

# Brittany Johnson, Ph.D.

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## EDUCATION

### North Carolina State University

*Doctor of Philosophy Student in Computer Science* | August 2017 | Raleigh, NC

### College of Charleston

*Bachelor of Arts in Computer Science* | May 2011 | Charleston, SC

## PUBLICATIONS

### Conference Papers (Peer-Reviewed)

- “A Cross-Tool Communication Study on Program Analysis Tool Notifications,” **Johnson, B.**, Pandita, R., Smith, J., Ford, D., Elder, S., Murphy-Hill, E., Heckman, S., Sadowski, C., *24<sup>th</sup> International Symposium on the Foundations of Software Engineering*, Seattle, WA, November 2016.
- “From Quick Fixes to Slow Fixes: Reimagining Static Analysis Resolutions to Enable Design Space Exploration,” Barik, T., Song, Y., **Johnson, B.**, Murphy-Hill, E., *32<sup>nd</sup> International Conference on Software Maintenance and Evolution*, Raleigh, NC, October 2016.
- “Questions Developers Ask While Diagnosing Potential Security Vulnerabilities with Static Analysis,” Smith, J., **Johnson, B.**, Murphy-Hill, E., Chu, B., Lipford, H., *ACM SIGSOFT Symposium on the Foundations of Software Engineering*, Bergamo, Italy, September 2015.
- “Why Don’t Software Developers Use Static Analysis Tools to Find Bugs?” **Johnson, B.**, Song, Y., Murphy Hill, E., Bowdidge, R., *35<sup>th</sup> International Conference on Software Engineering*, San Francisco, California, May 2013.

### Short Papers (Peer-Reviewed)

- “Evaluating How Static Analysis Tools Can Reduce Code Review Effort,” Singh, D., Ramachandra, V., Stolee, K., and **Johnson, B.**, *IEEE Symposium on Visual Languages and Human Centric Computing (VL/HCC)*, Raleigh, NC, October 2017.
- “Adapting Program Analysis Tool Notifications to the Individual Developer,” **Johnson, B.**, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Graduate Consortium, Atlanta, Georgia, October 2015.
- “Bespoke Tools: Adapted to the Concepts Developers Know,” **Johnson B.**, Pandita, R., Murphy-Hill, E., Heckman, S., *ACM SIGSOFT Symposium on the Foundations on Software Engineering NIER*, 2015.
- “I Heart Hacker News: Expanding Qualitative Research Findings by Analyzing Social News Websites,” Barik, T., **Johnson, B.**, Murphy-Hill, E., *ACM SIGSOFT Symposium on the Foundations on Software Engineering NIER*, 2015.
- “Compiler Error Messages Revisited: An interaction-first approach for helping developers more effectively comprehend and resolve compiler error messages,” Barik, T., Witschey, J., **Johnson, B.**, Murphy-Hill, E., *36<sup>th</sup> International Conference on Software Engineering NIER Track*, Hyderabad, India, May 2014.
- “Designing Interventions to Persuade Software Developers to Adopt Security Tools,” Jordan, B., **Johnson, B.**, Witschey, J., Murphy-Hill, E., *CCS Workshop on Security Information Workers* 2014.
- “Enhancing Tools’ Intelligence for Improved Program Analysis Tool Usability,” **Johnson, B.**, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Graduate Consortium, Melbourne, Australia, July 2014.

## Journal Papers (Peer-Reviewed)

- “Comparing Approaches to Analyze Refactoring Activity on Software Repositories,” Soares, G., Gheyi, R., Murphy-Hill, E., **Johnson, B.** and Massoni, T., *Journal of Systems and Software*. 2013.

## RESEARCH EXPERIENCE

### National Science Foundation Research Fellow

*Fall 2013 – Summer 2017*

*North Carolina State University, Raleigh, NC*

- Researching program analysis tool usability
- Implementing a programmer experience modeler for adapting program analysis tool notifications; occasionally pair programming with lab mates

### Graduate Research Assistant

*Fall 2011 – Spring 2013, 2015 - 2016*

*North Carolina State University, Raleigh, NC*

Advisors: Drs. Emerson Murphy-Hill and Sarah Heckman

- Researching usability of program analysis tools
- Conducted interviews and sessions for analysis/qualitative data, some including Participatory Design (for “interactive interviews”)
- Researching and experimenting with the effectiveness of program analysis tool notifications

### Research Intern

*Summer 2015*

*Microsoft Research, Redmond, WA*

Mentor: Dr. Thomas Zimmermann

- Researched the relationship between work environments and developer productivity
- Presented incremental findings to other researchers and developers

### Undergraduate Research Assistant

*2008-2011*

*CIRDLES (Cyber Infrastructure Research and Development Lab for the Earth Sciences)*

*College of Charleston, Charleston, SC*

Advisor/Principle Investigator: Dr. James F. Bowring

- Designed and implemented the help system for CIRDLES' flagship software using JavaHelp System
- Created and modified Java visualization library for use in CIRDLES software

### Ronald E. McNair Summer Scholar

*Summer 2010*

*College of Charleston, Charleston, SC*

Advisors: Dr. James F. Bowring and Carrie Ben-Yisrael

- Researched MathML for implementation in a Java library
- Implemented a library for rendering dynamic mathematical visualizations
- Learned about different research methodologies and documentation styles

## TEACHING EXPERIENCE

### Python Workshop Leader

*Summer 2016*

*D.H.Hill Makerspace, NC State University, Raleigh, NC*

- Designed, organized and led a workshop to teach Python programming to non-CS majors
- Used active learning to engage students in course material

### **Hi-Tech Teens Mentor/Teacher**

*December 2014- May 2015, July 2016*

*Wade Edwards Foundation and Learning Lab (WELL), Raleigh, NC*

- Co-organized sessions to teach high schoolers how to program using Python
- Created and led interactive classes on writing code in Python
- Created and led a week long camp on using MIT AppInventor 2

### **Girls Video Game Design Camp Co-Lead**

*July 2014, July 2016*

*The Engineering Place, North Carolina State University, Raleigh, NC*

- Co-organized camp activities with co-camp leads
- Taught middle school students how to build video games using GameMaker 8.1 along with co-camp lead
- Taught middle school students how to design, build, and critique video games using Kodu.

### **Graduate Teaching Assistant**

*Spring 2012*

*Graduate Level Software Engineering, North Carolina State University*

- Assisted the professor with course activities and grading of assignments and exams
- Assisted student in the course via office hours where I was available to resolve issues and answer questions related to the course material

## **DEVELOPMENT EXPERIENCE**

### **Software Developer Intern**

*Summer 2012*

*Truven Health Analytics, Durham, NC*

Supervisor: Joe Rice

- Developed healthcare software (Javascript/Java) on an agile development team of 9
- Managed databases using Oracle/SQL
- Learned how to use new technologies such as Robot (for functional testing)

## **TECHNICAL SKILLS**

**Expert Languages:** Java, Python, R, HTML

**Other Languages:** Javascript, SQL

**Software:** Eclipse, Excel, Weka, RStudio, Atlas.ti, Qualtrics

**Databases:** Oracle, MySQL, SQLite

## **ACADEMIC/PROFESSIONAL AFFILIATIONS**

- Member, Black Women in Computing (BWiC), 2016 - present
- Member, National Society of Blacks in Computing (NSBC), 2016 - present
- Member, NCSU Minority Engineering Graduate Students Association (MEGSA), 2013-2017
- Member, National Society of Black Engineering (NSBE) NC State and National Chapter, 2015
- Member, NCSU STARS (Students & Technology in Academia, Research & Service), 2015
- Member/Officer, Women in Computer Science (WiCS), 2012 - 2015
- Member, Institute of Electrical and Electronics Engineers, 2011
- Member, Association for Computing Machinery, 2011 - present
- Member, National Society of Collegiate Scholars, 2009 - present

## **HONORS/ACHIEVEMENTS/AWARDS**

- **Center for Data Science Postdoctoral Fellowship**, Award Value: 60,000/year, 2017
- **NSF Graduate Research Fellow**, Award Value: \$140,000, 2013
- **Building Future Faculty Program Scholar** (nationally competitive), 2016

- Grace Hopper Conference Scholar (funded by Microsoft), 2014
- Carolinas Women in Computing Conference Scholar, 2014
- Southeast Women in Computing Conference Scholar, 2013
- ICSE ACM Student Research Competition Finalist, 2012
- Wellgates Scholar, member, 2012 - present
- Grace Hopper Conference Scholar (funded by Microsoft), 2011
- College of Charleston Class of 2011 Feature Student (*Post and Courier* newspaper)
- Who's Who Among Students in American Universities and Colleges, 2010 – 2011
- Grace Hopper Conference Scholar (funded by State Farm), 2010
- Ronald E. McNair Scholar, 2010 - 2011
- First place in Computer Science and Mathematics, LS-AMP Research Conference, 2009
- South Carolina LIFE Scholarship Recipient, 2007 – 2011

## POSTERS AND PRESENTATIONS

### Conference Presentations (Oral)

- **“A Cross-Tool Communication Study on Program Analysis Tool Notifications,”** FSE 2016
- **“Bespoke Tools: Adapted to the Concepts Developers Know,”** FSE NIER 2015
- **“Modeling Conceptual Knowledge Using Public Git Repositories”** NSBE Convention 2016
- **“Why Don't Software Developers Use Static Analysis Tools to Find Bugs?”** 35<sup>th</sup> *International Conference on Software Engineering*, San Francisco, California, May 2013
- **“A Study on Improving Static Analysis Tools: Why Aren't We Using Them?”**, 34<sup>th</sup> *International Conference on Software Engineering ACM Student Research Competition*, Zurich, Switzerland, June 2012.
- **“The OpenMath Machine”**, *Annual LS-AMP Research Conference*, South Carolina State University, Orangeburg, SC 2010
- **“CIRDLES: Cyber Infrastructure Research and Development Lab for the Earth Sciences”**, *Annual LS-AMP Research Conference*, Benedict College, Columbia, SC 2009

### Poster Presentations

- **“Adapting Program Analysis Tools to the Individual Developer,”** *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC) 2015*
- **“Improving the Usability of Program Analysis Tools,”** 9<sup>th</sup> *Annual NC State Graduate Research Symposium 2014*
- **“Improving the Usability of Program Analysis Tools,”** *Southeast Women in Computing Conference 2013*
- **“Novice Understanding of Program Analysis Tool Notifications,”** 35<sup>th</sup> *International Conference on Software Engineering ACM Student Research Competition*, San Francisco, California, May 2013.
- **“A Study on Improving Static Analysis Tools: Why Aren't We Using Them?”**, 34<sup>th</sup> *International Conference on Software Engineering ACM Student Research Competition*, Zurich, Switzerland, June 2012.
- **“The OpenMath Machine,”** *Carolina Women in Computing Conference*, Columbia, SC 2010
- **“The OpenMath Machine,”** *Summer Research Poster Session*, College of Charleston, Charleston, SC 2010

### Oral Presentations

- **“Improving the Usability of Program Analysis Tools,”** Lightning Talk, *NC State Women in Computer Science (WiCS) Symposium*, Raleigh, NC 2014
- **“Preparing for Your Future”**, Lightning Talk, *Southeast Women in Computing Conference*, Lake Guntersville State Park, AL 2013

- **“Preparing for Your Future”**, Lightning Talk, *Annual SCAMP Research Night*, College of Charleston, Charleston, SC October, 2013
- **“CIRDLES: Cyber Infrastructure Research and Development Lab for the Earth Sciences”**, Group Presentation, ACM Student Chapter meeting, College of Charleston, Charleston, SC November 2010
- **“The OpenMath Machine”**, *Annual SCAMP Research Night*, College of Charleston, Charleston, SC November 2010
- **“Mathematical Markup Language/The OpenMath Machine”**, *Ronald E. McNair Summer Research Conference*, College of Charleston, Charleston, SC August 2010
- **“CIRDLES: Cyber Infrastructure Research and Development Lab for the Earth Sciences”**, *Annual SCAMP Research Night*, College of Charleston, Charleston, SC 2009

### Invited Talks

- **“Producing Productive Programmers: Increasing developer productivity with artificially intelligent developer environments”**, Invited talk, Northern Kentucky University, School of Informatics, October 2016
- **“Producing Productive Programmers: Increasing developer productivity with artificially intelligent developer environments”**, Invited talk, IBM T.J. Watson Research Center, Yorktown Heights, NY, October 2016
- **“Qualitative Data Analysis,”** Invited talk for CSEd Workshop, NC State University
- **“Improving the Usability of Program Analysis Tools”**, Invited Talk for WiC@CofC, College of Charleston, Charleston, SC October, 2013
- **“Improving the Usability of Program Analysis Tools”**, Broader Impacts Presentation, *The Attic* group, Seattle, WA July, 2013

## COMPUTING-RELATED SERVICE

- Program Committee Member, VISSOFT 2017, NIER and Tool Demos Track
- Program Committee Member, ICPC 2017, Industry Track
- Board of Advocates, School of Science and Mathematics, College of Charleston, 2016
- Associate Editor, IEEE Software blog, 2016
- Program Committee Member, ICSME 2016, Industry Track
- Student Volunteer, FSE 2012, ICSE 2013, ICSE 2016, ICSME 2016, VISSOFT 2016
- Judge, Poster Session, NC-LSAMP 2015 Annual Research Conference, Pembroke, NC 2015
- Sub-reviewer, Financial Cryptography and Data Security 2015
- Student Volunteer, NCSU Dept. of Computer Science Recruiting Event, Raleigh, NC 2015
- Student Volunteer, NC State Dept. of Computer Science Open House, Raleigh, NC 2014
- Volunteer/Panelist, NC State Dept. of Computer Science Student Visits, Raleigh, NC 2013
- Student Volunteer, NC State Dept. of Computer Science Open House, Raleigh, NC 2013
- Computer Science Retention Program Volunteer (Graduate Panel Speaker), Raleigh, NC 2012
- Panel Speaker, NC State University Tapestry Workshop, Raleigh, NC 2012
- Alumni Panelist, College of Charleston Annual Computer Science Panel, Charleston, SC 2012
- Student Volunteer, NC State Department of Computer Science Open House, Raleigh, NC 2012
- Low Country Computer Science Camp, Charleston, SC 2010

## OTHER COMMUNITY SERVICE

- Dance Marathon, MUSC Children’s Hospital Fundraiser, Charleston, SC 2011
- Service Project at the Metanoia Freedom School, North Charleston, SC 2010
- College of Charleston Accepted Students Day Volunteer, Charleston, SC 2011

## **EXTRA-CURRICULAR ACTIVITIES**

- President, WiCS, NC State University– 2014 - 2015
- Co-organizer for Lady App-a-thon (NC State Computer Science recruitment event for accepted undergraduate females) – 2015
- Webmaster, WiCS, NC State University– 2012 - 2014
- Pep Band, College of Charleston 2008 – 2011
- Association for Computing Machinery (College of Charleston Chapter) – 2008 – 2011
- South Carolina Alliance for Minority Participation (College of Charleston Chapter) – 2008 – 2011
- National Society of Collegiate Scholars (College of Charleston Chapter), Webmaster – 2010 – 2011