

Gregory James Gay

University of South Carolina
Department of Computer Science & Engineering
3A66 Swearingen Engineering Center,
Columbia, SC 29201

E-Mail: greg@greggay.com
Skype: Greg4cr
Phone: (803) 777-9479

Research Interests:

Automated software testing and analysis, search-based software engineering, automated test generation, data analytics, optimization, information retrieval.

Teaching Interests:

Software engineering, software testing, software verification & validation, software design principles, artificial intelligence, data structures, programming languages.

Education:

- Ph.D. Computer Science, University of Minnesota, Minneapolis, Minnesota, 2015.
Advisor: Dr. Mats Heimdahl.
Thesis title: *Steering Model-Based Oracles to Admit Real Program Behaviors*.
- M.S. Computer Science, West Virginia University, Morgantown, West Virginia, 2010.
Advisor: Dr. Tim Menzies.
Thesis title: *Robust Optimization of Non-Linear Requirements Models*.
- B.S. Computer Science, West Virginia University, Morgantown, West Virginia, 2008.

Professional Experience:

- 2015–Present** Assistant Professor, University of South Carolina, Columbia, SC.
Department of Computer Science & Engineering
- 2010–2015** Research Assistant, University of Minnesota, Minneapolis, MN.
Critical Systems Group (under Mats Heimdahl)
- 2010** Visiting Researcher, Chinese Academy of Sciences, Beijing, PRC.
Lab for Internet Software Technologies, Institute of Software
- 2009** Intern, National Aeronautics and Space Administration (NASA), Mountain View, CA.
Robust Software Engineering Group, Ames Research Center
- 2007–2010** Research Assistant, West Virginia University, Morgantown, WV.
Modeling Intelligence Lab (under Tim Menzies)
- 2006–2007** Research Assistant, West Virginia University, Morgantown, WV.
Virtual Environments Lab (under Francis Van Scoy)
- 2005** SEAP Intern, National Aeronautics and Space Administration (NASA), Fairmont, WV.
Independent Verification & Validation Center

Teaching Experience:

For University of South Carolina courses, review scores are out of 5 points.

Spring 2017 Instructor, Software Testing and Quality Assurance (Graduate).

Reviews: TBD

Fall 2016 Instructor, Software Engineering (Graduate).

Reviews: On Clear Presentation - 4.29, On Preparedness - 4.40, On Effective Use of Time - 4.14, On Enthusiasm - 4.08, On Facilitating Understanding - 4.40, On Clear Answering of Questions - 4.27, On Respect - 4.47

Spring 2016 Instructor, Software Testing and Quality Assurance (Graduate).

Reviews: On Clear Presentation - 4.55, On Preparedness - 4.55, On Effective Use of Time - 4.55, On Enthusiasm - 4.64, On Facilitating Understanding - 4.55, On Clear Answering of Questions - 4.64, On Respect - 4.55

Spring 2016 Instructor, Seminar on Advances in Computing (Graduate).

Reviews: On Clear Presentation - 4.81, On Preparedness - 4.53, On Effective Use of Time - 4.73, On Enthusiasm - 4.69, On Facilitating Understanding - 4.63, On Clear Answering of Questions - 4.50, On Respect - 4.75

Fall 2015 Instructor, Software Engineering (Graduate).

Reviews: On Clear Presentation - 4.85, On Preparedness - 5.00, On Effective Use of Time - 5.00, On Enthusiasm - 4.92, On Facilitating Understanding - 5.00, On Clear Answering of Questions - 5.00, On Respect - 4.92

For University of Minnesota courses, review scores are out of 6 points.

Spring 2015 Instructor, Software Engineering 1 (Undergraduate/Graduate).

Reviews: On Preparedness - 5.70, On Clear Presentation - 5.22, On Helpful Feedback - 4.97, On Respect - 5.81, On Facilitating Understanding - 4.92, On Stimulating Further Interest in Topic - 4.42

Fall 2014 Teaching Assistant, Software Engineering 1 (Undergraduate/Graduate).

Reviews: On Preparedness - 5.60, On Clear Presentation - 5.60, On Helpful Feedback - 5.70, On Respect - 5.80, On Facilitating Understanding - 5.20, On Stimulating Further Interest in Topic - 5.10

Fall 2013 Teaching Assistant, Software Engineering 1 (Undergraduate/Graduate).

Reviews: On Preparedness - 5.40, On Clear Presentation - 5.14, On Helpful Feedback - 5.38, On Respect - 5.62, On Facilitating Understanding - 5.34, On Stimulating Further Interest in Topic - 5.17

Spring 2013 Teaching Assistant, Software Engineering 2 (Undergraduate/Graduate).

Reviews: On Preparedness - 5.58, On Clear Presentation - 5.58, On Helpful Feedback - 5.67, On Respect - 5.62, On Facilitating Understanding - 5.00, On Stimulating Further Interest in Topic - 4.75

Fall 2012 Teaching Assistant, Software Engineering 1 (Undergraduate/Graduate).

Reviews: On Preparedness - 5.26, On Clear Presentation - 5.23, On Helpful Feedback - 5.23, On Respect - 5.45, On Facilitating Understanding - 5.29, On Stimulating Further Interest in Topic - 4.97

Spring 2012 Participant, University of Minnesota Preparing Future Faculty Program.

Student Supervision:

Ph.D. Advisor

Ongoing Hazhar Rahmani, Ph.D. in Computer Science, Estimated Graduation: Spring 2021.

Alireza Salahirad, Ph.D. in Computer Science, Estimated Graduation: Spring 2021.

M.S. Advisor

Ongoing Ying Meng, M.S. in Software Engineering, Estimated Graduation: Spring 2017.
Srujana Bollina, M.S. in Computer Science, Estimated Graduation: Summer 2017.
Avini Sogani, M.S. in Computer Science, Estimated Graduation: Summer 2017.

Funding:

2017–2019 National Science Foundation Award CCF-1657299, CRII: SHF: Understanding The Role of Software Test Adequacy Criteria in Search-Based Test Generation (\$173,528.00).

Awards:

2016 Challenge Award Winner, 8th Symposium on Search-Based Software Engineering (SSBSE'16)

2014 Best Presentation, 7th International Workshop on Search-Based Software Testing (SBST'14)

2010–2013 National Science Foundation Graduate Research Fellowship

Conference Committees and Chairmanships:

2018 Workshop Co-Chair, International Conference on Software Testing, Verification, and Validation (ICST'18).

2017–Present Program Committee, International Workshop on Search-Based Software Testing (SBST).

2017–Present Program Committee, European Conference on the Applications of Evolutionary Computing (EvoSET Track—Nature-inspired algorithms in Software Engineering and Testing).

2017 Publicity Co-Chair, Symposium on Search-Based Software Engineering (SSBSE).

2016–Present Steering Committee Chair, International Workshop on Search-Based Software Testing (SBST).

2016–Present Steering Committee, Symposium on Search-Based Software Engineering (SSBSE).

2016–Present Program Committee, Symposium on Search-Based Software Engineering (SSBSE).

2016 Workshop Co-Chair, 9th International Workshop on Search-Based Software Testing (SBST'16).

2016 Program Co-Chair, 3rd International Workshop on Requirements Engineering and Testing (RET'16).

2015–Present Steering Committee, International Workshop on Search-Based Software Testing (SBST).

2015 Workshop Co-Chair, 8th International Workshop on Search-Based Software Testing (SBST'15).

2015 Program Committee, International Workshop on Actionable Analytics for SE (ACTION'15).

2011–2012 Program Committee, International Conference on Predictive Models in Software Engineering (PROMISE).

2012 North America Publicity Chair, 27th IEEE /ACM International Conference on Automated Software Engineering (ASE'12).

2012 Web Chair, 20th IEEE International Conference on Requirements Engineering (RE'12).

2008–2010 Web Chair, International Conference on Predictive Models in Software Engineering (PROMISE).

Journal Publications:

1. Gregory Gay, Sanjai Rayadurgam, Mats P.E. Heimdahl. Automated Steering of Model-Based Test Oracles to Admit Real Program Behaviors. *To appear, IEEE Transactions on Software Engineering*. Available online at <http://greggay.com/pdf/16steering.pdf>.
2. Gregory Gay, Ajitha Rajan, Matt Staats, Michael Whalen, Mats P.E. Heimdahl. The Effect of Program and Model Structure on the Effectiveness of MC/DC Test Adequacy Coverage. *ACM Transactions on Software Engineering and Methodology*. Volume 25, Number 3. August, 2016. Article 25. Available online at <http://greggay.com/pdf/16mcdc.pdf>.
3. Gregory Gay, Matt Staats, Michael Whalen, Mats P.E. Heimdahl. Automated Oracle Data Selection Support. *IEEE Transactions on Software Engineering*. Volume 41, Number 11. November, 2015. Pages 1119-1137.. Available online at <http://greggay.com/pdf/15oracles.pdf>.
4. Gregory Gay, Matt Staats, Michael Whalen, Mats P.E. Heimdahl. The Risks of Coverage-Directed Test Case Generation. *IEEE Transactions on Software Engineering*. Volume 41, Number 8. August, 2015. Pages 803-819.. Available online at <http://greggay.com/pdf/15covrisks.pdf>.
5. Adam Nelson, Tim Menzies, and Gregory Gay. Sharing Experiments Using Open-Source Software. *Software: Practice and Experience*. Volume 41, Number 3. March, 2011. Pages 283-305.. Available online at <http://greggay.com/pdf/10ourmine.pdf>.
6. Gregory Gay, Tim Menzies, Misty Davies, and Karen Gundy-Burlet. Automatically Finding the Control Variables for Complex System Behavior. *Automated Software Engineering*. Volume 17, Number 4. December, 2010. Pages 1-30. Available from <http://www.greggay.com/pdf/10tar3.pdf>.
7. Gregory Gay, Tim Menzies, Omid Jalali, Gregory Mundy, Beau Gilkerson, Martin Feather, and James Kiper. Finding Robust Solutions in Requirements Models. *Automated Software Engineering*. Volume 17, Number 1. March, 2010. Pages 87-116. Available from <http://www.greggay.com/pdf/10keys.pdf>.

Conference Publications:

8. Gregory Gay. The Fitness Function for the Job: Search-Based Generation of Test Suites that Detect Real Faults. *To appear, proceedings of the 10th International Conference on Software Testing, Verification, and Validation (ICST'17)*. Tokyo, Japan, March 2017. Available from <http://greggay.com/pdf/17fitness.pdf>. *Acceptance Rate 27% (135 Submitted, 36 Accepted)*
9. Gregory Gay. Challenges in Using Search-Based Test Generation to Identify Real Faults in Mockito. *Proceedings of the 8th Symposium on Search-Based Software Engineering, Challenge Track (SS-BSE'16)*. Raleigh, NC, USA, October 2016. Available from <http://greggay.com/pdf/16mockito.pdf>. *Acceptance Rate Unknown.*
10. Dongjiang You, Sanjai Rayadurgam, Michael Whalen, Mats P.E. Heimdahl, Gregory Gay. Efficient Observability-based Test Generation by Dynamic Symbolic Execution. *Proceedings of the 26th IEEE International Symposium on Software Reliability Engineering (ISSRE'15)*. Gaithersburg, MD, USA, November 2015. Available from <http://greggay.com/pdf/15issre.pdf>. *Acceptance Rate 32% (172 Submitted, 55 Accepted)*
11. Gregory Gay, Sanjai Rayadurgam, Mats P.E. Heimdahl. Improving the Accuracy of Oracle Verdicts Through Automated Model Steering. *Proceedings of the 29th ACM/IEEE International Conference on Automated Software Engineering (ASE'14)*. Vasteras, Sweden, September 2014. Available from <http://greggay.com/pdf/14ase.pdf>. *Acceptance Rate 20% (276 Submitted, 55 Accepted)*
12. Gregory Gay, Sanjai Rayadurgam, Mats P.E. Heimdahl. Steering Model-Based Oracles to Admit Real Program Behaviors. *Proceedings of the 36th ACM/IEEE International Conference on Software Engineering, NIER Track (ICSE'14-NIER)*. Hyderabad, India, June 2014. Available from <http://greggay.com/pdf/14nier.pdf>. *Acceptance Rate 24% (146 Submitted, 35 Accepted)*

13. Michael Whalen, Gregory Gay, Dongjiang You, and Mats P.E. Heimdahl. Observable Modified Condition/Decision Coverage. *Proceedings of the 35th ACM/IEEE International Conference on Software Engineering (ICSE'13)*. San Francisco, United States, May 2013. Available from <http://greggay.com/pdf/13omcdc.pdf>. *Acceptance Rate 19% (461 Submitted, 85 Accepted)*
14. Matt Staats, Gregory Gay, and Mats P.E. Heimdahl. Automated Oracle Creation Support, or: How I Learned to Stop Worrying About Fault Propagation and Love Mutation Testing. *Proceedings of the 34th ACM/IEEE International Conference on Software Engineering (ICSE'12)*. Zurich, Switzerland, May 2012. Available from <http://greggay.com/pdf/12oracle.pdf>. *Acceptance Rate 21% (408 Submitted, 87 Accepted)*
15. Matt Staats, Gregory Gay, Michael Whalen, and Mats P.E. Heimdahl. On the Danger of Coverage Directed Test Case Generation. *Proceedings of the 15th International Conference on Fundamental Approaches to Software Engineering (FASE'12)*. Talinn, Estonia, March 2012. Available from <http://greggay.com/pdf/12danger.pdf>. *Acceptance Rate 25% (134 Submitted, 33 Accepted)*
16. Ekrem Kocaguneli, Gregory Gay, Tim Menzies, Ye Yang, and Jacky Keung. When to Use Data from Other Projects for Effort Estimation. Short Paper, *Proceedings of the 25th ACM/IEEE International Conference on Automated Software Engineering (ASE'10)*. Antwerp, Belgium, September 2010. Available from <http://greggay.com/pdf/10ccwc.pdf>. *Acceptance Rate 18% (191 Submitted, 34+31 Accepted)*
17. Gregory Gay. A Baseline Method For Search-Based Software Engineering. *Proceedings of the 6th International Conference on Predictive Models in Software Engineering (PROMISE'10)*. Banff, Canada, September 2010. Available from <http://greggay.com/pdf/10baseline.pdf>. *Acceptance Rate 36% (53 Submitted, 19 Accepted)*
18. Jia Chen, Ye Yang, Wen Zhang, Gregory Gay. Measuring the Heterogeneity of Crosscompany Datasets. *Proceedings of the 11th International Conference on Product Focused Software Development and Process Improvement (PROFES'10)*. Limerick, Ireland, June 2010. Available from <http://greggay.com/pdf/10profes.pdf>. *Acceptance Rate Unknown.*
19. Gregory Gay, Sonia Haiduc, Andrian Marcus, Tim Menzies. On the Use of Relevance Feedback in IR-based Concept Location. *Proceedings of the 25th IEEE International Conference on Software Maintenance (ICSM'09)*. Alberta, Canada, September 2009. Available from <http://greggay.com/pdf/09irrf.pdf>. *Acceptance Rate 22% (162 Submitted, 35 Accepted)*
20. Gregory Gay, Tim Menzies, Bojan Cukic, Burak Turhan. How to Build Repeatable Experiments. *Proceedings of the 5th International Conference on Predictive Models in Software Engineering (PROMISE'09)*. Vancouver, Canada, May 2009. Available from <http://greggay.com/pdf/09ourmine.pdf>. *Acceptance Rate 48% (36 Submitted, 17 Accepted)*

Workshop Publications:

21. Gregory Gay, Matt Staats, Michael Whalen, and Mats P.E. Heimdahl. Moving the Goalposts: Coverage Satisfaction is Not Enough. *Proceedings of the 7th International Workshop on Search-Based Software Testing (SBST'14)*. Hyderabad, India, June 2014. Available from <http://greggay.com/pdf/14sbst.pdf>. *Acceptance Rate 53% (19 Submitted, 10 Accepted)*
22. Gregory Gay and Mats P.E. Heimdahl. Towards Community-Assisted Software Engineering Decision Making. *Proceedings of the 2nd International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering (RAISE 2013), "Over the Horizon" track*. San Francisco, California, May 2013. Available from <http://greggay.com/pdf/13raise.pdf>. *Acceptance Rate Unknown.*
23. Tim Menzies, Burak Turhan, Gregory Gay, Ayse Bener, Bojan Cukic and Yue Jiang. Implications of Ceiling Effects in Defect Predictors. *Proceedings of the 4th International Workshop on Predictive*

Models in Software Engineering (PROMISE'08). Leipzig, Germany, May 2008. Available from <http://greggay.com/pdf/08ceiling.pdf>. *Acceptance Rate 81% (16 Submitted, 13 Accepted)*

Other Publications:

24. Michael Unterkalmsteiner, Gregory Gay, Michael Felderer, Elizabeth Bjarnason, Markus Borg, Mirko Morandini. Summary of the 3rd International Workshop on Requirements Engineering and Testing (RET 2016). *ACM SIGSOFT Software Engineering Notes*. Volume 41, Number 3. May, 2016. Pages 31-33.. Available from <http://greggay.com/pdf/16ret.pdf>.
25. Gregory Gay, Giuliano Antoniol. 8th International Workshop on Search-based Software Testing (SBST 2015). *Proceedings of the 37th International Conference on Software Engineering (ICSE'15)—Workshop Summaries*. Florence, Italy, May 2015. Available from <http://greggay.com/pdf/sbst-summary.pdf>.
26. Gregory Gay. Automated Steering of Model-Based Test Oracles to Admit Real Program Behaviors. *Doctoral Dissertation, University of Minnesota*. Minneapolis, MN, May 2015. Available from <http://greggay.com/pdf/GregoryGayDissertation.pdf>.
27. Gregory Gay and Mats P.E. Heimdahl. Towards Community-Assisted Software Engineering Decision Making. *University of Minnesota Tech Report 13-015*. Minneapolis, MN, April 2013. Available from <http://greggay.com/pdf/13raise.pdf>.
28. Gregory Gay. The Robust Optimization of Non-Linear Requirements Models. *MS Thesis, West Virginia University*. Morgantown, WV, May 2010. Available from http://greggay.com/pdf/thesis_v1.pdf.

Invited Presentations:

1. South Carolina Law Review 2016 Symposium. February 2016. Columbia, SC.
Panelist: The Science of Cyber Attacks
2. West Virginia University. March 2015. Morgantown, WV.
Invited Talk: Steering Model-Based Oracles to Admit Real Program Behaviors
3. College of William and Mary. March 2015. Williamsburg, VA.
Invited Talk: Steering Model-Based Oracles to Admit Real Program Behaviors
4. University of South Carolina. February 2015. Columbia, SC.
Invited Talk: Steering Model-Based Oracles to Admit Real Program Behaviors
5. Concordia University. January 2015. Montreal, QC, Canada.
Invited Talk: Steering Model-Based Oracles to Admit Real Program Behaviors
6. University of Colorado Denver. March 2014. Denver, CO.
Invited Talk: Connecting the Dots: Improving the Effectiveness of Testing by Leveraging Artifact Relationships
7. Miami University. February 2014. Oxford, OH.
Invited Talk: Connecting the Dots: Improving the Effectiveness of Testing by Leveraging Artifact Relationships
8. University of Kentucky. February 2014. Lexington, KY.
Invited Talk: Connecting the Dots: Improving the Effectiveness of Testing by Leveraging Artifact Relationships
9. California Polytechnic State University. February 2014. San Luis Obispo, CA.
Invited Talk: Connecting the Dots: Improving the Effectiveness of Testing by Leveraging Artifact Relationships

10. Oakland University. January 2014. Oakland, MI.
Invited Talk: Connecting the Dots: Improving the Effectiveness of Testing by Leveraging Artifact Relationships
11. Middle Tennessee State University. January 2014. Murfreesboro, TN.
Invited Talk: Connecting the Dots: Improving the Effectiveness of Testing by Leveraging Artifact Relationships
12. University of Minnesota Graduate Student Colloquium. October 2011. Minneapolis, MN.
Invited Talk: Software Test Oracles: How I Learned to Stop Worrying and Love Mutation Testing
13. Midwest Verification Day 2011. September 2011. Minneapolis, MN.
Invited Talk: Towards Oracle Creation Support
14. Tsinghua University School of Software. March 2010. Beijing, PRC.
Invited Talk: Finding Robust Solutions to Model Optimization Problems
15. Institute of Software, Chinese Academy of Sciences. January 2010. Beijing, PRC.
Invited Talk: OURMINE: A Toolkit for Sharing Experiments
16. NASA Ames Research Center Summer Intern Talks. August 2009. Mountain View, CA.
Invited Talk: Automatically finding the control variables for complex system behavior
17. WVU/NETL/ERA Workshop on Digital Preservation of Complex Engineering Data. April 2009. Morgantown, WV. Poster Presentation: Information Retrieval with HAMLET

Professional Activities:

- 2016–Present** Reviewer, Journal of Systems and Software
- 2016–Present** Reviewer, IEEE Transactions on Evolutionary Computation.
- 2016–Present** Reviewer, Journal of Classification.
- 2015–Present** Reviewer, Empirical Software Engineering (journal).
- 2015–Present** Reviewer, ACM Transactions on Software Engineering and Methodology.
- 2014–Present** Reviewer, IEEE Transactions on Software Engineering.
- 2014–Present** Reviewer, Automated Software Engineering (conference).
- 2014–Present** Reviewer, Software Testing, Verification and Reliability.
- 2013–Present** Reviewer, IEEE Software.
- 2012–Present** Reviewer, Software Quality Journal.
- 2010–Present** Reviewer, Automated Software Engineering (journal).
- 2016** Reviewer, 2017 IFAC World Conference
- 2014** Reviewer, Journal of Aerospace Information Systems.
- 2013** Student Volunteer, International Conference on Software Engineering.
- 2012** Reviewer, Formal Methods for Industrial Critical Systems.
- 2012** Student Volunteer, 2012 International Symposium on Software Testing and Analysis.
- 2008–2009** President, ACM West Virginia University Student Chapter.
- 2007–2008** Vice-President, ACM West Virginia University Student Chapter.
- 2007–2010** Member, West Virginia University Engineering Student Advisory Council.

Affiliate:

- Member of IEEE, ACM, Upsilon Pi Epsilon.