# Gregory Gay

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## 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:

- Docent, University of Gothenburg, Gothenburg, Sweden, 2021.
- 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:

**2021–Present** Associate Professor, Chalmers and the University of Gothenburg, Gothenburg, Sweden.
Interaction Design and Software Engineering Division,
Department of Computer Science & Engineering

**2019–2021** Assistant Professor, Chalmers and the University of Gothenburg, Gothenburg, Sweden.
Interaction Design and Software Engineering Division,
Department of Computer Science & Engineering

**2015–2019** 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 Gothenburg courses, review scores are out of 5 points.

**Fall 2021 (SP2)** Course Responsible, Software Engineering Principles for Complex Systems (Bachelor, Chalmers University of Technology).
Course Materials: `https://greg4cr.github.io/courses/fall21tda594/index.html`
Reviews: TBA

**Spring 2021 (SP3)** Course Responsible, Software Quality and Testing (Bachelor, U. Gothenburg).
Course Materials: `https://greg4cr.github.io/courses/spring21dit635/index.html`
Reviews: Awareness of Learning Outcomes - 4.5, Course Structure - 4.7, Teaching Methods - 4.6, Course Literature - 4.1, Appropriate Examination - 4.7, Course Administration - 4.7, Overall Impression - 4.7

**Fall 2020 (SP2)** Course Responsible, Software Engineering Principles for Complex Systems (Bachelor, Chalmers University of Technology).
Course Materials: `https://greg4cr.github.io/courses/fall20tda594/index.html`
Reviews: Awareness of Learning Outcomes - 3.5, Course Structure - 3.1, Teaching Methods - 2.9, Course Literature - 3.0, Appropriate Examination - 3.1, Course Administration - 2.6, Overall Impression - 2.6

**Spring 2020 (SP3)** Course Responsible, Software Quality and Testing (Bachelor, U. Gothenburg).
Course Materials: `https://greg4cr.github.io/courses/spring20dit635/index.html`
Reviews: Awareness of Learning Outcomes - 3.9, Course Structure - 3.4, Teaching Methods - 2.7, Course Literature - 2.7, Appropriate Examination - 3.5, Course Administration - 3.9, Overall Impression - 2.6

**Fall 2019 (SP2)** Co-Teacher, Miniproject: Team Programming (Bachelor, U. Gothenburg).
Course Materials: `https://greg4cr.github.io/courses/misc/index.html`

**Fall 2019 (SP1)** Co-Teacher, Mobile and Web Development (Bachelor, U. Gothenburg).
Course Materials: `https://greg4cr.github.io/courses/misc/index.html`
Reviews: Awareness of Learning Outcomes - 4.2, Course Structure - 3.4, Teaching Methods - 4.0, Course Literature - 3.9, Appropriate Examination - 3.8, Course Administration - 4.0, Overall Impression - 3.8

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

**Spring 2019** Examiner, Software Engineering (Undergraduate).
Course Materials: `https://greg4cr.github.io/courses/spring19csce247/index.html`
Reviews: On Clear Presentation - 4.64, On Preparedness - 4.55, On Effective Use of Time - 4.64, On Enthusiasm - 4.74, On Facilitating Understanding - 4.25, On Clear Answering of Questions - 4.45, On Respect - 4.80

**Fall 2018** Examiner, Software Architecture (Graduate).
Course Materials: `https://greg4cr.github.io/courses/fall18csce742/index.html`
Reviews: On Clear Presentation - 5.00, On Preparedness - 5.00, On Effective Use of Time - 5.00, On Enthusiasm - 4.75, On Facilitating Understanding - 4.75, On Clear Answering of Questions - 4.75, On Respect - 5.00

**Spring 2018** Examiner, Software Testing and Quality Assurance (Graduate).
Course Materials: `https://greg4cr.github.io/courses/spring18csce747/index.html`
Reviews: On Clear Presentation - 5.00, On Preparedness - 4.95, On Effective Use of Time - 5.00, On Enthusiasm - 4.90, On Facilitating Understanding - 4.81, On Clear Answering of Questions - 4.95, On Respect - 5.00

**Fall 2017** Examiner, Seminar on Advances in Computing (Graduate). Course Materials: `https://greg4cr.github.io/courses/fall17csce791/index.html`

**Fall 2017** Examiner, Software Engineering (Graduate).
Course Materials: `https://greg4cr.github.io/courses/fall17csce740/index.html`
Reviews: On Clear Presentation - 4.60, On Preparedness - 4.73, On Effective Use of Time - 4.80, On Enthusiasm - 4.60, On Facilitating Understanding - 4.53, On Clear Answering of Questions - 4.87, On Respect - 4.93

**Spring 2017** Examiner, Software Testing and Quality Assurance (Graduate).
Course Materials: `https://greg4cr.github.io/courses/spring17csce747/index.html`
Reviews: On Clear Presentation - 4.79, On Preparedness - 4.86, On Effective Use of Time - 4.85, On Enthusiasm - 4.79, On Facilitating Understanding - 4.83, On Clear Answering of Questions - 4.69, On Respect - 4.92

**Fall 2016** Examiner, Software Engineering (Graduate).
Course Materials: `https://greg4cr.github.io/courses/fall16csce740/index.html`
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** Examiner, Seminar on Advances in Computing (Graduate).
Course Materials: `https://greg4cr.github.io/courses/spring16csce791/index.html`
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

**Spring 2016** Examiner, Software Testing and Quality Assurance (Graduate).
Course Materials: `https://greg4cr.github.io/courses/spring16csce747/index.html`
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

**Fall 2015** Examiner, Software Engineering (Graduate).
Course Materials: `https://greg4cr.github.io/courses/fall15csce740/index.html`
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** Examiner, 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. Supervisor

**Ongoing** Afonso Fontes (University of Gothenburg), Estimated Graduation: 2025.

**Ongoing** Alireza Salahirad (University of South Carolina), Estimated Graduation: 2022.

**2020** Hussein Almulla (University of South Carolina)

### Ph.D. Co-Supervision

**Ongoing** Khan Mohammad Habibullah (University of Gothenburg), Estimated Graduation: 2025.

**Ongoing** Ying Meng (University of South Carolina), Estimated Graduation: 2023.

### Ph.D. or Licentiate Examination

**2022** William Hoskins (Ph.D., University of South Carolina).

**2021** Khouloud Gaaloul (Ph.D., University of Luxembourg).

**2020** Mahshid Helali (Licentiate, Mälardalen University).

### M.S. Supervisor

**Ongoing** Teklit Berihu Gereziher and Selam Gebrekrstos, M.S. in Software Engineering and Technology (Chalmers University of Technology)

**2020** Ashish Husain and Martin Tran, M.S. in Software Engineering and Technology (Chalmers University of Technology).

**2020** Rasmus Jenth, M.S. in Computer Science and Engineering (Chalmers University of Technology).

**2019** Burl Kenner III, M.S. in Engineering Management (University of South Carolina).

**2018** Srujana Bollina, M.S. in Computer Science (University of South Carolina).

**2017** Ying Meng, M.S. in Software Engineering (University of South Carolina).

### M.S. Co-Supervision

**2018** George Akhvlediani, M.S. in Computer Science (University of South Carolina, Co-Supervisor).

### B.S. Supervisor

**2022** Shonaigh Douglas, B.S. in Software Engineering and Management (University of Gothenburg).

**2022** Dia Istanbuly and Max Zimmer, B.S. in Software Engineering and Management (University of Gothenburg).

**2020** Fabian Daneshmand-Mehr and Daniel Salomons, B.S. in Software Engineering and Management (University of Gothenburg).

**2020** Sarkis George Sarkisian, B.S. in Software Engineering and Management (University of Gothenburg).

**Independent Study Supervisor**[1]

**2018** Hayley Lichtenfels, B.S. in Computer Science (University of South Carolina).

**2016** Allen Kanapala, M.S. in Computer Science (University of South Carolina).

**2016** Narasimha Chilukuri, M.S. in Software Engineering (University of South Carolina).

**2016** Craig Sharp, Ph.D. in Computer Science (University of South Carolina).

## Funding:

**2020–2024** Vetenskapsrådet (Swedish Research Council) Award 2019-05275, Context-Infused Automated Software Test Generation (Sole PI, 3,900,000 SEK).

**2020–Present** Software Center, Aspects of Automated Testing (15% of research hours funded on an ongoing basis).

**2019–2020** South Carolina NASA EPSCoR, Robust Software Testing of Autonomous Aerospace Robotic Systems Using Transfer Learning (Co-PI, $25,000.00).

**2018–2019** University of South Carolina ASPIRE-1, Investigating the Relationship between Real and Synthetic Software Faults (Sole PI, $14,959.00).

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

## Awards:

**2020** Distinguished Reviewer, $35^{th}$ International Conference on Automated Software Engineering (ASE'20)

**2019** 2009-2019 Most Influential Paper Award, $35^{th}$ International Conference on Software Maintenance and Evolution (ICSME'19)

**2019** Best Reviewer, Journal of Systems and Software.

**2018** Graduate Teaching Award, University of South Carolina (Department of Computer Science & Engineering)

**2018** Challenge Award Winner, $10^{th}$ Symposium on Search-Based Software Engineering (SSBSE'18)

**2018** Best Presentation, $11^{th}$ International Workshop on Search-Based Software Testing (SBST'18)

**2016** Challenge Award Winner, $8^{th}$ Symposium on Search-Based Software Engineering (SSBSE'16)

**2014** Best Presentation, $7^{th}$ International Workshop on Search-Based Software Testing (SBST'14)

**2010–2013** National Science Foundation Graduate Research Fellowship

## Conference Steering Committees and Chairmanships:

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

**2022** Publicity and Social Media Co-Chair, $38^{th}$ International Conference on Software Maintenance and Evolution (ICSME'22)

**2021** Artifact Evaluation Co-Chair, $37^{th}$ International Conference on Software Maintenance and Evolution (ICSME'21)

**2021** Challenge Track Co-Chair, $13^{th}$ Symposium on Search-Based Software Engineering (SSBSE'21).

**2020** New Ideas and Emerging Results (NIER) Track Co-Chair, $12^{th}$ Symposium on Search-Based Software Engineering (SSBSE'20).

**2015–2020** Steering Committee, International Workshop on Search-Based Software Testing (SBST).

[1] An "Independent Study" in the US is similar to a Swedish Bachelor's Thesis in scope and duration.

**2019** Program Co-Chair, $11^{th}$ Symposium on Search-Based Software Engineering (SSBSE'19).

**2019** Co-Chair, $3^{rd}$ ROSE Festival (Recognizing and Rewarding Open Science in Software Engineering, ESEC/FSE Special Track).

**2019** General Chair, $6^{th}$ International Workshop on Requirements Engineering and Testing (RET'19)

**2018** Workshop Co-Chair, $11^{th}$ International Conference on Software Testing, Verification, and Validation (ICST'18).

**2018** Program Co-Chair, $5^{th}$ International Workshop on Requirements Engineering and Testing (RET'18)

**2017–2018** Steering Committee Deputy Chair, International Workshop on Search-Based Software Testing (SBST).

**2017** Publicity Co-Chair, $9^{th}$ Symposium on Search-Based Software Engineering (SSBSE'17).

**2017** Co-Chair, $4^{th}$ International Workshop on Requirements Engineering and Testing (RET'17).

**2016–2017** Steering Committee Chair, International Workshop on Search-Based Software Testing (SBST).

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

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

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

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

**2012** Web Chair, $20^{th}$ IEEE International Conference on Requirements Engineering (RE'12).

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

## Conference Program Committees:

**2020–Present** Program Committee, International Conference on Automated Software Engineering (ASE)

**2020–Present** Program Committee, Symposium on Search-Based Software Engineering (SSBSE) (Replications and Negative Results Track)

**2019–Present** Program Committee, International Conference on Automated Software Engineering (ASE) (Tool Demonstrations)

**2018–Present** Program Committee, Genetic and Evolutionary Computation Conference (GECCO)

**2017–Present** Program Committee, International Conference on Advances in System Testing and Validation Lifecycle (VALID).

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

**2022** Program Committee, International Conference on Software Engineering (ICSE).

**2021** Program Committee, International Conference on the Applications of Evolutionary Computing (EvoApplications)

**2021** Program Committee, International Conference on Software Analysis, Evolution and Reengineering (SANER) (Tool Track)

**2021** Program Committee, International Workshop on Test Oracles (TORACLE)

**2020** Program Committee, International Conference on Software Engineering (ICSE) (Poster Track).

**2020** Program Committee, Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) (Tool Demonstrations)

**2020** Program Committee, Symposium on Search-Based Software Engineering (SSBSE) (Challenge Track)

**2017–2019** Program Committee, European Conference on the Applications of Evolutionary Computing (EvoSET Track—Nature-inspired algorithms in Software Engineering and Testing).

**2019** Program Committee, International Symposium on Software Testing and Analysis (ISSTA) (Tool Demonstrations)

**2019** Program Committee, International Workshop on Software Engineering Intelligence (SEI)

**2018–2019** Program Committee, International Conference on Software Testing, Verification, and Validation (ICST)

**2018–2019** Program Committee, International Conference on Software Engineering (ICSE) (Demonstrations Track).

**2017–2018** Program Committee, International Workshop on Software Analytics (SWAN).

**2016–2018** Program Committee, Symposium on Search-Based Software Engineering (SSBSE).

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

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

## Books and Chapters:

1. Afonso Fontes, Gregory Gay, Francisco Gomes de Oliveria Neto, Robert Feldt. Automated Support for Unit Test Generation. *Optimising the Software Development Process with Artificial Intelligence.* Springer, 2022. To appear. Available online at `http://greg4cr.github.io/pdf/21ai4se.pdf`.
2. Shiva Nejati and Gregory Gay, editors. Proceedings of the 11th International Symposium on Search-Based Software Engineering, SSBSE 2019, Talinn, Estonia, August 31-September 1, 2019. Vol. 11664. Lecture Notes in Computer Science. Springer, 2019. ISBN: 978-3-030-27455-9. DOI: 10.1007/978-3-030-27455-9.

## Journal Publications:

Names in **bold** are supervised students.

3. **Hussein Almulla**, Gregory Gay. Learning How to Search: Generating Exception-Triggering Tests Through Adaptive Fitness Function Selection. *Empirical Software Engineering Journal.* To appear, 2021. Available online at `http://greg4cr.github.io/pdf/21affs.pdf`.
4. **Alireza Salahirad**, **Hussein Almulla**, Gregory Gay. Choosing The Fitness Function for the Job: Automated Generation of Test Suites that Detect Real Faults. *Wiley Software Testing, Verification and Reliability.* Volume 29, Issue 4-5. June-August, 2019. Available online at http://greg4cr.github.io/pdf/19fitness.pdf.
5. **Ying Meng**, Gregory Gay, Michael Whalen. Ensuring the Observability of Structural Test Obligations. *IEEE Transactions on Software Engineering.* Volume 46, Issue 7, September 2018. Available online at http://greg4cr.github.io/pdf/18omcdc.pdf.
6. Amanda Schwartz, Daniel Puckett, **Ying Meng**, Gregory Gay. Investigating Faults Missed by Test Suites Achieving High Code Coverage. *Journal of Systems and Software.* Volume 144. October, 2018. Pages 106-120. Available online at http://greg4cr.github.io/pdf/18mutation.pdf.
7. Gregory Gay, Sanjai Rayadurgam, Mats P.E. Heimdahl. Automated Steering of Model-Based Test Oracles to Admit Real Program Behaviors. *IEEE Transactions on Software Engineering.* Volume 43, Number 6. June, 2017. Pages 531-555. Available online at http://greg4cr.github.io/pdf/16steering.pdf.
8. 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://greg4cr.github.io/pdf/16mcdc.pdf.

9. 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://greg4cr.github.io/pdf/15oracles.pdf.
10. 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://greg4cr.github.io/pdf/15covrisks.pdf.
11. Adam Nelson, Tim Menzies, 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://greg4cr.github.io/pdf/10ourmine.pdf.
12. 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 online at http://www.greg4cr.github.io/pdf/10tar3.pdf.
13. 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 online at http://www.greg4cr.github.io/pdf/10keys.pdf.

## Conference Publications:

14. Hamid Ebadi, Mahshid Helali Moghadam, Markus Borg, Gregory Gay, **Afonso Fontes**, Kasper Socha. Efficient and Effective Generation of Test Cases for Pedestrian Detection–Search-based Software Testing of Baidu Apollo in SVL. *Proceedings of 3$^{rd}$ IEEE International Conference on Artificial Intelligence Testing, Challenge Track (AiTest'21).* Bari, Italy, August 2021. Available online at http://greg4cr.github.io/pdf/21aitest.pdf. *Acceptance Rate Unknown.*
15. Gregory Gay, René Just. Defects4J as a Challenge Case for the Search-Based Software Engineering Community. *Proceedings of 12$^{th}$ Symposium on Search-Based Software Engineering, Challenge Cases Track (SSBSE'20).* Bari, Italy, September 2020. Available online at http://greg4cr.github.io/pdf/20d4j.pdf. *Acceptance Rate 52% (34 Submitted, 18 Accepted)*
16. **Hussein Almulla**, Gregory Gay. Generating Diverse Test Suites for Gson Through Adaptive Fitness Function Selection. *Proceedings of 12$^{th}$ Symposium on Search-Based Software Engineering, Challenge Solutions Track (SSBSE'20).* Bari, Italy, September 2020. Available online at http://greg4cr.github.io/pdf/20rldiv.pdf. *Acceptance Rate 52% (34 Submitted, 18 Accepted)*
17. **Srujana Bollina**, Gregory Gay. Bytecode-based Multiple Condition Coverage: An Initial Investigation. *Proceedings of 12$^{th}$ Symposium on Search-Based Software Engineering, Replications and Negative Results Track (SSBSE'20).* Bari, Italy, September 2020. Available online at http://greg4cr.github.io/pdf/20bmcc.pdf. *Acceptance Rate 52% (34 Submitted, 18 Accepted)*
18. **Ying Meng**, Gregory Gay. Understanding The Impact of Solver Choice in Model-Based Test Generation. *Proceedings of the ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM'20).* Bari, Italy, September 2020. Available online at http://greg4cr.github.io/pdf/20solvers.pdf. *Acceptance Rate 21% (123 Submitted, 26 Accepted)*
19. **Hussein Almulla**, Gregory Gay. Learning How to Search: Generating Exception-Triggering Tests Through Adaptive Fitness Function Selection. *Proceedings of the 13$^{th}$ IEEE International Conference on Software Testing, Verification, and Validation (ICST'20).* Porto, Portugal, March 2020. Available online at http://greg4cr.github.io/pdf/20icst.pdf. *Acceptance Rate 24% (114 Submitted, 27 Accepted)*
20. **Allen Kanapala**, Gregory Gay. Mapping Class Dependencies for Fun and Profit. *Proceedings of the 10$^{th}$ Symposium on Search-Based Software Engineering, Hot Off the Press Track (SSBSE'18).* Montpellier, France, September 2018. Available online at http://greg4cr.github.io/pdf/18coupling.pdf. *Acceptance Rate Unknown.*

21. Gregory Gay. Detecting Real Faults in the Gson Library Through Search-Based Unit Test Generation. *Proceedings of the 10$^{th}$ Symposium on Search-Based Software Engineering, Challenge Track (SSBSE'18).* Montpellier, France, September 2018. Available online at http://greg4cr.github.io/pdf/18gson.pdf. *Acceptance Rate Unknown.*

22. **Hussein Almulla**, **Alireza Salahirad**, Gregory Gay. Using Search-Based Test Generation to Discover Real Faults in Guava. *Proceedings of the 9$^{th}$ Symposium on Search-Based Software Engineering, Challenge Track (SSBSE'17).* Paderborn, Germany, September 2017. Available online at http://greg4cr.github.io/pdf/17guava.pdf. *Acceptance Rate Unknown.*

23. Gregory Gay. Generating Effective Test Suites by Combining Coverage Criteria. *Proceedings of the 9$^{th}$ Symposium on Search-Based Software Engineering (SSBSE'17).* Paderborn, Germany, September 2017. Available online at http://greg4cr.github.io/pdf/17ssbse.pdf. *Acceptance Rate 23% (31 Submitted, 7 Accepted)*

24. Gregory Gay. The Fitness Function for the Job: Search-Based Generation of Test Suites that Detect Real Faults. *Proceedings of the 10$^{th}$ IEEE International Conference on Software Testing, Verification, and Validation (ICST'17).* Tokyo, Japan, March 2017. **Best Paper Nominee**. Available online at http://greg4cr.github.io/pdf/17fitness.pdf. *Acceptance Rate 27% (135 Submitted, 36 Accepted)*

25. Gregory Gay. Challenges in Using Search-Based Test Generation to Identify Real Faults in Mockito. *Proceedings of the 8$^{th}$ Symposium on Search-Based Software Engineering, Challenge Track (SSBSE'16).* Raleigh, NC, USA, October 2016. **Best Paper Winner (Challenge Track)**. Available online at http://greg4cr.github.io/pdf/16mockito.pdf. *Acceptance Rate Unknown.*

26. Dongjiang You, Sanjai Rayadurgam, Michael Whalen, Mats P.E. Heimdahl, Gregory Gay. Efficient Observability-based Test Generation by Dynamic Symbolic Execution. *Proceedings of the 26$^{th}$ IEEE International Symposium on Software Reliability Engineering (ISSRE'15).* Gaithersburg, MD, USA, November 2015. Available online at http://greg4cr.github.io/pdf/15issre.pdf. *Acceptance Rate 32% (172 Submitted, 55 Accepted)*

27. Gregory Gay, Sanjai Rayadurgam, Mats P.E. Heimdahl. Improving the Accuracy of Oracle Verdicts Through Automated Model Steering. *Proceedings of the 29$^{th}$ ACM/IEEE International Conference on Automated Software Engineering (ASE'14).* Vasteras, Sweden, September 2014. Available online at http://greg4cr.github.io/pdf/14ase.pdf. *Acceptance Rate 20% (276 Submitted, 55 Accepted)*

28. Gregory Gay, Sanjai Rayadurgam, Mats P.E. Heimdahl. Steering Model-Based Oracles to Admit Real Program Behaviors. *Proceedings of the 36$^{th}$ ACM/IEEE International Conference on Software Engineering, NIER Track (ICSE'14-NIER).* Hyderabad, India, June 2014. Available online at http://greg4cr.github.io/pdf/14nier.pdf. *Acceptance Rate 24% (146 Submitted, 35 Accepted)*

29. Michael Whalen, Gregory Gay, Dongjiang You, and Mats P.E. Heimdahl. Observable Modified Condition/Decision Coverage. *Proceedings of the 35$^{th}$ ACM/IEEE International Conference on Software Engineering (ICSE'13).* San Francisco, United States, May 2013. Available online at http://greg4cr.github.io/pdf/13omcdc.pdf. *Acceptance Rate 19% (461 Submitted, 85 Accepted)*

30. 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 34$^{th}$ ACM/IEEE International Conference on Software Engineering (ICSE'12).* Zurich, Switzerland, May 2012. Available online at http://greg4cr.github.io/pdf/12oracle.pdf. *Acceptance Rate 21% (408 Submitted, 87 Accepted)*

31. Matt Staats, Gregory Gay, Michael Whalen, and Mats P.E. Heimdahl. On the Danger of Coverage Directed Test Case Generation. *Proceedings of the 15$^{th}$ International Conference on Fundamental Approaches to Software Engineering (FASE'12).* Talinn, Estonia, March 2012. Available online at http://greg4cr.github.io/pdf/12danger.pdf. *Acceptance Rate 25% (134 Submitted, 33 Accepted)*

32. 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 25$^{th}$ ACM/IEEE International*

*Conference on Automated Software Engineering (ASE'10)*. Antwerp, Belguim, September 2010. Available online at http://greg4cr.github.io/pdf/10ccwc.pdf. *Acceptance Rate 18% (191 Submitted, 34 Accepted)*

33. Gregory Gay. A Baseline Method For Search-Based Software Engineering. *Proceedings of the 6$^{th}$ International Conference on Predictive Models in Software Engineering (PROMISE'10)*. Banff, Canada, September 2010. Available online at http://greg4cr.github.io/pdf/10baseline.pdf. *Acceptance Rate 36% (53 Submitted, 19 Accepted)*
34. Jia Chen, Ye Yang, Wen Zhang, Gregory Gay. Measuring the Heterogeneity of Crosscompany Datasets. *Proceedings of the 11$^{th}$ International Conference on Product Focused Software Development and Process Improvement (PROFES'10)*. Limerick, Ireland, June 2010. Available online at http://greg4cr.github.io/pdf/10profes.pdf. *Acceptance Rate Unknown.*
35. Gregory Gay, Sonia Haiduc, Andrian Marcus, Tim Menzies. On the Use of Relevance Feedback in IR-based Concept Location. *Proceedings of the 25$^{th}$ IEEE International Conference on Software Maintenance (ICSM'09)*. Alberta, Canada, September 2009. **2009–2019 Most Influential Paper Award**. Available online at http://greg4cr.github.io/pdf/09irrf.pdf. *Acceptance Rate 22% (162 Submitted, 35 Accepted)*
36. Gregory Gay, Tim Menzies, Bojan Cukic, Burak Turhan. How to Build Repeatable Experiments. *Proceedings of the 5$^{th}$ International Conference on Predictive Models in Software Engineering (PROMISE'09)*. Vancouver, Canada, May 2009. Available online at http://greg4cr.github.io/pdf/09ourmine.pdf. *Acceptance Rate 48% (36 Submitted, 17 Accepted)*

## Workshop Publications:

37. Afonso Fontes, Gregory Gay. Using Machine Learning to Generate Test Oracles: A Systematic Literature Review *Proceedings of the 1st International Workshop on Test Oracles (TORACLE'21)*. Athens, Greece, August 2021. Available online at http://greg4cr.github.io/pdf/21oracleslr.pdf. *Acceptance Rate Unknown.*
38. Gregory Gay. One-Size-Fits-None? Improving Test Generation Using Context-Optimized Fitness Functions. *Proceedings of the 12th International Workshop on Search-Based Software Testing (SBST'19)*. Montreal, Canada, May 2018. Available online at http://greg4cr.github.io/pdf/19sbst.pdf. *Acceptance Rate Unknown.*
39. Gregory Gay. To Call, or Not to Call: Contrasting Direct and Indirect Branch Coverage in Test Generation. *Proceedings of the 11th International Workshop on Search-Based Software Testing (SBST'18)*. Gothenburg, Sweden, May 2018. Available online at http://greg4cr.github.io/pdf/18sbstdbc.pdf. *Acceptance Rate Unknown.*
40. Gregory Gay. Multifaceted Test Suite Generation Using Primary and Supporting Fitness Functions. *Proceedings of the 11th International Workshop on Search-Based Software Testing (SBST'18)*. Gothenburg, Sweden, May 2018. Available online at http://greg4cr.github.io/pdf/18sbstposition.pdf. *Acceptance Rate Unknown.*
41. 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 online at http://greg4cr.github.io/pdf/14sbst.pdf. *Acceptance Rate 53% (19 Submitted, 10 Accepted)*
42. Gregory Gay and Mats P.E. Heimdahl. Towards Community-Assisted Software Engineering Decision Making. *Proceedings of the 2$^{nd}$ International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering (RAISE 2013), "Over the Horizon" track*. San Francisco, California, May 2013. Available online at http://greg4cr.github.io/pdf/13raise.pdf. *Acceptance Rate Unknown.*
43. Tim Menzies, Burak Turhan, Gregory Gay, Ayse Bener, Bojan Cukic and Yue Jiang. Implications of Ceiling Effects in Defect Predictors. *Proceedings of the 4$^{th}$ International Workshop on Predictive*

*Models in Software Engineering (PROMISE'08)*. Leipzig, Germany, May 2008. Available online at http://greg4cr.github.io/pdf/08ceiling.pdf. *Acceptance Rate 81% (16 Submitted, 13 Accepted)*

## Other Publications:

44. Paul Ralph, Nauman bin Ali, Sebastian Baltes, Domenico Bianculli, Jessica Diaz, Yvonne Dittrich, Neil Ernst, Michael Felderer, Robert Feldt, Antonio Filieri, Breno Bernard Nicolau de Frana, Carlo Alberto Furia, Gregory Gay, Nicolas Gold, Daniel Graziotin, Pinjia He, Rashina Hoda, Natalia Juristo, Barbara Kitchenham, Valentina Lenarduzzi, Jorge Martnez, Jorge Melegati, Daniel Mendez, Tim Menzies, Jefferson Molleri, Dietmar Pfahl, Romain Robbes, Daniel Russo, Nyyti Saarimki, Federica Sarro, Davide Taibi, Janet Siegmund, Diomidis Spinellis, Miroslaw Staron, Klaas Stol, Margaret-Anne Storey, Davide Taibi, Damian Tamburri, Marco Torchiano, Christoph Treude, Burak Turhan, Xiaofeng Wang, Sira Vegas. ACM SIGSOFT Empirical Standards for Software Engineering Research. *arXiv preprint arXiv:2010.03525*. March, 2021.
45. Michael Unterkalmsteiner, Tingting Yu, Gregory Gay, Elizabeth Bjarnason, Markus Borg, Michael Felderer. Summary of the 5th International Workshop on Requirements Engineering and Testing (RET 2018). *ACM SIGSOFT Software Engineering Notes*. Volume 44, Number 1, March, 2019. Pages 31–34..
46. Markus Borg, Elizabeth Bjarnason, Michael Unterkalmsteiner, Tingting Yu, Gregory Gay, Michael Felderer. Summary of the 4th International Workshop on Requirements Engineering and Testing (RET 2017). *ACM SIGSOFT Software Engineering Notes*. Volume 42, Number 4. January, 2018. Pages 28-31.. Available from http://greg4cr.github.io/pdf/18ret.pdf.
47. 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://greg4cr.github.io/pdf/16ret.pdf.
48. Gregory Gay, Giuliano Antoniol. 8th International Workshop on Search-based Software Testing (SBST 2015). *Proceedings of the 37$^{th}$ International Conference on Software Engineering (ICSE'15)—Workshop Summaries*. Florence, Italy, May 2015. Available from http://greg4cr.github.io/pdf/sbst-summary.pdf.
49. 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://greg4cr.github.io/pdf/GregoryGayDissertation.pdf.
50. 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://greg4cr.github.io/pdf/13raise.pdf.
51. Gregory Gay. The Robust Optimization of Non-Linear Requirements Models.*MS Thesis, West Virginia University*. Morgantown, WV, May 2010. Available from http://greg4cr.github.io/pdf/thesis_v1.pdf.

## Invited Presentations:

1. International Workshop on Artificial Intelligence in Software Testing. April 2021. Online.
   Keynote: Learning How to Test - Generating Context-Infused Test Cases
2. International Conference on Software Engineering. July 2020. Seoul, South Korea.
   Invited Panelist: Student Mentoring Workshop
3. Chalmers University of Technology (Machine Learning Seminar). March 2020. Gothenburg, Sweden.
   Invited Talk: Learning How to Search: Generating Exception-Triggering Tests Through Adaptive Fitness Function Selection
4. Jeppesen Systems AB. December 2019. Gothenburg, Sweden.
   Invited Talk: An Introduction to Search-Based Test Generation

5. SAST Vst. October 2019. Gothenburg, Sweden.
   Invited Talk: A Brief Introduction to Search-Based Test Generation
6. Shonan Seminar 160: Fuzzing and Symbolic Execution: Reflections, Challenges, and Opportunities. September 2019. Kanagawa, Japan.
   Invited Talk: A Brief Introduction to (Metaheuristic) Search-Based Test Generation
7. South Carolina Law Review 2016 Symposium. February 2016. Columbia, SC.
   Panelist: The Science of Cyber Attacks
8. 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
9. Midwest Verification Day 2011. September 2011. Minneapolis, MN.
   Invited Talk: Towards Oracle Creation Support
10. Tsinghua University School of Software. March 2010. Beijing, PRC.
    Invited Talk: Finding Robust Solutions to Model Optimization Problems
11. Institute of Software, Chinese Academy of Sciences. January 2010. Beijing, PRC.
    Invited Talk: OURMINE: A Toolkit for Sharing Experiments
12. NASA Ames Research Center. August 2009. Mountain View, CA.
    Invited Talk: Automatically finding the control variables for complex system behavior
13. WVU/NETL/ERA Workshop on Digital Preservation of Complex Engineering Data. April 2009. Morgantown, WV. Poster Presentation: Information Retreival with HAMLET

## Professional Activities:

**2019–Present** Member, ACM TOSEM Board of Distinguished Reviewers

**2017–Present** Member, Empirical Software Engineering Journal Review Board

**2020–Present** Reviewer, Software and Systems Modeling

**2019–Present** Reviewer, IEEE Access

**2019–Present** Reviewer, Software Practice and Experience

**2019–Present** Reviewer, Systems Engineering

**2018–Present** Reviewer, Traffic Injury Prevention

**2018–Present** Reviewer, Journal of Software: Evolution and Process

**2018–Present** Reviewer, Information and Software Technology

**2017–Present** Reviewer, IET Software

**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, Software Testing, Verification and Reliability

**2013–Present** Reviewer, IEEE Software

**2012–Present** Reviewer, Software Quality Journal

**2010–Present** Reviewer, Automated Software Engineering (journal)

**2018** Panelist, NSF Panel P181594 (CRI-SW)

**2018** Reviewer, IEEE Transactions on Reliability

**2018** Reviewer, Applied Soft Computing Journal

**2017** Reviewer, The Computer Journal

**2017** Reviewer, Formal Methods in System Design

**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 System

**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.