Intl. Conference on Software Maintenance and Evolution
NasBASE	North American Conference on Search-Based Software Engineering
ICSE/Tools	Tools Track, Intl. Conference on Software Engineering
ICSE NIER	New Ideas and Emerging Results, Intl. Conference on Software Engineering
GECCO-GI	GECCO Workshop on Genetic Improvement
..... 2014 .....	
ICSME	Intl. Conference on Software Maintenance and Evolution
ICSE NIER	New Ideas and Emerging Results, Intl. Conference on Software Engineering

**Guest reviewing and refereeing**

..... 2017 .....	
IEEE TSE	IEEE Transactions on Software Engineering
JARS	Journal of Automated Reasoning
ESEM	Empirical Software Engineering
..... 2016 .....	
ACM TSE	IEEE Transactions on Software Engineering
JARS	Journal of Automated Reasoning
ESEM	Empirical Software Engineering
..... 2015 .....	
ACM TOSEM	ACM Transactions on Software Engineering and Methodology
JSEP	Journal of Software: Evolution and Process
ACM TSE	IEEE Transactions on Software Engineering
Computing	Journal of Computing
..... 2014 .....	
IEEE SW	IEEE Software
JSS	Journal of Systems and Software
JSEP	Journal of Software: Evolution and Process
TOSEM	Transactions on Software Engineering and Methodology

**Research Funding**

*Listed amounts denote the CMU portion of multi-institutional awards.*

CAREER: Quality Matters: Dynamic, Static and Proactive Analyses for Automated Program Repair

NSF: The National Science Foundation  
Duration: March 1, 2018 – February 28, 2023  
Amount: \$524,998

Trusted and Resilient Mission Operation

AFRL: Air Force Research Lab  
Duration: June 26, 2017 – June 25, 2018  
With: Stephanie Forrest (ASU)  
Westley Weimer (UMich)  
Jack Davidson (UVA)  
Amount: \$210,000

REU Supplement: Evolution of Self-adaptive Systems using Stochastic Search

NSF: The National Science Foundation  
Duration: June 1, 2016–May 31, 2019  
With: David Garlan (CMU)  
Amount: \$9,525

REU Supplement: Semi and fully automated program repair and synthesis via semantic code search

NSF: The National Science Foundation  
Duration: June 1, 2016–May 31, 2019  
Amount: \$9,525

SHF: Small: Evolution of Self-adaptive Systems using Stochastic Search

NSF: The National Science Foundation  
Duration: July 1, 2016–June 30, 2020  
With: David Garlan (CMU)  
Amount: \$499,948

SHF: Medium: Collaborative Research: Semi and fully automated program repair and synthesis via semantic code search

NSF: The National Science Foundation  
Duration: July 1, 2016–June 30, 2020  
With: Yuriy Brun (UMass-Amherst)  
Kathryn Stolee (NCSU)  
Amount: \$411,996

CMU REU Site in Interdisciplinary Software Engineering

NSF: The National Science Foundation  
Duration: 1/16–12/18  
With: Joshua Sunshine (CMU)  
Amount: \$360,000

Intelligent Model-Based Adaptation for Mobile Robotics

DARPA: The Defense Advanced Research Projects Agency  
Duration: 11/15 – 9/19  
With: Jonathan Aldrich (CMU)  
Joydeep Biswass (UMass-Amherst)  
David Garlan (CMU)  
Christian Kaestner (CMU)  
Manuela Velosa (CMU)  
Amount: \$7,996,519

Cooperative, Trusted Repair for Cyber Physical System Resiliency

AFRL: Air Force Research Lab  
Duration: 01/15–09/17  
With: Stephanie Forrest (UNM)  
Miryung Kim (UCLA)  
Westley Weimer (UVA)  
Amount: \$215,972

EAGER: Demonstrating the Feasibility of Automatic Program Repair Guided by Semantic Code Search

NSF: National Science Foundation  
Duration: 07/14–06/16  
With: Yuriy Brun (UMass-Amherst)  
Kathryn Stolee (Iowa State)  
Amount: \$95,932

Human-friendly automatic bug repair via source code and repository mining

Google: Faculty Research Award  
Duration: 01/14–01/15  
With: *Sole PI*  
Amount: \$81,924

## Publications

### Books and chapters

- [B2] Claire Le Goues and Shin Yoo, eds. *Proceedings of the 6th International Symposium on Search-Based Software Engineering, SSBSE 2014, Fortaleza, Brazil, August 26-29, 2014*. Vol. 8636. Lecture Notes in Computer Science. Springer, 2014. ISBN: 978-3-319-09939-2. DOI: 10.1007/978-3-319-09940-8.

- [B1] Claire Le Goues, Anh Nguyen-Tuong, Hao Chen, Jack W. Davidson, Stephanie Forrest, Jason Hiser, John C. Knight, and Matthew Van Gundy. “Moving Target Defenses in the Helix Self-Regenerative Architecture”. In: *Moving Target Defense II - Application of Game Theory and Adversarial Modeling*. Springer, 2013, pp. 117–149. DOI: 10.1007/978-1-4614-5416-8\_7.

## Refereed Journal Articles

- [J8] Claire Le Goues, Yuriy Brun, Sven Apel, Emery Berger, Sarfraz Khurshid, and Yannis Smaragdakis. “Effectiveness of Anonymization in Double-Blind Review”. In: *Commun. ACM* 61.6 (June 2018), pp. 30–33. DOI: 10.1145/3208157.
- [J7] Xuan-Bach D. Le, Ferdian Thung, David Lo, and Claire Le Goues. “Overfitting in semantics-based automated program repair”. In: *Empirical Software Engineering* (Mar. 2018). DOI: 10.1007/s10664-017-9577-2.
- [J6] Vinicius Paulo L. Oliveira, Eduardo F. Souza, Claire Le Goues, and Celso G. Camilo-Junior. “Improved representation and genetic operators for linear genetic programming for automated program repair”. In: *Empirical Software Engineering* (Jan. 2018). DOI: 10.1007/s10664-017-9562-9.
- [J5] Claire Le Goues, Neal Holtschulte, Edward K. Smith, Yuriy Brun, Premkumar T. Devanbu, Stephanie Forrest, and Westley Weimer. “The ManyBugs and IntroClass Benchmarks for Automated Repair of C Programs”. In: *IEEE Trans. Software Eng.* 41.12 (2015), pp. 1236–1256. DOI: 10.1109/TSE.2015.2454513.
- [J4] Claire Le Goues, Stephanie Forrest, and Westley Weimer. “Current challenges in automatic software repair”. In: *Software Quality Journal* 21.3 (2013), pp. 421–443. DOI: 10.1007/s11219-013-9208-0.
- [J3] Claire Le Goues, ThanhVu Nguyen, Stephanie Forrest, and Westley Weimer. “GenProg: A Generic Method for Automatic Software Repair”. In: *IEEE Trans. Software Eng.* 38.1 (2012), pp. 54–72. DOI: 10.1109/TSE.2011.104.
- [J2] Claire Le Goues and Westley Weimer. “Measuring Code Quality to Improve Specification Mining”. In: *IEEE Trans. Software Eng.* 38.1 (2012), pp. 175–190. DOI: 10.1109/TSE.2011.5.
- [J1] Westley Weimer, Stephanie Forrest, Claire Le Goues, and ThanhVu Nguyen. “Automatic program repair with evolutionary computation”. In: *Communications of the ACM Research Highlight* 53.5 (May 2010), pp. 109–116. DOI: 10.1145/1735223.1735249.

## Refereed Conference Publications

- [C26] Rijnard van Tonder and Claire Le Goues. “Semantic Crash Bucketing”. In: *Proceedings of the 33rd IEEE/ACM International Conference on Automated Software Engineering*. ASE ’18. 2018 (to appear).
- [C25] Rijnard van Tonder and Claire Le Goues. “Cross-Architecture Lifter Synthesis”. In: *Proceedings of the 16th International Conference on Software Engineering and Formal Methods (SEFM) Held as part of STAF 2018*. Vol. 10886. Lecture Notes in Computer Science. Toulouse, France: Springer, 2018, pp. 155–170. DOI: 10.1007/978-3-319-92970-5\_10.
- [C24] Eduardo Faria de Souza, Claire Le Goues, and Celso Goncalves Camilo-Junior. “A Novel Fitness Function for Automated Program Repair Based on Source Code Checkpoints”. In: *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*. Kyoto, Japan: ACM, July 2018, pp. 1443–1450. DOI: 10.1145/3205455.3205566.
- [C23] Alan Jaffe, Jeremy Lacomis, Edward Schwartz, Claire Le Goues, and Bogdan Vasilescu. “Meaningful Variable Names for Decompiled Code: A Machine Translation Approach”. In: *Proceedings of the 26th IEEE International Conference on Program Comprehension (ICPC)*. May 2018.
- [C22] Rijnard van Tonder and Claire Le Goues. “Static Automated Program Repair for Heap Properties”. In: *Proceedings of the 40th IEEE/ACM International Conference on Software Engineering (ICSE)*. Gothenburg, Sweden: ACM, May 2018, pp. 151–162. DOI: 10.1145/3180155.3180250.

- [C21] Casidhe Hutchison, Milda Zizyte, Patrick E. Lanigan, David Guttendorf, Michael Wagner, Claire Le Goues, and Philip Koopman. “Robustness Testing of Autonomy Software”. In: *Proceedings of the 40th International Conference on Software Engineering: Software Engineering in Practice (ICSE SEIP)*. Gothenburg, Sweden: ACM, May 2018, pp. 276–285. DOI: 10.1145/3183519.3183534.
- [C20] Cody Kinner, Zack Coker, Jiacheng Wang, David Garlan, and Claire Le Goues. “Managing Uncertainty in Self-Adaptive Systems with Plan Reuse and Stochastic Search”. In: *Proceedings of the 12th IEEE/ACM International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*. May 2018.
- [C19] Mauricio Soto and Claire Le Goues. “Using a probabilistic model to predict bug fixes”. In: *Proceedings of the 25th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER)*. Campobasso, Italy, Mar. 2018, pp. 221–231. DOI: 10.1109/SANER.2018.8330211.
- [C18] Christopher Steven Timperley, Afsoon Afzal, Deborah Katz, Jam Marcos Hernandez, and Claire Le Goues. “Crashing simulated planes is cheap: Can simulation detect robotics bugs early?”. In: *Proceedings of the 11th IEEE Conference on Software Testing, Validation and Verification (ICST)*. Västerås, Sweden, Apr. 2018, pp. 331–342. DOI: 10.1109/ICST.2018.00040.
- [C17] Zack Coker, Kostadin Damevski, Claire Le Goues, Nicholas A. Kraft, David Shepherd, and Lori Pollock. “Behavior Metrics for Prioritizing Investigations of Exceptions”. In: *Proceedings of the 2017 IEEE International Conference on Software Maintenance and Evolution (ICSME, Industry Track)*. Shanghai, China: IEEE Computer Society, Sept. 2017, pp. 554–563. DOI: 10.1109/ICSME.2017.62.
- [C16] Christopher Steven Timperley, Susan Stepney, and Claire Le Goues. “An investigation into the use of mutation analysis for automated program repair”. In: *Proceedings of the 9th International Symposium on Search Based Software Engineering (SSBSE)*. Vol. 10452. Lecture Notes in Computer Science. Paderborn, Germany: Springer, Sept. 2017, pp. 99–114. DOI: 10.1007/978-3-319-66299-2\_7.
- [C15] Xuan-Bach D. Le, Duc Hiep Chu, David Lo, Claire Le Goues, and Willem Visser. “S3: Syntax- and Semantic-Guided Repair Synthesis via Programming by Examples”. In: *Proceedings of the 11th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*. Paderborn, Germany: ACM, Sept. 2017, pp. 593–604. DOI: 10.1145/3106237.3106309.
- [C14] Cyrus Omar, Ian Voysey, Michael Hilton, Joshua Sunshine, Claire Le Goues, Jonathan Aldrich, and Matthew Hammer. “Toward Semantic Foundations for Program Editors”. In: *Proceedings of the 2nd Summit on Advances in Programming Languages (SNAPL)*. Asilomar, CA, USA: Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, May 2017, 11:1–11:12. DOI: 10.4230/LIPIcs.SNAPL.2017.11.
- [C13] Vinicius Paulo L. Oliveira, Eduardo F. D. Souza, Claire Le Goues, and Celso G. Camilo-Junior. “Improved Crossover Operators for Genetic Programming for Program Repair”. In: *Proceedings of the 8th International Symposium on Search Based Software Engineering (SSBSE)*. Vol. 9962. Lecture Notes in Computer Science. Raleigh, NC, USA, Oct. 2016, pp. 112–127. DOI: 10.1007/978-3-319-47106-8\_8.
- [C12] Tien-Duy B. Le, David Lo, Claire Le Goues, and Lars Grunske. “A Learning-to-rank Based Fault Localization Approach Using Likely Invariants”. In: *Proceedings of the 25th International Symposium on Software Testing and Analysis (ISSTA)*. Saarbrücken, Germany: ACM, July 2016, pp. 177–188. DOI: 10.1145/2931037.2931049.
- [C11] Yuan Tian, Dinusha Wijedasa, David Lo, and Claire Le Goues. “Learning to rank for bug report assignee recommendation”. In: *Proceedings of the 24th IEEE International Conference on Program Comprehension (ICPC)*. Austin, TX, USA: IEEE Computer Society, May 2016, pp. 1–10. DOI: 10.1109/ICPC.2016.7503715.
- [C10] Xuan-Bach D. Le, David Lo, and Claire Le Goues. “History Driven Program Repair”. In: *Proceedings of the 23rd IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER)*. Vol. 1. Osaka, Japan: IEEE Computer Society, Mar. 2016, pp. 213–224. DOI: 10.1109/SANER.2016.76.
- [C9] Zack Coker, Michael Maass, Tianyuan Ding, Claire Le Goues, and Joshua Sunshine. “Evaluating the Flexibility of the Java Sandbox”. In: *Proceedings of the 31st Annual Computer Security Applications Conference (ACSAC)*. Los Angeles, CA, USA: ACM, Dec. 2015, pp. 1–10. DOI: 10.1145/2818000.2818003.

- [C8] Yalin Ke, Kathryn T. Stolee, Claire Le Goues, and Yuriy Brun. “Repairing Programs with Semantic Code Search”. In: *Proceedings of the 30th IEEE/ACM International Conference on Automated Software Engineering (ASE)*. Lincoln, NE, USA: IEEE Computer Society, Nov. 2015, pp. 295–306. DOI: 10.1109/ASE.2015.60.
- [C7] Edward K. Smith, Earl Barr, Claire Le Goues, and Yuriy Brun. “Is the Cure Worse than the Disease? Overfitting in Automated Program Repair”. In: *Proceedings of the 10th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*. Bergamo, Italy: ACM, Sept. 2015, pp. 532–543. DOI: 10.1145/2786805.2786825.
- [C6] Claire Le Goues, Stephanie Forrest, and Westley Weimer. “Representations and Operators for Improving Evolutionary Software Repair”. In: *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*. Philadelphia, PA, USA: ACM, July 2012, pp. 959–966. DOI: 10.1145/2330163.2330296.
- [C5] Claire Le Goues, Michael Dewey-Vogt, Stephanie Forrest, and Westley Weimer. “A Systematic Study of Automated Program Repair: Fixing 55 out of 105 bugs for \$8 Each”. In: *Proceedings of the 34th International Conference on Software Engineering (ICSE)*. Zurich, Switzerland: IEEE Computer Society, June 2012, pp. 3–13. DOI: 10.1109/ICSE.2012.6227211.
- [C4] Ethan Fast, Claire Le Goues, Stephanie Forrest, and Westley Weimer. “Designing better fitness functions for automated program repair”. In: *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*. Portland, OR, USA: ACM, July 2010, pp. 965–972. DOI: 10.1145/1830483.1830654.
- [C3] Stephanie Forrest, Westley Weimer, ThanhVu Nguyen, and Claire Le Goues. “A genetic programming approach to automated software repair”. In: *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*. Montreal, Québec, Canada: ACM, July 2009, pp. 947–954. DOI: 10.1145/1569901.1570031.
- [C2] Westley Weimer, ThanhVu Nguyen, Claire Le Goues, and Stephanie Forrest. “Automatically Finding Patches Using Genetic Programming”. In: *Proceedings of the 31st International Conference on Software Engineering (ICSE)*. Vancouver, Canada: IEEE, May 2009, pp. 364–374. DOI: 10.1109/ICSE.2009.5070536.
- [C1] Claire Le Goues and Westley Weimer. “Specification Mining with Few False Positives.” In: *Proceedings of the 15th Annual Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Held as Part of the Joint European Conferences on Theory and Practice of Software (ETAPS)*. Vol. 5505. Lecture Notes in Computer Science. York, UK: Springer, Mar. 2009, pp. 292–306. DOI: 10.1007/978-3-642-00768-2\_26.

## Refereed Short Publications

- [S14] Afsoon Afzal, Jeremy Lacomis, Claire Le Goues, and Christopher S. Timperley. “A Turing Test for Genetic Improvement (Position Paper)”. In: *Proceedings of the 4th International Genetic Improvement Workshop*. GI ’18. 2018.
- [S13] Christopher Steven Timperley, Susan Stepney, and Claire Le Goues. “Poster: BugZoo: A Platform for Studying Software Bugs”. In: *Proceedings of the 40th International Conference on Software Engineering: Companion Proceedings (ICSE Poster)*. Gothenburg, Sweden: ACM, May 2018, pp. 446–447. DOI: 10.1145/3183440.3195050.
- [S12] Mauricio Soto and Claire Le Goues. “Common Statement Kind Changes to Inform Automatic Program Repair”. In: *Proceedings of the 15th International Conference on Mining Software Repositories (MSR Challenge)*. Gothenburg, Sweden, May 2018.
- [S11] Afsoon Afzal and Claire Le Goues. “A Study on the Use of IDE Features for Debugging”. In: *Proceedings of the 15th International Conference on Mining Software Repositories (MSR Challenge)*. Gothenburg, Sweden, May 2018.
- [S10] Claire Le Goues, Yuriy Brun, Stephanie Forrest, and Westley Weimer. “Clarifications on the Construction and Use of the ManyBugs Benchmark (Comment Paper)”. In: *IEEE Trans. Software Eng.* 43.11 (2017), pp. 1089–1090. DOI: 10.1109/TSE.2017.2755651.
- [S9] Xuan-Bach D. Le, Duc Hiep Chu, David Lo, Claire Le Goues, and Willem Visser. “JFix: Semantics-based repair of Java programs via Symbolic PathFinder”. In: *Proceedings of the 26th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA Tools)*. Santa Barbara, CA, USA: ACM, July 2017, pp. 376–379. DOI: 10.1145/3092703.3098225.

- [S8] Mauricio Soto, Zack Coker, and Claire Le Goues. “Analyzing the Impact of Social Attributes on Commit Integration Success”. In: *Proceedings of the 14th International Conference on Mining Software Repositories (MSR Challenge)*. Buenos Aires, Argentina: IEEE Computer Society, May 2017, pp. 483–486. DOI: 10.1109/MSR.2017.34.
- [S7] Xuan-Bach D. Le, David Lo, and Claire Le Goues. “Empirical Study on Synthesis Engines for Semantics-based Program Repair”. In: *Proceedings of the 32nd IEEE International Conference on Software Maintenance and Evolution (ICSME ERA)*. Raleigh, NC, USA: IEEE Computer Society, Oct. 2016, pp. 423–427. DOI: 10.1109/ICSME.2016.68.
- [S6] Xuan-Bach D. Le, Quang Loc Le, David Lo, and Claire Le Goues. “Enhancing Automated Program Repair with Deductive Verification”. In: *Proceedings of the 32nd IEEE International Conference on Software Maintenance and Evolution (ICSME ERA)*. Raleigh, NC, USA: IEEE Computer Society, Oct. 2016, pp. 428–432. DOI: 10.1109/ICSME.2016.66.
- [S5] Rijnard van Tonder and Claire Le Goues. “Defending against the attack of the micro-clones”. In: *Proceedings of the 24th IEEE International Conference on Program Comprehension (ICPC Short)*. Austin, TX, USA: IEEE Computer Society, May 2016, pp. 1–4. DOI: 10.1109/ICPC.2016.7503736.
- [S4] Mary Beth Kery, Claire Le Goues, and Brad A. Myers. “Examining Programmer Practices for Locally Handling Exceptions”. In: *Proceedings of the 13th International Conference on Mining Software Repositories (MSR Challenge)*. Austin, TX, USA: ACM, May 2016, pp. 484–487. DOI: 10.1145/2901739.2903497.
- [S3] Mauricio Soto, Ferdian Thung, Chu-Pan Wong, Claire Le Goues, and David Lo. “A Deeper Look into Bug Fixes: Patterns, Replacements, Deletions, and Additions”. In: *Proceedings of the 13th International Conference on Mining Software Repositories (MSR Challenge)*. Austin, TX, USA: ACM, May 2016, pp. 512–515. DOI: 10.1145/2901739.2903495.
- [S2] Zack Coker, David Garlan, and Claire Le Goues. “SASS: Self-Adaptation Using Stochastic Search”. In: *Proceedings of the 10th IEEE/ACM International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*. Florence, Italy: IEEE Computer Society, May 2015, pp. 168–174. DOI: 10.1109/SEAMS.2015.16.
- [S1] Claire Le Goues, K. Rustan M. Leino, and Michal Moskal. “The Boogie Verification Debugger (Tool Paper)”. In: *Proceedings of the 9th International Conference on Software Engineering and Formal Methods (SEFM)*. Vol. 7041. Lecture Notes in Computer Science. Montevideo, Uruguay: Springer, Nov. 2011, pp. 407–414. DOI: 10.1007/978-3-642-24690-6\_28.

## Refereed Workshop

- [W3] Westley Weimer, Stephanie Forrest, Miryung Kim, Claire Le Goues, and Patrick Hurley. “Trusted Software Repair for System Resiliency”. In: *Proceedings of the 46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN Workshops)*. Toulouse, France: IEEE Computer Society, July 2016, pp. 238–241. DOI: 10.1109/DSN-W.2016.64.
- [W2] Claire Le Goues, Stephanie Forrest, and Westley Weimer. “The case for software evolution”. In: *Proceedings of the Workshop on Future of Software Engineering Research (FoSER), at the 18th ACM SIGSOFT International Symposium on Foundations of Software Engineering*. Santa Fe, NM, USA: ACM, Nov. 2010, pp. 205–210. DOI: 10.1145/1882362.1882406.
- [W1] ThanhVu Nguyen, Westley Weimer, Claire Le Goues, and Stephanie Forrest. “Using Execution Paths to Evolve Software Patches”. In: *Second International Conference on Software Testing Verification and Validation, Workshops Proceedings*. Denver, CO, USA: IEEE Computer Society, Apr. 2009, pp. 152–153. DOI: 10.1109/ICSTW.2009.35.

## Unconventional and Non-Refereed Publications

- [N3] Xuan-Bach D. Le, Ferdian Thung, David Lo, and Claire Le Goues. “Overfitting in semantics-based automated program repair”. In: *Proceedings of the 40th International Conference on Software Engineering (Journal First)*. ICSE (Journal First) 2018. Gothenburg, Sweden: ACM, May 2018, p. 163. DOI: 10.1145/3180155.3182536.



- [N2] Claire Le Goues and Shin Yoo. “Guest editorial for special section on research in search-based software engineering”. In: *Empirical Software Engineering* 22.2 (2017), pp. 849–851. DOI: 10.1007/s10664-017-9504-6.
- [N1] Sunghun Kim, Claire Le Goues, Michael Pradel, and Abhik Roychoudhury. “Automated Program Repair (Dagstuhl Seminar 17022)”. In: *Dagstuhl Reports* 7.1 (2017). Ed. by Sunghun Kim, Claire Le Goues, Michael Pradel, and Abhik Roychoudhury, pp. 19–31. ISSN: 2192-5283. DOI: 10.4230/DagRep.7.1.19.

## Invited Tutorials

- [T1] Stephanie Forrest and Claire Le Goues. “Evolutionary software repair (Invited Tutorial)”. In: *Genetic and Evolutionary Computation Conference (GECCO): Companion Material Proceedings*. Philadelphia, PA, USA: ACM, July 2012, pp. 1345–1348. DOI: 10.1145/2330784.2330943.

## Formal Presentations

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*Note: Excludes conference presentations, interviews.*

- Evolving Software Quality (invited keynote)  
–4th International Genetic Improvement Workshop (GI), co-located with ICSE 2018  
*Gothenburg, Sweden, June 2018*
- Advances in automated software repair  
–FaceTAV 2017 Symposium, Facebook, *London, UK, Nov 2017*  
Video available: <https://facetavlondon2017.splashthat.com/>
- FTFY: Research Advances in Automatic Bug Repair (invited keynote)  
–O’Reilly Velocity NY, *NYC, NY, Sep 2017*
- Research Advances in Automatic Program Repair  
–Amazon, *Seattle, WA, Sep 2017*
- Scalable Semantic Code Search for High-Quality Program Repair  
–University of Washington, *Seattle, WA, Jan 2017*  
–Microsoft Research, *Redmond, WA, Jan 2017*  
–Dagstuhl Seminar 17022, Automated Program Repair, *Wadern, Germany, Jan 2017*
- Overview on Search-based Program Patching  
–Dagstuhl Seminar 17022, Automated Program Repair, *Wadern, Germany, Jan 2017*
- Automatic patch generation (invited keynote)  
–PWLConf, co-located with StrangeLoop 2016  
*St. Louis, MO, Sep 2016*  
Video available: [https://www.youtube.com/watch?v=sRkfMe0\\_5cA](https://www.youtube.com/watch?v=sRkfMe0_5cA)
- Passing tests is easy: when full coverage isn’t enough (invited keynote)  
–9th International Workshop on Search Based Software Testing (SBST), co-located with ICSE 2016  
*Austin, TX, May 2016*
- Automatic Program Repair Using Genetic Programming  
–University of Massachusetts, Amherst, *Amherst, MA, Jan 2014*  
–Virginia Polytechnic Institute and State University (Virginia Tech), *Blacksburg, VA, Sep 2012*
- Bloat vs. overfitting in test-driven GP for program repair  
–28th Crest Open Workshop, Genetic Programming for Software Engineering  
University College London, *London, UK, Oct 2013*
- Question your assumptions: the bleeding edge of search-based program repair  
–Lille 1 University/INRIA Lille Norde-Europe, *Lille, France, Oct 2013*
- Specification Mining with few false positives  
–King’s College London, *Nov 2009*

## Invited Panels

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### New Faculty Symposium

–40th International Conference on Software Engineering (ICSE)  
*Gothenburg, Sweden, May 2018*

### Thirty Years of Automated Software Engineering (ASE)

–30th IEEE/ACM International Conference on Automated Software Engineering (ASE)  
*Lincoln, NE, Nov 2015*  
*Moderated by Lars Grunske*

## Student Supervision

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### Postdoctoral Advisor

current Christopher Timperley started November, 2016

### PhD Advisor

current	Deborah Katz	Ph.D. in Computer Science, entered 2012
	Zack Coker	Ph.D. in Computer Science, entered 2013
	Mauricio Soto	Ph.D. in Software Engineering, entered 2014
	Rijnard van Tonder	Ph.D. in Software Engineering, entered 2014
	Afsoon Afzal	Ph.D. in Software Engineering, entered 2015
	Cody Kinneer	Ph.D. in Software Engineering, entered 2016
	Jeremy Lacomis	Ph.D. in Software Engineering, entered 2017

### PhD Dissertation Committee Member

current	Paulo Casanova	School of Computer Science, CMU
	Milda Zizyte	College of Engineering, CMU
	Xuechen (Jerry) Lei	College of Engineering, CMU
2017	Gabriel Moreno	School of Computer Science, CMU
	Jason Tsay	School of Computer Science, CMU
2014	David Kelk	University of Ontario Institute of Technology

### Masters Advisor

2017	Jon Kotheimer	Heinz College of Public Policy, CMU
2016	Ted Smith	University of Massachusetts - Amherst

## Teaching Activities

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### Instructor of Record

*Carnegie Mellon University*

17-355	Program Analysis (cross-listed, 17-655, 17-819) (undergraduate, graduate)	Spring 2018
17-356	Software Engineering for Startups (undergraduate)	Spring 2018
15-313	Foundations of Software Engineering (undergraduate)	Fall 2017
17-654	Analysis of Software Engineering (Masters)	Spring 2017
15-313	Foundations of Software Engineering (undergraduate)	Fall 2016
17-808	Software Engineering Research (Ph.D.)	Fall 2016
15-819O	Special Topics in Programming Languages: Program Analysis (Ph.D)	Spring 2016
15-313	Foundations of Software Engineering (undergraduate)	Fall 2015
17-808	Software Engineering Research (Ph.D.)	Fall 2015
17-654	Analysis of Software Engineering (Masters)	Spring 2015
15-313	Foundations of Software Engineering (undergraduate)	Fall 2014
17-808	Software Engineering Research (Ph.D.)	Fall 2014
17-654	Analysis of Software Engineering (Masters)	Spring 2014
17-808	Software Engineering Research (Ph.D.)	Fall 2013

*University of Virginia*

## Software and Software Artifacts

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Other code and data can be found at <https://github.com/squaresLab> and <http://squareslab.github.io>.

**JFix:** Semantics-based repair for Java programs. Implements S3.

<https://xuanbachle.github.io/semanticsrepair/>

**BugZoo:** A framework for performing empirical studies on automated repair of C programs.

<https://github.com/squaresLab/BugZoo>

**SearchRepair:** A semantic-search-based automated program repair technique.

<https://github.com/ProgramRepair/SearchRepair>

**ManyBugs and IntroClass:** benchmarks for research in automated repair of C programs.

<http://repairbenchmarks.cs.umass.edu>

**GenProg:** framework for search-and evolutionary-computation-based repair of C programs.

<https://squareslab.github.io/genprog-code/>

**Boogie Verification Debugger (BVD):** tool to assist in debugging failed program verification activities.

<http://boogie.codeplex.com/>

## Professional Associations

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ACM	Association for Computing Machinery
ACM SIGSOFT	ACM Special Interest Group on Software Engineering
IEEE	The Institute of Electrical and Electronics Engineers
IEEE Women	IEEE Women in Engineering