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RESEARCH AREAS

Software Engineering: Software Security, Metrics, and Testing

EDUCATION

North Carolina State University; Raleigh, NC; GPA 4.00/4.00

Doctor of Philosophy, Computer Science

August 2009 – August 2012

Advisor: Dr. Laurie Williams

North Carolina State University; Raleigh, NC; GPA 4.00/4.00

Master of Science, Computer Science

August 2007 – May 2009

North Carolina State University; Raleigh, NC; GPA 3.87/4.00

Bachelor of Science, Computer Science, Summa Cum Laude

August 2003 – May 2007

RESEARCH

INTERVIEWS

B. Smith, "The Security of Electronic Health Records Systems", available from YouTube at http://youtu.be/dtDaqChp_pE, 2011.

BOOK CHAPTERS

A. Meneely, B. Smith, L. Williams, "iTrust Electronic Health Care System: A Case Study" in *Software Systems and Traceability*. J. Cleland-Huang, O. Gotel, A. Zisman, eds. Springer, pp. 425-438, 2012.

JOURNAL ARTICLES

A. Meneely, B. Smith, and L. Williams, "Software Metrics Validation Criteria: A Systematic Literature Review." *Transactions on Software Engineering and Methodology (TOSEM)*, vol. 21, no. 4, 2012.

B. Smith and B. Phillips, "Truckers Drive Their Own Assessment for Obstructive Sleep Apnea: A Collaborative Approach to Online Self-Assessment for Obstructive Sleep Apnea", *Journal of Clinical Sleep Medicine*, vol. 7, no. 3, pp. 241-245, 2011.

B. Smith and L. Williams, "On Guiding the Augmentation of an Automated Test Suite via Mutation Analysis", *Empirical Software Engineering*, vol. 14, no. 3, pp. 341-369, 2009.

B.H. Smith and L. Williams, "Should Software Testers use Mutation Analysis to Augment a Test Set?", *Journal of Systems Software*, vol. 82, no. 11, pp. 1819-1832, 2009.

CONFERENCES

B. Smith, L. Williams, "On the Effective Use of Security Test Patterns," *Sixth International Conference on Software Security and Reliability (SERE 2012)*, Washington, DC, pp. 108-117, 2012.

A. Massey, B. Smith, P. Otto, A. Antón, "Assessing the Accuracy of Legal Implementation Readiness Decisions," *International Requirements Engineering Conference (RE 2011)*, Trento, Italy, pp. 207-217, 2011.

- B. Smith, L. Williams, "Using SQL Hotspots in a Prioritization Heuristic for Detecting All Types of Web Application Vulnerabilities", Proceedings of the International Conference on Software Testing, Verification and Validation (ICST 2011), Berlin, Germany, pp. 220-229, 2011.
- B. Smith, G. Hull, B. Stanton, B. Phillips, "Truckers Drive Their Own Assessment for Obstructive Sleep Apnea: A Collaborative Approach to Online Self-Assessment for Obstructive Sleep Apnea", CHEST 2010, vol. 138, no. 4, 2010.
- B. Smith, L. Williams, A. Austin, "Idea: Using System Level Testing for Revealing SQL Injection-Related Error Message Information Leaks", Lecture Notes in Computer Science, vol. 5965, Engineering Secure Software and Systems (ESSoS 2010), pp. 192-200, 2010.
- B. H. Smith and L. Williams, "An Empirical Evaluation of the MuJava Mutation Operators", Testing: Academic and Industrial Conference Practice and Research Techniques (MUTATION 2007). TAICPART-MUTATION 2007, pp. 193-202, 2007

WORKSHOPS

- B. Smith, "Testing Electronic Health Records Applications With a Security Test Pattern Catalog Developed Using Empirical Data", Proceedings of the International Health Informatics Symposium Doctoral Symposium (IHI 2012), Miami, FL, USA, 2012.
- J. King, B. Smith, L. Williams, "Modifying Without a Trace: General Audit Guidelines are Inadequate for Electronic Health Record Audit Mechanisms", Proceedings of the International Health Informatics Symposium (IHI 2012), Miami, FL, pp. 305-314, 2012.
- B. Smith, "Systematizing Security Test Planning Using Functional Requirements Phrases". Proceedings of the 33rd international conference on Software engineering (ICSE '11). Honolulu, HI, pp. 1136-1137, 2011.
- B. Smith, A. Austin, M. Brown, J. King, J. Lankford, A. Meneely, L. Williams, "Challenges for Protecting the Privacy of Health Information: Required Certification Can Leave Common Vulnerabilities Undetected", Proceedings of the Security and Privacy in Medical and Home-care Systems (SPIMACS 2010) Workshop, co-located with CCS, Chicago, IL, pp. 1-12, 2010.
- A. Austin, B. Smith, and L. Williams, "Towards Improved Security Criteria for Certification of Electronic Health Record Systems". Proceedings of the Second Workshop on Software Engineering in Healthcare (SEHC 2010), co-located with ICSE, Cape Town, South Africa, pp. 68-73, 2010.
- B. Smith, "Metrics validation criteria: How do we know when a metric is worthwhile?" Presented at Workshop on Security Predictions, Pisa, Italy, 2010.
- B. Smith, Y. Shin, and L. Williams, "Proposing SQL Statement Coverage Metrics", Proceedings of the Fourth International Workshop on Software Engineering for Secure Systems (SESS 2008), pp. 49-56, 2008.

RESEARCH POSTERS

- B. Smith, "Testing Electronic Health Records Applications With a Security Test Pattern Catalog Developed Using Empirical Data", presented at Doctoral Consortium, International Health Informatics Symposium Doctoral Symposium (IHI 2012), Miami, FL, USA, 2012.
- E. Smith, B. Smith, B. Phillips, "Living Well: Do Health Education College Students Sleep Better?", presented at SLEEP 2011, Minneapolis, MN, 2011.
- A. Austin, B. Smith, L. Williams, J. Halladay, "How Secure is Your Electronic Health Record System?", presented at North Carolina Academy of Family Physicians Weekend (NCAFPW), Asheville, NC, December 2010.
- B. Smith and L. Williams, "Only Grey Box Testing Can Detect Input Validation and Error Message Information Leakage Vulnerabilities", presented at State of the Art in Testing and Analysis Day (SATA), March 2009.

TECHNICAL REPORTS

B. Smith and L. Williams, "Systematizing Security Test Planning Using Functional Requirements Phrases". North Carolina State University, Technical Report #2011-5.

B. Smith and L. Williams, "A Survey on Code Coverage as a Stopping Criterion for Unit Testing", North Carolina State University, Technical Report #2008-22.

WORK EXPERIENCE

IBM Software Group, Research Triangle Park, NC

Emerging Technology Institute Solutions Developer

May 2012 – present

- Helped to enable IBM WebSphere Liberty to the Cloud Foundry Platform as a Service
- Helped to design the original deployment of IBM's BlueMix, an enterprise-grade Platform as a Service offering
- Performed many following deployments of Cloud Foundry, both within IBM and at our client sites
- Worked with executive team to drive the future direction of WebSphere Liberty into various cloud-based environments

IBM Software Group, Research Triangle Park, NC

Software Engineer

May 2011–August 2012

- Developed an automated technique for deploying OVF images to VMware products
- Migrated IBM's Cast Iron virtual appliance to NC State's Virtual Computing Lab (VCL)

IBM Software Group, Research Triangle Park, NC

Software Engineer

May 2009 – August 2009

- Helped develop an Adobe Flash interface for IBM's WebSphere CloudBurst
- Worked on a team with another student and presented weekly progress to management

North Carolina State University Senior Design Center

Testing Manager

August 2008 – May 2009

- Worked with students in NC State's capstone course in software engineering
- Helped teaching staff develop a testing curriculum
- Managed 15 teams with 15 separate software engineering projects
- Assisted each team in designing a testing strategy for their project for both automated and manual testing

North Carolina State University with Support from IBM

Student Researcher

August 2009 – May 2010

- Helped investigate the security posture of open source healthcare software systems
- Presented reports to IBM management and interested third parties
- Developed a procedure for evaluating open healthcare products

IBM Software Group, Research Triangle Park, NC

Software Engineer

May 2011 – present

- Migrated IBM's Cast Iron virtual appliance to NC State's Virtual Computing Lab (VCL)

PROFESSIONAL/SERVICE ACTIVITIES

ESEM 2009, Orlando FL

- Web Chair
- Local Arrangements Co-Chair

REVIEWER

Empirical Software Engineering Journal
IET Software Journal
IEEE Security & Privacy Journal
Information & Software Technology Journal
ISSRE 2008, 2010
ESEM 2008, 2010, 2011
ESSoS 2009, 2012

RE 2008
Mutation 2009, 2010
Agile 2009
ICST 2008, 2009, 2010
ICSE 2008, 2010, 2011, 2012
SECTEST 2008, 2011
MSR 2010
SEHC 2011

RELEVANT COURSEWORK

Java Programming
Discrete Mathematics
Computer Organization and Logic
Assembly Language
Operating Systems
Numerical Methods
Requirements Engineering
Design and Analysis of Algorithms
Software Design
Agile Product Owner

Software Engineering
Ethics in Computing
Senior Design Project
E-Commerce
Independent Research
Software Testing
Statistics for Engineers
Web Services
Database Management Systems
Computer Performance Modeling

TECHNICAL SKILLS

Java/J2EE
Perl
PHP
C
C++
CSS
HTML/DHTML
JavaScript
SQL
Apple GarageBand
Adobe Flex
JSON
Mac OS X
Weka
VMWare
Fortify Standard Edition
WebScarab
Firebug
Ruby
Vmware ESX, Desktop, ESXi
Chef
VirtualBox

Adobe Premiere
Microsoft Office
Linux
Windows
Eclipse
UML Modeling
Tomcat
Server Administration
Visual Studio
ActionScript/Flash
R
SAS
SPSS
Rational AppScan
Threat Modeling
ParosProxy
Manual Penetration Testing
WebSphere Liberty
OpenStack
Cloud Foundry
BOSH
Statistical Analysis

HONORS

Gamma Beta Phi
Upsilon Pi Epsilon
Phi Kappa Phi
CSC Departmental Honors Program
ACM Travel Award Recipient (SPIMACS 2010)

National Society of Collegiate Scholars
Golden Key
NCSU Dean's Fellowship Recipient
IBM PhD Fellowship Recipient
ACM Travel Award Recipient (IHI 2012)