

## Jonathan Bell

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| CONTACT INFORMATION | Department of Computer Science<br>George Mason University<br>4400 University Drive MSN 4A5<br>Fairfax, VA 22030 USA   | Office: +1-703-993-6089<br>Mobile:<br>E-mail: <a href="mailto:bellj@gmu.edu">bellj@gmu.edu</a><br>WWW: <a href="http://jonbell.net">jonbell.net</a> |
| RESEARCH INTERESTS  | Software engineering: software quality, reliability and security, software testing, fault reproduction and privacy, program analysis, software systems, mobile computing  |   |
| EDUCATION           | <b>Columbia University</b> , New York, NY USA<br>Ph.D., <b>Computer Science</b> , May 2016 <ul style="list-style-type: none"><li>• Advisor: <b>Professor Gail Kaiser</b></li><li>• Area of Study: Software Engineering and Software Systems</li><li>• Thesis Topic: <i>Making Software More Reliable by Uncovering Hidden Dependencies</i></li></ul> M.Phil., <b>Computer Science</b> , February 2014<br>M.S., <b>Computer Science</b> , May 2011<br>B.S., <b>Computer Science</b> , May 2010, <i>Cum Laude</i>   |   |
| AWARDS AND HONORS   | <b>Distinguished Paper Awards</b><br>Awarded to the top papers at a conference. Received at ICPC 2016 and ICSE 2014.<br><b>Paul Charles Michelman Memorial Award for Exemplary Service</b><br>Columbia University Department of Computer Science. Given to a student in Computer Science who has performed exemplary service to the department, devoting time and effort beyond the call to further the department's goals. 2013, 2014 and 2016.<br><b>Andrew P. Kosoresow Memorial Award for Excellence in Teaching and Service</b><br>Columbia University Department of Computer Science. Given to a student in Computer Science who has made outstanding contributions to teaching in the Department and exemplary service to the Department and its mission. 2010.  |   |
| PUBLICATIONS        | <b>Conferences and Journals</b> <ol style="list-style-type: none"><li>1. Gambi, A., <b>Bell, Jonathan</b>, and A. Zeller. Practical Test Dependency Detection. In: <i>Proceedings of the 2018 IEEE Conference on Software Testing, Validation and Verification</i>. ICST 2018. Acceptance rate: 25%.</li><li>2. <b>Bell, Jonathan</b>, O. Legunsen, M. Hilton, L. Eloussi, T. Yung, and D. Marinov. DeFlaker: Automatically Detecting Flaky Tests. In: <i>Proceedings of the 2018 International Conference on Software Engineering</i>. ICSE 2018. Acceptance rate: 21%.</li><li>3. Su, F.-H., <b>Bell, Jonathan</b>, K. Harvey, G. Kaiser, S. Sethumadhavan, and T. Jebara. Code Relatives: Detecting Similarly Behaving Software. In: <i>Proceedings of the 2016 ACM SIGSOFT International Symposium on the Foundations of Software Engineering</i>. FSE 2016. Acceptance rate: 30%. <a href="http://jonbell.net/publications/dyclink">http://jonbell.net/publications/dyclink</a>.</li><li>4. Su, F.-H., <b>Bell, Jonathan</b>, G. Kaiser, and S. Sethumadhavan. Identifying Functionally Similar Code in Complex Codebases. In: <i>Proceedings of the 24th IEEE International Conference on Program Comprehension</i>. ICPC 2016. Acceptance rate: 30%. <b>Distinguished Paper Award</b>. <a href="http://jonbell.net/publications/hitoshiio">http://jonbell.net/publications/hitoshiio</a>.</li><li>5. <b>Bell, Jonathan</b>, G. Kaiser, E. Melski, and M. Dattatreya. Efficient Dependency Detection for Safe Java Test Acceleration. In: <i>Proceedings of the 10th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering</i>. ESEC/FSE 2015. Acceptance rate: 25.4%. <a href="http://jonbell.net/publications/electrictest">http://jonbell.net/publications/electrictest</a>.</li><li>6. <b>Bell, Jonathan</b>, E. Melski, M. Dattatreya, and G. Kaiser. Vroom: Faster Build Processes for Java. In: <i>IEEE Software</i>. Vol. Special Issue: Release Engineering, March/April 2015. IEEE Computer Society.</li></ol> |   |

7. **Bell, Jonathan**, C. Murphy, and G. Kaiser. Metamorphic Runtime Checking of Applications Without Test Oracles. In: *CrossTalk, the Journal of Defense Software Engineering*. Vol. March 2015. <http://jonbell.net/publications/columbus>.
8. Viennot, N., M. Lecuyer, **Bell, Jonathan**, R. Geambasu, and J. Nieh. Synapse: A Microservices Architecture for Heterogeneous-Database Web Applications. In: *Proceedings of The 2015 European Conference on Computer Systems (EuroSys)*. Acceptance rate: 21%. <http://jonbell.net/publications/synapse>.
9. Spahn, R., **Bell, Jonathan**, M. Lee, S. Bhamidipati, R. Geambasu, and G. Kaiser. Pebbles: Fine-Grained Data Management Abstractions for Modern Operating Systems. In: *Proceedings of the 11th USENIX Symposium on Operating Systems Design and Implementation*. OSDI 2014. Acceptance rate: 18.4%. <http://jonbell.net/publications/pebbles>.
10. **Bell, Jonathan** and G. Kaiser. Phosphor: Illuminating Dynamic Data Flow in Off-The Shelf JVMs. In: *Proceeding of the 29th ACM SIGPLAN Conference on Object Oriented Programming Systems Languages and Applications*. OOPSLA 2014. Acceptance rate: 28%. Artifact accepted as meeting reviewer expectations. <http://jonbell.net/publications/phosphor>.
11. **Bell, Jonathan** and G. Kaiser. Unit Test Virtualization with VMVM. In: *Proceedings of the 2014 International Conference on Software Engineering*. ICSE 2014. Acceptance rate: 20%. **ACM SIGSOFT Distinguished Paper Award**. <http://jonbell.net/publications/vmvm>.
12. **Bell, Jonathan**, N. Sarda, and G. Kaiser. Chronicler: Lightweight Recording to Reproduce Field Failures. In: *Proceedings of the 2013 International Conference on Software Engineering*. ICSE 2013. Acceptance rate: 18.5%. <http://jonbell.net/publications/chronicler>.

#### CS Education

1. Sheth, S., **Bell, Jonathan**, and G. Kaiser. A Competitive-Collaborative Approach for Introducing Software Engineering in a CS2 Class. In: *Proceedings of the 2013 Conference on Software Engineering Education and Training*. CSEET 2013. <http://jonbell.net/publications/cseet2013>.
2. **Bell, Jonathan**, S. Sheth, and G. Kaiser. Secret ninja testing with HALO software engineering. In: *Proceedings of the 4th international workshop on Social software engineering*. SSE '11. <http://jonbell.net/publications/halo-sse>.
3. Sheth, S., **Bell, Jonathan**, and G. Kaiser. HALO (Highly Addictive, socialLy Optimized) Software Engineering. In: *Proceeding of the 1st international workshop on Games and software engineering*. GAS '11. <http://jonbell.net/publications/halo>.

#### Other Short Papers

1. Su, F.-H., **Bell, Jonathan**, and G. Kaiser. Challenges in Behavioral Code Clone Detection. In: *Proceedings of the 10th International Workshop on Software Clones*. IWSC 2016. <http://jonbell.net/publications/iwsc16>.
2. **Bell, Jonathan** and G. Kaiser. Dynamic Taint Tracking for Java with Phosphor (Demo). In: *Proceedings of the 2015 International Symposium on Software Testing and Analysis*. ISSA 2015. <http://jonbell.net/publications/phosphor-demo>.
3. **Bell, Jonathan**. Detecting, Isolating and Enforcing Dependencies Between and Within Test Cases. In: *Proceedings of the 22nd ACM SIGSOFT International Symposium on Foundations of Software Engineering Doctoral Symposium*. SIGSOFT/FSE 2014. <http://jonbell.net/publications/fse-docsym>.
4. **Bell, Jonathan** and G. Kaiser. VMVM: Unit Test Virtualization for Java (Formal Tool Demonstration). In: *Proceedings of the 2014 International Conference on Software Engineering*. ICSE 2014. Acceptance rate: 36%. <http://jonbell.net/publications/vmvm-demo>.

5. **Bell, Jonathan**, S. Sheth, and G. Kaiser. A Large-Scale, Longitudinal Study of User Profiles in World of Warcraft. In: *Proceedings of the 5th international workshop on web intelligence and communities*. WiC '13. <http://jonbell.net/publications/wow>.

INVITED TALKS “Practical Dynamic Data Flow Analysis in the JVM,” University of Maryland, May 2017.  
 “Practical Dynamic Data Flow Analysis in the JVM,” Virginia Tech Arlington Campus, March 2017.  
 “Making Software More Reliable by Uncovering Hidden Dependencies,” University of Washington, November 2016.  
 “Making Software More Reliable by Uncovering Hidden Dependencies,” University of Delaware, September 2016.  
 “Making Software More Reliable by Uncovering Hidden Dependencies,” Carnegie Mellon, April 2016.  
 “Making Software More Reliable by Uncovering Hidden Dependencies,” George Mason University, March 2016.  
 “Making Software More Reliable by Uncovering Hidden Dependencies,” Georgia Tech, February 2016.  
 “Making Software More Reliable by Uncovering Hidden Dependencies,” IBM TJ Watson, January 2016.  
 “Faster, More Reliable Builds,” University of Illinois at Urbana-Champaign, December 2015.  
 “Practical Dynamic Taint Tracking in the JVM,” University of Illinois at Urbana-Champaign, December 2015.  
 “Practical Dynamic Taint Tracking in the JVM,” IBM Programming Languages Day, November 2015.  
 “Test Dependencies and the Future of Build Acceleration,” CUNY City Tech Computer Systems Colloquium, September 2015.  
 “Accelerating Software Testing”, Georgia Tech Software Engineering Group Seminar, November 2014.  
 “Accelerating Software Testing”, Electric Cloud, inc. internal all-hands meeting, November 2014.

TEACHING **George Mason University**, Fairfax, VA USA  
*“Q15” refers to student evaluation question 15, “My overall rating of the teaching;” “Q16” refers to student evaluation question 16 “My overall rating of this course;” “avg” refers to the overall department average that semester on that question.*

- Fall 2017: “Program Analysis for Software Testing.” <http://www.jonbell.net/swe-795-fall-17-program-analysis-for-software-testing/>
- Spring 2017: “Distributed Software Engineering.” Q15: 4.38/5 (avg 4.21), Q16: 4.13/5 (avg 4.05). <http://www.jonbell.net/swe-622-spring-2017/>
- Fall 2016: “Design and Implementation of Software for the Web.” Q15: 4.71/5 (avg 4.23), Q16: 4.52/5 (avg 4.08). <http://www.jonbell.net/swe-432-fall-2016/>

PROFESSIONAL AND RESEARCH EXPERIENCE **George Mason University**, Fairfax, VA USA  
*Assistant Professor, Department of Computer Science* **August 2016 to Present**

**Electric Cloud, Inc**, San Jose, CA USA  
*Consulting Research Scientist* **July 2014 to November 2014**

**Programming Systems Laboratory, Columbia University**, New York, NY USA  
*Graduate Research Assistant* **January 2011 to August 2016**

**RentPost, LLC**, Atlanta, GA USA  
*Co-Founder and Advisor* **May 2010 to Present**

## SERVICE

**Conference/Workshop Organization**

|        |   |                     |
|--------|---|---------------------|
|        |   | 2018                |
| SPLASH | Co-chair for conference publicity   | 2017                |
| SPLASH | Co-chair for posters track  |                     |
|        | PL Mentoring Workshop organizing committee member   | 2015, 2014 and 2013 |
| SPLASH | Co-Chair for student volunteers track   | 2012                |
| GAS    | Workshop co-organizer at the International Workshop on Games and Software Engineering, Co-Located with ICSE | 2012                |

**Conference/Workshop Program Committee Membership**

|                  |  |      |
|------------------|--|------|
|                  |  | 2018 |
| ASE              | Automated Software Engineering PC                      |      |
| MSR/Challenge    | Mining Software Repositories Mining Challenge Track PC | 2017 |
| ICSME/Artifacts  | Artifacts track at the IEEE ICSME conference           |      |
| MSR/Challenge    | Mining Software Repositories Mining Challenge Track PC | 2016 |
| RELENG           | Release Engineering Workshop co-located with FSE       |      |
| OOPSLA/Artifacts | Artifacts track at the ACM OOPSLA conference           |      |
| ICST/Tools       | Tool papers track at the IEEE ICST conference          | 2015 |
| OOPSLA/Artifacts | Artifacts track at the ACM OOPSLA conference           |      |
| ISSTA/Artifacts  | Artifacts track at the ACM ISSTA conference            |      |

**Journal Reviewing**

|         |  |      |
|---------|--|------|
|         |  | 2017 |
| ESE     | Springer's Empirical Software Engineering  |      |
| JSS     | Elsevier's Journal of Systems and Software |      |
| IEEE SW | IEEE Software Magazine                     | 2016 |
| JSS     | Elsevier's Journal of Systems and Software |      |
| ESE     | Springer's Empirical Software Engineering  |      |

**Other**

|     |                        |      |
|-----|------------------------|------|
|     |                        | 2017 |
| NSF | Panelist on two panels |      |

STUDENT  
ADVISING**At George Mason:**

**Jeffrey Currence** (BS), with Thomas LaToza, "Mining API invocations in JavaScript," Summer 2017.

**Monica Jeyasankar** (BS), "Detecting Code Relatives in JavaScript," Spring 2017.

**Shravya Kalva** (BS), "Detecting Code Relatives in JavaScript," Spring 2017. Now at Geico.

**Pakeezha Arfany** (BS), "Detecting Code Relatives in JavaScript," Spring 2017. Now at CACI.

**At Columbia:**

**Mandi Wang** (MS), "Extending Test Suite Minimization," Fall 2014, Spring 2015. Now at Google.

**Emilia Pakulski** (BS), "Automating Test Suite Minimization," Fall 2014. Now at Segovia.

**Alana Ramjit** (BS), "Optimizing Scala Test Suites," Fall 2014. Now at UCLA.

**Jennifer Lam** (BS), "Analyzing Regression Testing Practices in OSS," Spring 2014. Interned at Citi and Bloomberg.

**Xingzhou Derek He** (BS), "Symbolic String Analysis for Java," Spring 2014, Fall 2014, Spring 2015. Interned at Dropbox and D.E. Shaw.

**Sidharth Shanker** (BS), "Comparing test suite minimization techniques," Fall 2013. Now at Counsyl.

**Winnie Narang** (MS), "Reproducing Java application field-failures with limited user information," Fall 2013. Now at Amazon.

**Nikhil Sarda** (MS), "Creating an efficient and robust Java *in-vivo* testing framework," Summer 2012. Now at Mattermark.

**Miriam Melnick** (BS), "Detecting state-based metamorphic properties with *in-vivo* testing," Spring 2012. "HALO-SE web portal," Fall 2011. Now at Google.

**Ethan Hann** (MS), "Visualizing World of Warcraft player data," Spring 2012. Now at Columbia Medical Center.

**Alison Yang** (BS), "Research notebook for *genSpace*," Spring 2012.

**Jason Halpern** (MS), "Understanding user retention in *genSpace*," Fall 2011. Now at SecondMarket.

**Evgeny Fedetov** (MS), "Towards social diversity in tool recommendations with *genSpace*," Summer 2011. Now at JP Morgan.

**Aditya Bir** (MS), "Managing complex data sets in *genSpace* ," Spring 2011. Now at UBS.