Brittany I. Johnson

Postdoctoral Research Fellow

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education

August 2017 **Doctor of Philosophy** in Computer Science — North Carolina State University
A Tool (Mis)communication Theory and Adaptive Approach for Supporting Developer Tool Use
This thesis explored how we can improve program analysis tools to better support developers when building and maintaining software.

May 2011 **Bachelor of Arts** in Computer Science — College of Charleston

publications

Conference Papers [Peer-reviewed]

Brittany Johnson, Yuriy Brun, & Alexandra Meliou. **Causal Testing: Understanding Defects' Root Causes.** International Conference on Software Engineering 2020. (to appear)

Brittany Johnson, Rahul Pandita, Justin Smith, Denae Ford, Sarah Elder, Emerson Murphy-Hill, & Sarah Heckman. **A Cross-Tool Communication Study on Program Analysis Tool Notifications.** International Symposium on the Foundations of Software Engineering 2016.

Titus Barik, Yoonki Song, Brittany Johnson, & Emerson Murphy-Hill. **From Quick Fixes to Slow Fixes: Reimagining Static Analysis Resolutions to Enable Design Space Exploration.** International Conference on Software Maintenance and Evolution 2016.

Justin Smith, Brittany Johnson, Emerson Murphy-Hill, Bill Chu, & Heather Lipford. **Questions Developers Ask While Diagnosing Potential Security Vulnerabilities with Static Analysis.** International Symposium on the Foundations of Software Engineering 2015.

Brittany Johnson, Yoonki Song, Emerson Murphy-Hill, & Robert Bowdidge. **Why Don't Software Developers Use Static Analysis Tools to Find Bugs?** International Conference on Software Engineering 2013.

Short Papers [Peer-reviewed]

Rico Angell, Brittany Johnson, Yuriy Brun, & Alexandra Meliou. **Themis: Automatically testing software for discrimination.** International Symposium on the Foundations of Software Engineering 2018. Demonstrations Track.

Devarshi Singh, Varun Ramachandra Sekar, Kathryn T. Stolee, & Brittany Johnson. **Evaluating how static analysis tools can reduce code review effort**. IEEE Symposium on Visual Languages and Human Centric Computing 2017.

Brittany Johnson. **Adapting Program Analysis Tool Notifications to the Individual Developer.** IEEE Symposium on Visual Language and Human Centric Computing 2015. Graduate Consortium.

Brittany Johnson, Rahul Pandita, Emerson Murphy-Hill, & Sarah Heckman. **Bespoke Tools: Adapted to the Concepts Developers Know.** International Symposium on the Foundations of Software Engineering 2015. New Ideas and Emerging Results (NIER).

Titus Barik, Brittany Johnson, & Emerson Murphy-Hill. **I Heart Hacker News: Expanding Qualitative Research Findings by Analyzing Social News Website.** International Symposium on the Foundations of Software Engineering 2015. New Ideas and Emerging Results (NIER).

Titus Barik, Jim Witschey, Brittany Johnson, & Emerson Murphy-Hill. **Compiler Error Messages Revisited: An interaction-first approach for helping developers more effectively comprehend and resolve compiler error messages.** International Symposium on the Foundations of Software Engineering 2014. New Ideas and Emerging Results (NIER).

Brooke Jordan, Brittany Johnson, Jim Witschey, & Emerson Murphy-Hill. **Designing Intervention to Persuade Software Developers to Adopt Security Tools.** CCS Workshop on Security Information Workers 2014.

Brittany Johnson. **Enhancing Tools' Intelligence for Improved Program Analysis Tool Usability.** IEEE Symposium on Visual Languages and Human Centric Computing 2014. Doctoral Symposium.

Journal Papers [Peer-reviewed]

Brittany Johnson, Thomas Zimmermann, & Christian Bird. **The Effect of Work Environments on Productivity and Satisfaction of Software Engineers**. IEEE Transactions on Software Engineering 2019.

Justin Smith, Brittany Johnson, Emerson Murphy-Hill, Bill Chu, & Heather Ritcher. **How Developers Diagnose Potential Security Vulnerabilities with a Static Analysis Tools**. IEEE Transactions on Software Engineering 2018.

Gustavo Soares, Rohit Gheyi, Emerson Murphy-Hill, & Brittany Johnson. **Comparing approaches to analyze refactoring activity on software repositories**. Journal of Systems and Software 2013.

experience

Research

2017–Now **University of Massachusetts Amherst** Amherst, Massachusetts
Postdoctoral Research Associate
Advisors: Drs. Yuriy Brun and Alexandra Meliou
- Researching fairness and causal testing in software engineering
- Implementing and evaluating a testing tool to help developers determine the cause of test failures
- Mentoring students (graduate and undergraduate) working on software fairness

2011–2017 **NC State University** Raleigh, North Carolina
National Science Foundation Graduate Research Fellow
Graduate Research Assistant
Advisors: Drs. Emerson Murphy-Hill and Sarah Heckman
- Conducted empirical studies on program analysis tool use
- Implemented and evaluated models and tools for improving tool usability
- Mentored students (graduate and undergraduate) on various research projects

2015 **Microsoft Research** Redmond, Seattle
Research Intern
Supervisor: Dr. Thomas Zimmermann
- Explored the relationship between work environments, satisfaction, and productivity
- Presented incremental findings to other researchers and developers

2008–2011 **College of Charleston** Charleston, South Carolina
Undergraduate Research Assistant
Adivsor: 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

2010 **College of Charleston** Charleston, South Carolina
Ronald E. McNair Summer Research Scholar
Adivsors: Dr. James F. Bowring and Carrie Ben-Yisrael
- Researched MathML for implementation in a Java library
- Implemented a library for rendering dynamic mathematical visualizations

Teaching

Fall 2018 **University of Massachusetts Amherst** Amherst, Massachusetts
Lecturer
Great Women in CS: Past, Present, and Future
- Designed and led course that exposes the great contributions in the field of Computer Science women from diverse backgrounds have made.
- Assigned each student a great woman in CS to research and present as a form of active learning

2016 **NC State University** Raleigh, North Carolina
Python Workshop Leader
- Designed, organized and led a workshop to teach Python programming to non-CS majors

2014–2015 **Wade Edwards Foundation and Learning Lab (WELL)** Raleigh, North Carolina
Hi-Tech Teens Mentor/Teacher
- 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

2014 & 2016 **NC State University** Raleigh, North Carolina
Girls Video Game Design Camp Co-Lead
- Co-organized camp activities with co-camp leads
- Taught middle school students how to build design, build, and critique video games using GameMaker 8.1 along with co-camp lead
- Engaged students with various forms of active learning (e.g. think-pair-share)

2012 **NC State University** Raleigh, North Carolina
Graduate Teaching Assistant
- 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

student supervision

Graduate

Rico Angell
Project: Fairness in ML-based Software Systems

Undergraduate

Jesse Bartola
Project: Supporting Data Scientists in Training Fair Models

Aisiri Murulidhar
Project: Fairness in Image Recognition Systems

Anastasia Egorova
Project: Augmenting Program Analysis Tool Intelligence

Adam Smith
Project: Augmenting Program Analysis Tool Intelligence

awards

Research Funding

2018 **Postdoctoral Fellowship** — Center for Data Science, University of Massachusetts Amherst
Award value: $65,000/year

2013 **NSF Graduate Research Fellowship** — National Science Foundation
Award value: $140,000

Awards & Honors

2013 **Building Future Faculty Program Scholar** — NC State University
This is a nationally competitive workshop that selects a handful of exceptional doctoral students and postdoctoral researchers from diverse backgrounds to help prepare for an academic career.

2011 **College of Charleston Class of 2011 Feature Student** — Post and Courier newspaper
The Post and Courier selected one student from each graduating class in the Lowcountry that exemplify the new generation of well-rounded students.

invited talks

2019 **Surviving (and Thriving) in STEM** — University of Connecticut
Annual Technology, Engineering, and Science Latinx Symposium Keynote

2018 **Software (Un)Fairness** — University of Massachusetts Amherst
Center for Data Science Research Symposium

2018 **Software (Un)Fairness** — Mass Mutual
Mass Mutual Meetup guest speaker

2018 **Surviving (and Thriving) in Grad School** — University of Massachusetts Amherst
LS-AMP meeting speaker

2017 **Producing Productive Programmers** — University of Massachusetts Amherst
Data Science Tea speaker

2016 **Producing Productive Programmers** — School of Informatics, Northern Kentucky University
Guest speaker in software course

2016 **Producing Productive Programmers** — IBM T.J. Watson Research Center

2015 **Qualitative Data Analysis** — CSEd Workshop, NC State University

2013 **Improving the Usability of Program Analysis Tools** WiC@CofC, College of Charleston

2013 **Improving the Usability of Program Analysis Tools** The Attic, Seattle, WA

service

Diversity, Inclusion, and Belonging Co-Chair, ASE 2019
Program Committee Member, MSR Mining Challenge 2019
Program Committee Member, ESEC-FSE 2019
Program Committee Member, ICSE 2019, Demonstrations Track
Reviewer, Transactions on Software Engineering 2018
Co-Chair, FairWare 2018 (Co-located with ICSE)
Program Committee Member, ASE 2018
Program Committee Member, ESEC-FSE 2018, NIER Track
Program Committee Member & Judge, ESEC-FSE 2018, ACM Student Research Competition
Program Committee Member, ESEC-FSE 2018, NIER Track
Associate Editor, IEEE Software Blog, 2016–present
Program Committee Member, ICSME 2018, Industry Track
Student Volunteer, FSE 2012, ICSE 2013, ICSE 2016, ICSME 2016, VISSOFT 2016
Judge, Poster Session, NC-LSAMP 2015 Annual Research Conference 2015
Sub-reviewer, Financial Cryptography and Data Security 2015
Volunteer, Computer Science Retention Program 2012 Graduate Panel Speaker

affiliations

Professional

Member, Black Women in Computing (BWiC), 2016 - present
Member, National Society of Blacks in Computing (NSBC), 2016 - present
Member, Association for Computing Machinery, 2011 - present
Member, Institute of Electrical and Electronics Engineers, 2011

Academic

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

skills

programming

Java, Python, R, & HTML

software

Eclipse, RStudio, Excel

References

Dr. Yuriy Brun
Associate Professor in Computer Science
University of Massachusetts Amherst
Email: brun@cs.umass.edu

Dr. Emerson Murphy-Hill
Research Scientist
Google, USA
Email: captain.emerson@gmail.com

Dr. Sarah Heckman
Director of Undergraduate Programs & Teaching Associate Professor in Computer Science
NC State University
Email: sarah_heckman@ncsu.edu

Dr. Thomas Zimmermann
Principal Researcher
Microsoft Research
Email: tzimmer@microsoft.com