

Claire Le Goues

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School of Computer Science
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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

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

Education

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

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, Awards, Fellowships

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

Local Service at Carnegie Mellon University

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
 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. *Search-Based Software Engineering - 6th International Symposium, SS-BSE 2014, Fortaleza, Brazil, August 26-29, 2014. Proceedings*. 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: *Communications of the ACM* (June 2018).
- [J7] Xuan Bach D. Le, Ferdian Thung, David Lo, and Claire Le Goues. “Overfitting in semantics-based automated program repair”. In: *Empirical Software Engineering* (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* (2018, to appear).
- [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.

Refereed Conference Publications

- [C23] Alan Jaffe, Jeremy Lacomis, Edward Schwartz, Claire Le Goues, and Bogdan Vasilescu. “Meaningful Variable Names for Decompiled Code: A Machine Translation Approach”. In: *IEEE 26th International Conference on Program Comprehension. ICPC ’18*. 2018, to appear.
- [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 ’18*. 2018, to appear.
- [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 IEEE/ACM International Conference on Software Engineering - Software Engineering in Practice Track. ICSE-SEIP ’18*. 2018, to appear.
- [C20] Cody Kinneer, 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 ’18*. 2018, to appear.
- [C19] Mauricio Soto and Claire Le Goues. “Using a probabilistic model to predict bug fixes”. In: *IEEE 25rd International Conference on Software Analysis, Evolution, and Reengineering (SANER). SANER ’18*. 2018, to appear.
- [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 ’18*. 2018, to appear.
- [C17] Zack Coker, Kostadin Damevski, Claire Le Goues, Nicholas A. Kraft, David Shepherd, and Lori Pollock. “Behavior Metrics for Prioritizing Investigations of Exceptions”. In: *International Conference on Software Maintenance and Evolution (Industry Track). ICSME-Industry ’17*. 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 ’17. 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 ’17. 2017, pp. 593–604. DOI: 10.1145/3106237.3106309.
- [C14] C. Omar, I. Voysey, M. Hilton, J. Sunshine, C. Le Goues, J. Aldrich, and M. Hammer. “Toward Semantic Foundations for Program Editors”. In: *2nd Summit on Advances in Programming Languages*. SNAPL ’17. 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 ’16. 2016, pp. 112–127.
- [C12] Tien-Duy B. Le, David Lo, Claire Le Goues, and Lars Grunke. “A Learning-to-rank Based Fault Localization Approach Using Likely Invariants”. In: *International Symposium on Software Testing and Analysis*. ISSTA ’16. 2016, pp. 177–188. ISBN: 978-1-4503-4390-9. DOI: 10.1145/2931037.2931049.
- [C11] Y. Tian, D. Wijedasa, D. Lo, and C. Le Goues. “Learning to rank for bug report assignee recommendation”. In: *IEEE 24th International Conference on Program Comprehension*. ICPC ’16. 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: *IEEE 23rd International Conference on Software Analysis, Evolution, and Reengineering (SANER)*. Vol. 1. 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 ’15. 2015, pp. 1–10.
- [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)*. (ASE). Lincoln, NE, USA, 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 ’15. 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: *Genetic and Evolutionary Computation Conference*. 2012, pp. 959–966.
- [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: *International Conference on Software Engineering*. 2012, pp. 3–13.
- [C4] Ethan Fast, Claire Le Goues, Stephanie Forrest, and Westley Weimer. “Designing better fitness functions for automated program repair”. In: *Genetic and Evolutionary Computation Conference*. 2010, pp. 965–972.
- [C3] Stephanie Forrest, Westley Weimer, ThanhVu Nguyen, and Claire Le Goues. “A genetic programming approach to automated software repair”. In: *Genetic and Evolutionary Computation Conference*. 2009, pp. 947–954. ISBN: 978-1-60558-325-9.
- [C2] Westley Weimer, ThanhVu Nguyen, Claire Le Goues, and Stephanie Forrest. “Automatically Finding Patches Using Genetic Programming”. In: *International Conference on Software Engineering*. 2009, pp. 364–367.
- [C1] Claire Le Goues and Westley Weimer. “Specification Mining with Few False Positives.” In: *Tools and Algorithms for the Construction and Analysis of Systems*. 2009, pp. 292–306. ISBN: 978-3-642-00767-5.

Refereed Short Publications

- [S13] Christopher Steven Timperley, Susan Stepney, and Claire Le Goues. “Poster: BugZoo: A Platform for Studying Software Bugs”. In: *Proceedings of the 40th IEEE/ACM International Conference on Software Engineering - Poster Track*. ICSE-Poster ’18. 2018, to appear.
- [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 (Challenge Track)*. MSR-Challenge ’18. 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 (Challenge Track)*. MSR-Challenge ’18. 2018, to appear.
- [S10] Claire Le Goues, Yuriy Brun, Stephanie Forrest, and Westley Weimer. “Clarifications on the Construction and Use of the ManyBugs Benchmark”. In: *IEEE Transactions on Software Engineering (TSE) (comment paper)* (2017). 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: *International Symposium on Software Testing and Analysis (Tools)*. ISSA-Tools ’17. 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: *International Conference on Mining Software Repositories*. MSR ’17. Buenos Aires, Argentina, 2017, pp. 483–486.
- [S7] David Lo Le Dinh Xuan Bach 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 - Early Research Achievements*. ICSME-ERA ’16. 2016, pp. 423–427.
- [S6] David Lo Le Dinh Xuan Bach Quang Loc Le and Claire Le Goues. “Enhancing Automated Program Repair with Deductive Verification”. In: *Proceedings of the 32nd IEEE International Conference on Software Maintenance and Evolution - Early Research Achievements*. ICSME-ERA ’16. 2016, pp. 428–432.
- [S5] Rijnard van Tonder and Claire Le Goues. “Defending against the attack of the micro-clones”. In: *IEEE 24th International Conference on Program Comprehension*. ICPC ’16. 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 ’16. 2016, pp. 484–487. ISBN: 978-1-4503-4186-8. 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 ’16. 2016, pp. 512–515. ISBN: 978-1-4503-4186-8. 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 ’16. 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*. 2011, pp. 407–414. DOI: 10.1007/978-3-642-24690-6_28.

Refereed Workshop Publications

- [W3] Westley Weimer, Stephanie Forrest, Miryung Kim, Claire Le Goues, and Patrick Hurley. “Trusted Software Repair for System Resiliency”. In: *46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshops*. DSN Workshops ’16. 2016, pp. 238–241. URL: <http://dx.doi.org/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, at the 18th ACM SIGSOFT International Symposium on Foundations of Software Engineering*. FoSER 2010. 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*. ICST '09, Workshops Proceedings. 2009, pp. 152–153. DOI: 10.1109/ICSTW.2009.35.

Non-Refereed Publications

- [N3] Claire Le Goues and Shin Yoo. “Guest editorial for special section on research in search-based software engineering”. In: *Empirical Software Engineering* 22.2 (Apr. 2017), pp. 849–851. ISSN: 1573-7616. DOI: 10.1007/s10664-017-9504-URL: <http://dx.doi.org/10.1007/s10664-017-9504-6>.
- [N2] 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. URL: <http://drops.dagstuhl.de/opu>
- [N1] Stephanie Forrest and Claire Le Goues. “Evolutionary software repair (Invited Tutorial)”. In: *Genetic and Evolutionary Computation Conference, GECCO '12, Philadelphia, PA, USA, July 7-11, 2012, Companion Material Proceedings*. Ed. by Terence Soule and Jason H. Moore. ACM, 2012, pp. 1345–1348. ISBN: 978-1-4503-1178-6. DOI: 10.1145/2330784.2330943.

Invited Tutorials

- [T1] Stephanie Forrest and Claire Le Goues. “Evolutionary software repair (Invited Tutorial)”. In: *Genetic and Evolutionary Computation Conference, GECCO '12, Philadelphia, PA, USA, July 7-11, 2012, Companion Material Proceedings*. Ed. by Terence Soule and Jason H. Moore. ACM, 2012, pp. 1345–1348. ISBN: 978-1-4503-1178-6. DOI: 10.1145/2330784.2330943.

Formal Presentations

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

- 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

Invited Keynote: Automatic patch generation

- PWLConf, co-located with StrangeLoop 2016
- St. Louis, MO*, Sep 2016
- Video available: https://www.youtube.com/watch?v=sRkfMe0_5cA

Invited Keynote: Passing tests is easy: when full coverage isn’t enough

- 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 Nord-Europe, *Lille, France*, Oct 2013

Specification Mining with few false positives
–King’s College London, Nov 2009

Invited Panels

New Faculty Symposium
–40th International Conference on Software Engineering (ICSE)

Thirty Years of Automated Software Engineering (ASE)
–30th IEEE/ACM International Conference on Automated Software Engineering (ASE)
Moderated by Lars Grunske

Student Supervision

Postdoctoral Advisor

current	Christopher Timperley	started November, 2016
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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

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
15-8190	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
<i>University of Virginia</i>		
CS444/6444	High Performance and Parallel Computation (undergraduate/graduate)	Spring 2013

Software and Software Artifacts

Linked project pages list project collaborators. Other code and data can be found at <http://squareslab.github.io>.

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

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

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

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

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

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