JAMES CLAUSE

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Education

2011	**Georgia Institute of Technology**	Atlanta, GA

PhD in Computer Science
Thesis: Enabling and Supporting the Debugging of Software Failures
Advisor: Alessandro Orso

2005	**University of Pittsburgh**	Pittsburgh, PA

MS in Computer Science

2003	**Allegheny College**	Meadville, PA

BS in Computer Science

Employment

2011–present	**Assistant Professor**, University of Delaware	Newark, DE
2010–2011	**Instructor**, University of Delaware	Newark, DE
2005–2011	**Research Assistant**, Georgia Institute of Technology	Atlanta, GA
Summer 2008	**Research Intern**, Apple Inc.	Cupertino, CA
2003–2005	**Teaching Assistant**, University of Pittsburgh	Pittsburgh, PA

Current fields of interest

Green software engineering, program analysis, testing, debugging, dynamic tainting, capture/replay

I Teaching

A Courses Taught

A.1 Graduate Level

[1] Software Process Management (CISC611, CPEG611): Spring 2011, 12 students; Fall 2011, 16 students

[2] Formal Methods in Software Engineering (CISC414, CISC614, CPEG614): Fall 2012, 14 students

[3] Software Testing and Maintenance (CISC467, CISC615, CPEG615, MISY 467): Spring 2015, 23 students, Spring 2014, 19 students; Spring 2013, 16 students

[4] Advanced Topics: Advanced Program Analysis (CISC849): Fall 2010, 11 students

[5] Advanced Topics in Computer Applications: Developing Energy-Efficient Applications (CISC849): Fall 2014, 19 students

[6] Advanced Topics in Computer Applications: Software Testing (CISC849): Fall 2016, 18 students

A.2 Undergraduate Level

[1] Introduction to Computer Science I (CISC108): Spring 2017, 58 students; Spring 2016, 44 students; Fall 2014, 55 students; Spring 2014, 31 students; Fall 2013, 40 students; Fall 2012, 49 students; Spring 2012, 43 students

B Curriculum Development

Software Testing and Maintenance This is a revised graduate course in the Masters in Software Engineering curriculum. The overall focus on the course is on software testing and maintenance methodologies for modern software.

– The development of this course was supported by JPMC Curriculum Development Grant: Software Testing and Maintenance. One month summer salary per PI. Summer 2012. Co-PI with Lori Pollock.

Software Process Management This is a new graduate course in the Masters in Software Engineering curriculum. The overall focus of the course is on effective techniques for planning and managing a software development projects.

C Individual Student Guidance

C.1 Doctoral Students

[1] Cagri Sahin: Fall 2011–2017 (co-advised with Lori Pollock)

Thesis title: Empirically Investigating Energy Impacts of Software Engineering Decisions
Proposal defense: 12/5/2014
Dissertation defense: 6/15/2017

[2] Irene Manotas: Fall 2012–present (co-advised with Lori Pollock)

Thesis title: Developing a Software Engineer's Energy-optimization Decision Support Framework
Proposal defense: 11/12/2014
Dissertation defense: August 2017, anticipated

[3] Benwen Zhang: Fall 2012–present

Thesis title: Assisting Developers in the Creation and Maintenance of Unit Tests
Proposal defense: 4/26/2016
Dissertation defense: August 2017, anticipated

[4] Chen Huo: Fall 2012–present

Thesis title: Automated Techniques for Improving the Quality of Existing Test Suites
Proposal defense: August 2017, anticipated

[5] Tedis Agolli: Fall 2016–present

[6] Abdulrahman Alshammari: Fall 2016–present

C.2 MS Independent Study Students

[1] Zhiwen Li: Fall 2013

[2] Shriya Chintada: Fall 2011

[3] Kwang Choi: Fall 2011

[4] William Friedman: Fall 2011

[5] Vaibhav Krishan: Fall 2011

[6] Ramya Narayanaswamy: Fall 2011

[7] Sandeep Kumar: Spring 2011

[8] Cagri Sahin: Spring 2011

[9] Nisha Subramanian: Fall 2010

C.3 MSSE Practicum Students

[1] Anuj Sudhir Darekar: Spring 2016

[2] Alparslan Sari: Spring 2014

[3] Chris Donohue: Fall 2013

[4] Ryan O'Dowd: Fall 2013

[5] Ayush Agarwal: Fall 2013

[6] Vaibhav Krishan: Spring 2012

C.4 Undergraduate Independent Study Students

[1] Habibullah Aslam: Winter 2017–present

[2] Gifan Thadathil: Summer 2016–present

[3] Kate Travers: Summer 2016

[4] Eluamuno Enenmo (McNair scholar): Summer 2016

[5] Drake Smith: Winter 2016

[6] Mark Bamundo: Summer 2014

[7] Zachary Pearson: Winter 2014–Spring 2014

[8] Ryan McKenna: Winter 2014–Spring 2014

[9] Philip Tornquist: Fall 2014–Spring 2014

[10] Melissa Lauten: Winter 2013

[11] Victor Tranh: Summer 2012

[12] Gregory Diamond: Summer 2011

C.5 Visiting Scholars

[1] Maher Alshamkhani (Fulbright scholar): Summer 2016

[2] Leslie Solorzano (UD-Colombian University partnership): Summer 2012

II Research and Creative Scholarship

A Journal publications (refereed)

[1] C. Sahin, L. Pollock, and J. Clause. "From Benchmarks to Real Apps: Exploring the Energy Impacts of Performance-directed Changes." In: *Journal of Systems and Software* 117 (2016), pp. 307–316.

[2] C. Sahin, M. Wan, P. Tornquist, R. McKenna, Z. Pearson, W. G. J. Halfond, and J. Clause. "How Does Code Obfuscation Impact Energy Usage?" In: *Journal of Software: Evolution and Process* 28.7 (2016), pp. 565–588.

[3] I. Doudalis, J. Clause, G. Venkataramani, M. Prvulovic, and A. Orso. "Effective and Efficient Memory Protection Using Dynamic Tainting." In: *IEEE Transactions on Computers* 61.1 (2012), pp. 87–100.

B Conference publications (refereed)

[1] C. Huo and J. Clause. "Interpreting Coverage Information Using Direct and Indirect Coverage." In: *Proceedings of the 9th IEEE International Conference on Software Testing, Verification and Validation (ICST)*. 2016, pp. 234–243. Acceptance rate: 27%.

[2] I. Manotas, C. Bird, R. Zhang, D. Shepherd, W. Snipes, C. Jaspan, C. Sakowski, L. Pollock, and J. Clause. "An Empirical Study of Practitioners' Perspectives on Green Software Engineering." In: *Proceedings of the 38th International Conference on Software Engineering (ICSE)*. 2016, pp. 237–248. Acceptance rate: 19%.

[3] B. Zhang, E. Hill, and J. Clause. "Towards Automatically Generating Descriptive Names for Unit Tests." In: *31st IEEE/ACM International Conference on Automated Software Engineering (ASE)*. 2016, pp. 625–636. Acceptance rate: 19%.

[4] B. Zhang, E. Hill, and J. Clause. "Automatically Generating Test Templates from Test Names." In: *Proceedings of the 30th IEEE/ACM International Conference on Automated Software Engineering (ASE)*. 2015, pp. 506–511. Acceptance rate: 24%.

[5] C. Huo and J. Clause. "Improving Oracle Quality by Detecting Brittle Assertions and Unused Inputs in Tests." In: *Proceedings of the 22nd International Symposium on the Foundations of Software Engineering (FSE)*. 2014, pp. 621–631. Acceptance rate: 22%.

[6] C. Sahin, P. Tornquist, R. McKenna, Z. Pearson, and J. Clause. "How Do Code Obfuscations Impact Energy Usage?" In: *Proceedings of the 30th International Conference on Software Maintenance and Evolution (ICSME)*. 2014, pp. 131–140. Acceptance rate: 19%. Nominated for Best Research Track Paper award (6 of 40 accepted papers were nominated).

[7] C. Sahin, L. Pollock, and J. Clause. "How do Code Refactorings Affect Energy Usage?" In: *Proceedings of the 8th International Symposium on Empirical Software Engineering and Measurement (ESEM)*. 2014, 36:1–36:10. Acceptance rate: 19%.

[8] B. Zhang and J. Clause. "Lightweight Automated Detection of Unsafe Information Leakage via Exceptions." In: *Proceedings of the 2014 International Symposium on Software Testing and Analysis (ISSTA)*. 2014, pp. 327–338. Acceptance rate: 28%.

[9] D. Li, Y. Jin, C. Sahin, J. Clause, and W. G. J. Halfond. "Integrated energy-directed test suite optimization." In: *Proceedings of the 2014 International Symposium on Software Testing and Analysis (ISSTA)*. 2014, pp. 339–350. Acceptance rate: 28%.

[10] I. Manotas, L. Pollock, and J. Clause. "SEEDS: A Software Engineer's Energy-optimization Decision Support Framework." In: *Proceedings of the 36th International Conference on Software Engineering (ICSE)*. 2014, pp. 503–514. Acceptance rate: 20%.

[11] C. Sahin, F. Cayci, J. Clause, F. Kiamilev, L. Pollock, and K. Winbladh. "Towards Power Reduction Through Improved Software Design." In: *Proceedings of IEEE EnergyTech*. 2012. Acceptance rate: 85%.

[12] J. Clause and A. Orso. "Camouflage: Automated anonymization of field data." In: *Proceedings of the 33rd International Conference on Software Engineering (ICSE)*. 2011, pp. 21–30. Acceptance rate: 14%.

[13] J. Clause and A. Orso. "Leakpoint: Pinpointing the causes of memory leaks." In: *Proceedings of the 32nd ACM/IEEE International Conference on Software Engineering (ICSE)*. 2010, pp. 515–524. Acceptance rate: 14%.

[14] J. Clause and A. Orso. "Penumbra: Automatically Identifying Failure-Relevant Inputs Using Dynamic Tainting." In: *Proceedings of the 2009 International Symposium on Software Testing and Analysis (ISSTA)*. 2009, pp. 249–260. Acceptance rate: 27%.

[15] J. Clause, I. Doudalis, A. Orso, and M. Prvulovic. "Effective memory protection using dynamic tainting." In: *Proceedings of the 22nd IEEE/ACM International Conference on Automated Software Engineering (ASE)*. 2007, pp. 284–292. Acceptance rate: 12%.

[16] J. Clause, W. Li, and A. Orso. "Dytan: A generic dynamic taint analysis framework." In: *Proceedings of the 2007 International Symposium on Software Testing and Analysis (ISSTA)*. 2007, pp. 196–206. Acceptance rate: 21%. Awarded the ISSTA 2017 Impact Paper Award (only awardee) which recognizes research papers that were published at ISSTA a decade ago, and had a significant impact on research and/or practice of software testing and analysis..

[17] J. Clause and A. Orso. "A technique for enabling and supporting debugging of field failures." In: *Proceedings of the 29th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE)*. 2007, pp. 261–270. Acceptance rate: 15%.

[18] J. Misurda, J. A. Clause, J. L. Reed, B. R. Childers, and M. L. Soffa. "Demand-driven structural testing with dynamic instrumentation." In: *Proceedings of the 27th International Conference on Software Engineering (ICSE)*. 2005, pp. 156–165. Acceptance rate: 14%.

C   Tool demonstrations (refereed)

[1] J. Misurda, J. Clause, J. Reed, B. R. Childers, and M. L. Soffa. "Jazz: A Tool for Demand-Driven Structural Testing." In: *Compiler Construction*. Vol. 3443. Lecture Notes in Computer Science. Springer Berlin Heidelberg, 2005, pp. 242–245. Acceptance rate: 23%.

D   Workshop publications (refereed)

[1] I. Manotas, C. Sahin, J. Clause, L. Pollock, and K. Winbladh. "Investigating the impacts of web servers on web application energy usage." In: *Proceedings of the 2nd International Workshop on Green and Sustainable Software (GREENS)*. 2013, pp. 16–23.

[2] D. Li, C. Sahin, J. Clause, and W. G. J. Halfond. "Energy-directed test suite optimization." In: *Proceedings of the 2nd International Workshop on Green and Sustainable Software (GREENS)*. 2013, pp. 62–69.

[3] C. Sahin, F. Cayci, I. L. M. Gutiérrez, J. Clause, F. Kiamilev, L. Pollock, and K. Winbladh. "Initial Explorations on Design Pattern Energy Usage." In: *Proceedings of the 1st International Workshop on Green and Sustainable Software (GREENS)*. 2012. Acceptance rate: 41%.

E   Research Proposals and Grants

[1] CCF-1618161: SHF:SMALL:Enabling and Supporting the Development of Energy-Efficient Software. $515,999 ($498,999 plus a $17,500 REU supplement). 06/01/2016–05/31/2019. PI James Clause with Co-PI Lori Pollock.

[2] CCF-1527093: SHF:Small: Assisting Developers in the Creation and Maintenance of Unit Tests. National Science Foundation. $450,000. 09/01/2015–08/31/2018. PI with Co-PI Emily Hill.

[3] CCF-1216488: SHF:EAGER: Exploring Relations Between Power Consumption and Software Engineering Decisions. National Science Foundation. $105,462 ($96,462 plus a $9,000 REU supplement). 06/01/2012–05/31/2014. PI with Co-PIs Fouad Kiamilev and Lori Pollock.

[4] Measuring Power Usage from a Software Engineer's Perspective: Towards Power Awareness and Management at the Development Level. University of Delaware Research Foundation. $55,000. 12/01/11–05/31/13. Co-PI with Kristina Winbladh.

F   Research honors and awards

[1] Our paper *Dytan: A generic dynamic taint analysis framework* received the ISSTA 2017 Impact Paper Award (only awardee). This award recognizes research papers that were published at ISSTA a decade ago, and had a significant impact on research and/or practice of software testing and analysis.

[2] Nominated for the Best Research Track Paper award at the 30th International Conference on Software Maintenance and Evolution (ICSME 2014) for paper *How Do Code Obfuscations Impact Energy Usage?* with co-authors C. Sahin, P. Tornquist, R. McKenna, and Z. Pearson. Conference acceptance rate: 19%; 6 of 40 accepted papers were nominated.

G   Invited Talks

[1] "The Road to Seeds: A Software Engineer's Decision Support Framework". 50th CREST Open Workshop - Genetic Improvement. University College London. January 2017.

[2] "Preparing for Graduation and Beyond". Doctoral Symposium at the 38th International Conference on Software Engineering (ICSE 2016). May 2016.

[3] "An Empirical Study of Practitioners' Perspectives on Green Software Engineering". 39th CREST Open Workshop on Measuring, Testing and Optimising Computational Energy Consumption. University College London. February 2015.

III Service

A Service honors and awards

[1] Recipient of the Distinguished Reviewer Award "for exceptionally detailed and constructive feedback to the ICSME community". 32nd IEEE International Conference on Software Maintenance and Evolution. 2016.

B Professional activities

B.1 Conference organization activities

[1] Panelist for the Doctoral Symposium at the 38th International Conference on Software Engineering (ICSE 2016).

[2] Co-Chair of the Poster Session for the 38th International Conference on Software Engineering (ICSE 2016).

[3] Co-Publicity Chair for the 12th International Conference on Software Quality (QSIC 2012)

B.2 Conference committee activities

[1] Member of the Program Committee for the 40th International Conference on Software Engineering (ICSE 2018).

[2] Member of the Program Committee for the 39th International Conference on Software Engineering (ICSE 2017).

[3] Member of the Program Committee for the ACM Student Research Competition at ICSE 2017.

[4] Member of the Program Committee for the Short Papers and Posters track at the 2016 International Symposium on Empirical Software Engineering and Measurement (ESEM 2016).

[5] Member of the Program Committee for the Testing Tools Track at the 9th IEEE International Conference on Software Testing, Verification and Validation (ICST 2016).

[6] Member of the Program Committee for the 32nd IEEE International Conference on Software Maintenance and Evolution (ICSME 2016).

[7] Member of the Program Committee for the 24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2016).

[8] Member of the Symposium Committee for the Doctoral Symposium at the 38th International Conference on Software Engineering (ICSE 2016).

[9] Member of the Program Committee for the 38th International Conference on Software Engineering (ICSE 2016).

[10] Member of the Program Committee for the Tool Demonstrations Track of the 10th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2015)

[11] Member of the Program Committee for the 31st IEEE International Conference on Software Maintenance and Evolution (ICSME 2015).

[12] Member of the Program Committee for the 37th International Conference on Software Engineering (ICSE 2015).

[13] Member of the Program Committee for the 8th IEEE International Conference on Software Testing, Verification and Validation (ICST 2015).

[14] Member of the Program Committee for the 5th IEEE International Workshop on Programming Debugging (IWPD 2015)

[15] Member of the Program Committee for the Software Engineering Aspects of Green Computing Track at the 30th Symposium on Applied Computing (SAC 2015)

[16] Member of the Program Committee for the Testing Tools Track at the 7th IEEE International Conference on Software Testing, Verification and Validation (ICST 2014).

[17] Member of the Program Committee for the 4th IEEE International Workshop on Program Debugging (IWPD 2014).

[18] Member of the Program Committee for the Posters Track of the 36th International Conference on Software Engineering (ICSE 2014).

[19] Member of the Program Committee for the 7th IEEE International Conference on Software Testing, Verification and Validation (ICST 2014).

[20] Member of the Program Committee for the Software Engineering Aspects of Green Computing Track at the 29th Symposium on Applied Computing (SAC 2014).

[21] Member of the Program Committee for the Student Contest on Software Engineering associated with the 35th International Conference on Software Engineering (ICSE 2013).

[22] Member of the Program Committee for the sixth IEEE International Conference on Software Testing, Verification and Validation (ICST 2013).

[23] Member of the Program Committee for the third IEEE International Workshop on Program Debugging (IWPD 2013).

[24] Member of the Program Committee for the 9th Working Conference on Reverse Engineering (WCRE 2012).

[25] Member of the Program Committee for the Research Tool Demonstration Track of the 20th International Symposium on the Foundations of Software Engineering (FSE 2012).

[26] Member of the Program Committee for the 2nd International Workshop on Regression Testing (Regression 2012).

[27] Member of the External Review Committee for the OOPSLA Research Track of the 2011 Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH 2011).

[28] Member of the Program Committee for the 2011 International Workshop on End-to-End Test Script Engineering (ETSE 2011).

[29] Member of the Program Committee for the New Ideas Track of the 8th joint meeting of the European Software Engineering Conference and the Symposium on the Foundations of Software Engineering (ESEC/FSE 2011).

[30] External reviewer for the 32nd International Conference on Software Engineering (ICSE 2010).

[31] External reviewer for the Second International Conference on Software Testing Verification and Validation (ICST 2009).

[32] External reviewer for the 7th joint meeting of the European Software Engineering Conference and the Symposium on the Foundations of Software Engineering (ESEC/FSE 2009).

[33] External reviewer for the 24th IEEE/ACM International Conference on Automated Software Engineering (ASE 2009).

[34] External reviewer for the 6th joint meeting of the European Software Engineering Conference and the Symposium on the Foundations of Software Engineering (ESEC/FSE 2007).

[35] External reviewer for the 22nd IEEE/ACM International Conference on Automated Software Engineering (ASE 2007).

[36] External reviewer for the 2006 ACM/SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2006).

[37] External reviewer for the 21st IEEE/ACM International Conference on Automated Software Engineering (ASE 2006).

B.3 Invited Conference Session Chairmanships

[1] 30th IEEE/ACM International Conference on Automated Software Engineering (ASE 2015).

[2] 2015 International Symposium on Software Testing and Analysis (ISSTA 2015).

[3] 30th IEEE/ACM International Conference on Automated Software Engineering (ASE 2015).

[4] 2015 International Symposium on Software Testing and Analysis (ISSTA 2015).

[5] 30th IEEE International Conference on Software Maintenance and Evolution (ICSME 2014).

B.4 Review work for technical journals and publishers

[1] Communications of the ACM: 2016, 1 article

[2] Information and Software Technology: 2015, 1 article

[3] IEEE Transactions on Software Engineering: 2016, 1 article; 2015, 2 articles; 2014, 3 articles

[4] IEEE Software: 2016, 1 article; 2013, 1 article; 2011, 1 article

[5] Empirical Software Engineering: 2016, 1 article; 2013, 1 article; 2012, 2 articles

[6] Journal of Software: Evolution and Process: 2013, 1 article

[7] Journal of Systems and Software: 2013, 1 article; 2011, 2 articles

[8] Software: Testing, Verification and Reliability: 2016, 1 article

[9] Software: Practice and Experience: 2012, 1 article

[10] ACM Computing Surveys: 2012, 1 article

[11] Science of Computer Programming: 2012, 2 articles; 2011, 3 articles

[12] Transactions on Software Engineering and Methodology: 2012, 1 article

[13] Transactions on Reliability: 2011, 1 article

[14] Transactions on Architecture and Code Optimization: 2011, 1 article

[15] Pervasive and Mobile Computing: 2016, 1 article.

B.5   Research Proposal Reviewer

[1] National Science Foundation, Proposal review panelist: 2011

[2] Research Grants Council of Hong Kong, Proposal reviewer: 2011, 2012

[3] American University of Beirut, Proposal reviewer: 2010

B.6   Membership and activities in professional societies

– Member of the Association of Computing Machinery (ACM)
– Member of the ACM Special Interest Group on Software Engineering (SIGSOFT)
– Member of the Institute of Electrical and Electronics Engineers (IEEE) Computer Society

C   On-campus activities

C.1   Departmental committee activities

[1] Member of the Graduate Program Committee: 2016–present.

[2] Member of the Joint Graduate Committee on Software Engineering: 2010–2016.

[3] Member of the Graduate Admissions Committee: 2011–Spring 2015.

[4] Member of the faculty evaluation panel for CISC 475: 2011.

C.2   College of Engineering committee activities

[1] Member of the Junior Faculty Advisory Council: 2014–present.

D   Degree examination committee activities

D.1   Dissertation Committee member

[1] Wei Wang: University of Delaware

[2] Marcos Portnoi: University of Delaware

[3] Sameer Kulkarni: University of Delaware

[4] Timothy Zirkel: University of Delaware

D.2   Masters Thesis Committee member

[1] Suparna Gundagathi Manjunath: University of Delaware