

Sarah Smith Heckman

Associate Teaching Professor
Director of Undergraduate Programs
Alumni Distinguished Undergraduate Professor

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Summary

I am an Alumni Distinguished Undergraduate Professor and Director of Undergraduate Programs for the Department of Computer Science at NC State University. My areas of expertise are software engineering and computer science education. I have taught 12,199 credit hours in core software engineering and programming languages courses to 3,704 students between Fall 2009 and Spring 2019. I am supported by over \$2.3M in sponsored grants and awards as a PI or co-PI and I have published 20+ peer reviewed journal and conference papers. I am a member of the Academy of Outstanding Teachers at NC State. In 2017, I was one of the inaugural NC State CSC Outstanding Young Alumni awardees. I am the co-Program Chair of the 2019 and 2020 SIGCSE Technical Symposiums.

Professional Career

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| July 2015 – present | Associate Teaching Professor Director of Undergraduate Programs (2018-present) Assistant Director of Undergraduate Programs (2016-2018) Department of Computer Science, North Carolina State University, Raleigh NC <ul style="list-style-type: none">• Load of four (4) courses per academic year• Research in software engineering and computer science education• Co-coordinator of CSC Accreditation (2016-2018)• Honors Program Coordinator• Course coordinator for CSC216• Service to the department, college, and community |
| Aug. 2009 – June 2015 | Assistant Teaching Professor, Department of Computer Science, North Carolina State University, Raleigh, NC |
| June 2009 | R&D Engineer Intern, US Corporate Research, ABB, Inc., Raleigh, NC |
| May 2006 – May 2009 | Software Engineer Intern, Tivoli, Software Group, IBM, Research Triangle Park, NC |

Education

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| 2005-2009 | Doctorate of Philosophy, Computer Science, North Carolina State University, Raleigh, NC Title: <i>A Systematic Model Building Process for Predicting Actionable Static Analysis Alerts</i> Advisor: Dr. Laurie Williams |
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| 2004-2005 | Masters of Computer Science, North Carolina State University, Raleigh, NC |
| 2000-2004 | Bachelor of Science, Computer Science, North Carolina State University, Raleigh, NC |

Honors

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| 2019 | Computer Science Person of Exceptional Performance (PEP) Award |
| 2019, 2008 | ACM/AITP "Joyce Hatch Service" Award [student vote] |
| 2018 | Alumni Distinguished Undergraduate Professor Award |
| 2018, 2014 | ACM/AITP "Carol Miller Outstanding Lecturer" Award [student vote] |
| 2017 | Inaugural NC State CSC Outstanding Young Alumni Award |
| 2017, 2013, 2011 | Recognized by the "Thank a Teacher" Program at NC State University |
| 2017, 2013, 2011 | ACM/AITP "Most Receptive Professor Outside the Classroom" Award [student vote] |
| 2015 | NC State Outstanding Teacher Award and membership to the Academy of Outstanding Teachers |
| 2015 | NC State Alumni Association Outstanding Teacher Award |
| 2012 | Pride of the Wolfpack Award |
| 2006-2009 | IBM PhD Fellowship - \$17,500 9-month stipend + tuition and fees per year |

Teaching

Instructional Development

- CSC116: Introduction to Programming - Java
 - *Textbook*: Worked with colleagues to adopt a new textbook, *Building Java Programs* by Reges and Stepp, following an objects-late paradigm.
 - *Testing in CSC116*: Authored an introductory testing document that introduces students to white-box and black-box testing:
- CSC216: Programming Concepts – Java
 - *CSC216 Course Coordinator*: Oversee credit by examination and encourage consistency between offerings of the course by various instructors. Maintain course learning outcomes.
 - *CSC216 Course Refactoring*: Oversaw increase from 3 to 4 credit hours through adding an open lab to the course in Fall 2016. Created connected guided projects and lab activities to support major learning outcomes and refactored lectures to support lab activities. The changes were supported by a DELTA Course Redesign Grant.
 - *Peer Teaching Fellows Program*: Oversee hiring and training of Peer Teaching Fellows (PTFs) for CSC216, which are TA positions, some of which are supported by a Google CS Capacity Award.
 - *Software Engineering in CSC216*: Added static analysis and code coverage to course deliverables.
- CSC326: Software Engineering
 - *CSC326 Course Refactoring*: Oversaw increase from 3 to 4 credit hours. Restructured course projects and integrated team training. Supervised two students in creating a new base project for the class. Collaborated with Software Engineering faculty to modernize the course. The changes are supported by a DELTA Course Redesign Grant.
- Cross-Course Instructional Development
 - *Software Engineering Tools to Support Automated Course Grading*: Incorporation of a continuous integration tool, Jenkins, and version control, GitHub, for evaluation of student work while reinforcing good software engineering practices in CSC116, CSC216, CSC230, CSC316, and CSC326. A paper about the project was accepted to SIGCSE 2018.
 - *Google Forms as a Classroom Response System*: students submit in-class exercises through Google Forms, which allows for more complex responses and quick identification of students misunderstandings (with Dr. Ed Gehringer) in CSC216, CSC230, and CSC326.

- *CPATH II*: I have worked with a team of educators at NC State, University of Miami – Ohio, and other universities on the CPATH II grant for incorporating communication learning outcomes and assignments into the CS undergraduate curriculum in CSC116, CSC216, and CSC326. A paper about the project was accepted to the SEET track of ICSE 2015.
- TA Training
 - *University TA Training*: Worked with the Graduate School to coordinate a university-wide day-long TA training program in 2017. All COE TAs are now expected to attend the University TA Training program.
 - *COE TA Training*: Coordinated TA Training for new College of Engineering PhD students from 2015-2016. The training consisted of a three-hour Saturday seminar and managing three elective seminars taught by other COE faculty.
 - *TA Training*: An undergraduate special topics course for students who are teaching assistants in low-level undergraduate courses. Developed with support of Google CS Capacity RTPTF Award.
 - *Workshop – TA'ing Courses with Computer-Intensive Assignments*: Workshop for graduate student teaching assistants introducing them to techniques for evaluating and helping students in courses with computer-intensive assignments. Fall 2012, Fall 2013, Fall 2014.

Courses Taught

- **CSC116**: Introduction to Programming – Java (Fall 2009 [2 sections], Spring 2010 [2 sections], Spring 2011, Fall 2011, Spring 2012, Spring 2013, Spring 2015)
- **CSC216**: Programming Concepts – Java (Spring 2010, Summer 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012 [2 sections], Spring 2013, Fall 2013, Fall 2014 [2 sections], Fall 2015, Spring 2016, Fall 2016 [2 sections], Spring 2017, Fall 2017, Spring 2018 [2 sections], Fall 2018, Spring 2019)
- **CSC230**: C and Software Tools (Fall 2011, Spring 2012, Summer 2012, Fall 2012, Spring 2013, Fall 2013, Spring 2014, Spring 2015)
 - Distance Education offering of CSC230 (Summer 2012, Fall 2012, Spring 2013, Fall 2013, Spring 2014, Summer 2014, Fall 2014, Spring 2015, Fall 2015, Spring 2016)
- **CSC295**: TA Training (Fall 2016)
- **CSC326**: Software Engineering (Spring 2011, Fall 2013, Fall 2014, Fall 2015, Fall 2017, Spring 2019)
- **CSC492**: Senior Design (Spring 2014, Spring 2015, Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018)
- **CSC801**: Seminar Course (Spring 2012, Fall 2014)

Professional Development

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| Fall 2016 | CRA-W Career Mentoring Workshop (Mid-career) |
| Spring 2014 | Office of Faculty Development's Summer Institute on the Scholarship of Teaching and Learning |
| Spring 2014 | Completed Certificate of Reflective Teaching through the Office of Faculty Development |
| 2011-2012 | Mentee in Peer Scholar Program through the Office of Faculty Development |
| Spring 2011 | Workshop on Managing the Academic Career for Women Faculty in Undergraduate Computing Programs (co-located with SIGCSE 2011) |

Student Supervision & Mentoring

Ph.D. Student

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| 2012-2017 | Brittany Johnson, PhD, "Augmenting Program Analysis Tool Intelligence" (Defended May 2017) |
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Committee Membership

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| Summer 2019 | Justin Smith (PhD) |
| Summer 2019 | Shaoliang Nie (PhD) |

Summer 2019 Zhewei Hu (PhD)
Spring 2019 Rasika Pande (MS)
Spring 2019 Amanul Haque (MS)
Spring 2018 Veronica Catete (PhD)
Spring 2018 Thomas Price (PhD)
Summer 2017 Yang Song (PhD)
Spring 2015 Amanda Landi (PhD – Mathematics) – Graduate School Representative
Fall 2012 Ashutosh Grewal (Masters)
Spring 2012 Brittany Johnson (Preliminary Written Examination Committee)
Spring 2012 John Majikes (Preliminary Written Examination Committee)

Preparing the Professoriate Mentees

2013-2014 Barry Peddycord, III
2012-2013 David Fiala

Mentored Teaching Assistant Award Mentees

Fall 2019 Kai Presler-Marshall
Fall 2017 Adam Gaweda

Faculty Advisor

2011-2015 ACM/AITP Student Organization

Undergraduate Research & Development

Spring 2019 Ghin Chau (BS)
Summer 2018 Sarah Troise (REU)
Spring 2018 Brantley Collins (MS), Robert Herhold (BS), Oscar Molina (BS), Samuel Schoeneberger (BS)
Fall 2017 Qingyan Wang (BS), Samuel Schoeneberger (BS)
Spring 2017 Spatika Ganesh (BS), Samuel Schoeneberger (BS), Renata Zeitler (BS)
Fall 2016 Brantley Collins (BS), Brendan Kelly (BS)
Summer 2016 Brantley Collins (BS), Hanan Cavalcante (Brazil Exchange Program), Aline Lais Gomes (Brazil Exchange Program), Adam Smith (REU)
Spring 2016 David Carey (BS), Jordan Connor (BS)
Fall 2015 Jordan Connor (BS)
Spring 2012 Andrew Hall (BS)
Spring 2010 Khalia Braswell (BS), John Hall (BS), Ryan Kurt Hasian (BS), Robert Lampe (BS), Matthew Zizzi (BS) [co-directed by Dr. Robert Fornaro]

Independent Study (CSC499 & CSC630)

Fall 2018 Jonathan Schertz (BS)
Spring 2018 Renata Zeitler (BS)
Spring 2017 Qingyan Wang (BS)
Fall 2016 Spatika Ganesh (BS)
Fall 2015 Yao Lu (MS)
Fall 2015 David Carey (BS)
Spring 2015 Jordan Connor (BS)
Spring 2014 Martin Locklear (BS)
Fall 2011 Andrew Hall (BS)
Summer 2010 Kevin Bauer (BS), Ryan Fredette (BS), Cat Pike (BS), Andrew Warren-Love (BS) [co-mentored with Dr. Ed Gehringer]

University Honors Program Independent Study (HON295)

Spring 2011 Tyler Dodge (BS), Brandon Walker (BS)

Fall 2010 Tyler Dodge (BS), Timothy Mervine (BS), Bethany Vohlers (BS), Brandon Walker (BS)

University Honors Program Credit for CSC216

Fall 2011 William Beavers (BS)

Research

My overall goal is to scaffold software engineering skills throughout the core courses in the software engineering and programming languages area to support the software engineering lifecycle and debugging skills. Following the learning theory of situated learning, students are considered novice software engineers and work with tools and practices that professionals use. Additionally, as class size grows, I seek to provide tooling and automation to help students develop help-seeking and debugging skills.

CS1.5 Laboratories

Students have reported in class evaluations that they would like to engage more deeply with recently learned concepts and software engineering practices through larger programming exercises completed during class time. I introduced in-class laboratories into CSC216 in AY2015-2016 and we moved to open lab sections lead by Peer Teaching Fellows in AY2016-2017. The goal of the research is to increase student learning, efficacy, and engagement while supporting software engineering skills that may transfer to other assignments and courses. Automation and data mining support interventions in help-seeking and scaffolding to support student learning and debugging skills.

Software Engineering Technologies and Teaming

The CSC326 – Software Engineering course was redesigned to better support students when learning new technologies on teams. The updated course emphasizes training in new technologies and working effectively on teams. The goal of the research is to increase student learning and engagement in the junior level course when compared to the previous version of the course. Additionally, we seek to better prepare students for the CSC capstone experience.

Peer Teaching Fellows

To address the need for additional student support with growing enrollments in CSC216 and other second semester programming courses, the Research Triangle Peer Teaching Fellows (RTPTF) program was created between Duke University, NC State University, and University of North Carolina – Chapel Hill to identify evidence-based practices for teaching assistants in CS courses. The program investigates how to create a PTF program and train PTFs to increase student learning, engagement, and retention, particularly of underrepresented groups in a second semester CS course and other CS courses.

Communication across the Curriculum

The Department of Computer Science has participated in research about how best to incorporate and integrate communication learning outcomes in reading, writing, speaking, and teaming with the technical learning outcomes of our classes. As part of this project, I have developed assignments that incorporate communication genres (e.g., requirements specifications, design proposals, and black box test plans) to support students learning of communication and technical skills.

Publications

Journal Guest Editor

- [1] M. Sherriff and **S. Heckman**, "Capstones and Large Projects in Computing Education," ACM Transactions on Computing Education (TOCE), vol. 18, no. 2, 2018. Impact Factor: 1.821

Journal Papers

- [2] N. Gitinabard, Y. Xu, **S. Heckman**, T. Barnes, C. F. Lynch, "How Widely Can Prediction Models Be Generalized? Performance Prediction in Blended Courses," IEEE Transactions on Learning Technologies, pp. 184-197. Impact Factor: 1.869
- [3] **S. Heckman** and L. Williams, "A Systematic Literature Review of Actionable Alert Identification Techniques for Automated Static Code Analysis," Information and Software Technology, vol. 53, no. 4, April 2011, pp. 363-387. Impact Factor: 1.821

Refereed Full Conference Papers

- [4] N. Gitinabard, T. Barnes, **S. Heckman**, C. F. Lynch, "What will you do next? A sequence analysis on the student transitions between online platforms in blended courses," Educational Data Mining 2019, to appear.
- [5] **S. Heckman** and J. King, "Developing Software Engineering Skills using Real Tools for Automated Grading," SIGCSE 2018, pp. 794-799. (Acceptance Rate: 35%)
- [6] M. Vellukunnel, P. Buffum, K. E. Boyer, J. Forbes, **S. Heckman**, K. Mayer-Patel, "Deconstructing the Discussion Forum: Student Questions and Computer Science Learning," SIGCSE 2017, pp. 603-608. (Acceptance Rate: 30%) *Exemplary CS Education Research Paper*
- [7] A. Smith, K. E. Boyer, J. Forbes, **S. Heckman**, K. Mayer-Patel, "My Digital Hand: A Tool for Scaling Up One-to-One Peer Teaching in Support of Computer Science Learning," SIGCSE 2017, pp. 549-554. (Acceptance Rate: 30%)
- [8] B. Johnson, R. Pandita, J. Smith, D. Ford, S. Elder, E. Murphy-Hill, **S. Heckman**, C. Sadowski, "A Cross-Tool Communication Study on Program Analysis Tool Notifications," ACM SIGSOFT International Symposium on the Foundations of Software Engineering, Seattle, WA, USA, November 13-19, 2016, p. 73-84. (Acceptance Rate: 27%)
- [9] A. Al-Zubidy, J. Carver, **S. Heckman**, M. Sherriff, "A (Updated) Review of Empiricism at the SIGCSE Technical Symposium," 2016 SIGCSE Technical Symposium, Memphis, TN, March 2-5, 2016, to appear. (Acceptance Rate: 35.4%)
- [10] **S. Heckman**, "An Empirical Study of In-Class Laboratories on Student Learning of Linear Data Structures," International Computing Education Research Conference (ICER), Omaha, Nebraska, USA, August 9-13, 2015, pp. 217-225.
- [11] P. V. Anderson, **S. Heckman**, M. Vouk, D. Wright, M. Carter, J. E. Burge, G. C. Gannod, "CS/SE Instructors Can Improve Student Writing without Reducing Class Time Devoted to Technical Content: Experimental Results," Joint Software Engineering Education and Training (JSEET) track of the International Conference of Software Engineering, 2015, p. 455-464.
- [12] **S. Heckman** and L. Williams, "A Comparative Evaluation of Static Analysis Actionable Alert Identification Techniques," 9th International Conference on Predictive Models in Software Engineering (PROMISE), Baltimore, Maryland, USA, October 9, 2013, pp. 4:1-4:10. Acceptance Rate: 55%
- [13] M. Carter, R. Fornaro, **S. Heckman**, and M. Heil, "Creating a Progression of Writing, Speaking, & Teaming Learning Outcomes in Undergraduate Computer Science/Software Engineering Curricula," World Engineering Education Forum (WEEF), Buenos Aires, Argentina, October 15-18, 2012.
- [14] **S. Heckman** and L. Williams, "A Model Building Process for Identifying Actionable Static Analysis Alerts," 2nd IEEE International Conference on Software Testing, Verification, and Validation (ICST), Denver, CO, USA, 2009, pp. 161-170. Acceptance Rate: 33%
- [15] **S. Heckman** and L. Williams, "On Establishing a Benchmark for Evaluating Static Analysis Alert Prioritization and Classification Techniques," Proceedings of the 2nd International Symposium on

Empirical Software Engineering and Measurement (ESEM) 2008, Kaiserslautern, Germany, October 9-10, 2008, pp. 41-50. Acceptance Rate: 28%

- [16] M. Rappa, **S. E. Smith**, A. Yacoub, and L. Williams, "OpenSeminar: A Web-Based Collaboration Tool for Open Educational Resources," Proceedings of the 1st International Conference on Collaborative Computing: Networking, Applications, and Worksharing (CollaborateCon 2005), San Jose, CA, December 19-21, 2005.

Other Refereed Conference Papers

- [17] **S. Heckman**, K. T. Stolee, C. Parnin, "10+ Years of Teaching Software Engineering with iTrust: the Good, the Bad, and the Ugly," ICSE-SEET 2018, pp. 1-4. (Acceptance Rate: 28%)
- [18] N. Gitinabard, L. Xue, C. F. Lynch, S. Heckman, T. Barnes, "A Social Network Analysis on Blended Courses," GEDM 2017 Proceedings, in EDM 2017 Extended Proceedings: Workshop Proceedings of the 10th International Conference on Educational Data Mining, 2017.
- [19] N. Gitinabard, C. F. Lynch, S. Heckman, T. Barnes, "Identifying Student Communities in Blended Courses," Proceedings of the 10th International Conference on Educational Data Mining, pp. 378-379, 2017.
- [20] B. Johnson, R. Pandita, E. Murphy-Hill, S. Heckman, "Bespoke Tools: Adapted to the Concepts Developers Know," 10th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering, New Ideas and Emerging Results Track, Bergamo, Italy, August 30-September 4, 2015, pp. 878-881.
- [21] M. Sherriff, **S. S. Heckman**, M. Lake, L. Williams, "Identifying Fault-Prone Files Using Static Analysis Alerts Through Singular Value Decomposition," Short Paper, Proceedings of the 2007 Conference of the Center for Advanced Studies on Collaborative Research (CASCON 2007), Richmond Hill, Ontario, Canada, October 22-25, 2007, pp. 276-279.
- [22] M. Sherriff, **S. S. Heckman**, M. Lake, L. Williams, "Using Groupings of Static Analysis Alerts to Identify Files Likely to Contain Field Failures," Short Paper, Proceedings of the 6th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2007), Dubrovnik, Croatia, September 2-7, 2007, pp. 565-568. Acceptance Rate: 25%
- [23] **S. S. Heckman**, "Adaptive Probabilistic Model for Ranking Code-Based Static Analysis Alerts," Doctoral Symposium, Companion to the Proceedings of the 29th International Conference on Software Engineering (ICSE 2007), Minneapolis, MN, May 19-27, 2007, pp. 89-90.
- [24] **S. S. Heckman** and L. Williams, "Automated Adaptive Ranking and Filtering of Static Analysis Alerts," Fast Abstract, 17th IEEE International Symposium on Software Reliability Engineering (ISSRE 2006), Raleigh, NC, November 7-10, 2006.
- [25] M. Rappa, **S. E. Smith**, and A. Yacoub, "Open Course Resources as Part of the OpenSeminar in Software Engineering," Proceedings of the 19th Conference on Software Education and Training (CSEE&T 2006), Turtle Bay, HI, April 19-21, 2006, pp. 187-189.
- [26] **S. E. Smith**, L. Williams, and J. Xu, "Expediting Programmer AWAREness of Anomalous Code," Fast Abstract, 16th IEEE International Symposium on Software Reliability Engineering (ISSRE 2005), Chicago, IL, November 8-11, 2005.
- [27] L. Williams, **S. E. Smith**, M. Rappa, "Resources for Agile Software Development in the Software Engineering Course," Proceedings of the 18th Conference on Software Engineering Education and Training (CSEE&T 2005), Ottawa, Canada, April 18-20, 2005, pp. 236-238.

Magazine Articles

- [28] E. K. Hawthorne, M. A. Pérez-Quiñones, **S. Heckman**, J. Zhang, "SIGCSE Technical Symposium 2019 Report" *ACM SIGCSE Bulletin*, vol. 51, no. 2, April 2019, p. 2-4.
- [29] **S. Heckman**, J. Zhang, M. A. Pérez-Quiñones, E. K. Hawthorne, "What is a SIGCSE Symposium Paper?," *ACM SIGCSE Bulletin*, vol. 50, no. 3, July 2018, p. 3.
- [30] **S. Heckman**, J. Zhang, M. A. Pérez-Quiñones, E. K. Hawthorne, "SIGCSE 2019 Paper Length Change," *ACM SIGCSE Bulletin*, vol. 50, no. 2., April 2018, p. 4.

- [31] **S. S. Heckman**, "Adaptively Ranking Alerts Generated from Automated Static Analysis," ACM Crossroads, vol. 14, no. 1, Winter 2007, pp. 16-20.
- [32] **S. E. Smith** and A. Potoczniak, "Five Points of Connectivity," in EDUCAUSE Review, vol. 40, September/October 2005, pp. 30-40.

Workshops/Tutorials/Birds of a Feather

- [33] **S. Heckman**, J. Carver, M. Sherriff, "Designing Empirical Education Research Studies (DEERS): Creating an Answerable Research Question," SIGCSE 2018 Workshop.
- [34] **S. Heckman**, J. Carver, M. Sherriff, "Designing Empirical Education Research Studies (DEERS): Creating an Answerable Research Question," SIGCSE 2017 Workshop.
- [35] M. Sherriff and **S. Heckman**, "Empirical Research in CS Education," Birds of a Feather, SIGCSE Technical Symposium, 2015, p. 701.
- [36] **S. Heckman**, T. B. Horton, and M. Sherriff, "Teaching Second-Level Java and Software Engineering with Android," 24th IEEE-CS Conference on Software Engineering Education and Training (CSEE&T), Honolulu, Hawaii, May 22-24, 2011, pp. 540-542.

Refereed Abstracts

- [37] **S. Heckman** and E. Gehringer "Google Forms as an Enhanced Classroom Response System," Abstract: International Society for the Scholarship of Teaching and Learning (ISSOTL '13).

Technical Reports

- [38] **S. Heckman**, A. Al-Zubidy, J. C. Carver, M. Sherriff, "A (Updated) Review of Empiricism at the SIGCSE Technical Symposium," NCSU Technical Report, TR-2015-1, January 5, 2015.
- [39] M. Carter, R. Fornaro, **S. Heckman**, and M. Heil, "Developing a Learning Progression that Integrates Communication in an Undergraduate CS/SE Curriculum," NCSU Technical Report, TR-2012-7, May 25, 2012.
- [40] **S. Heckman** and L. Williams, "A Systematic Literature Review of Actionable Alert Identification Techniques for Automated Static Code Analysis", NCSU Technical Report, TR-2010-17, July 23, 2010.
- [41] **S. Heckman** and L. Williams, "A Measurement Framework of Alert Characteristics for False Positive Mitigation Models," NCSU Technical Report, TR-2008-23, October 28, 2008.
- [42] **S. S. Heckman** and L. Williams, "On Establishing a Benchmark for Evaluating Static Analysis Alert Prioritization and Classification Techniques," NCSU Technical Report, TR-2008-11, April 24, 2008.

Research Posters

- [43] **S. Heckman**, J. King, "Teaching Software Engineering Skills in CS1.5: Incorporating Real-world Practices and Tools," Poster: NC State 2016 Teaching and Learning Symposium, 2016.
- [44] **S. Heckman**, J. King, "Teaching Software Engineering Skills in CS1.5: Incorporating Real-world Practices and Tools," Poster: 2016 SIGCSE Technical Symposium, 2016, p. 696-697.
- [45] **S. Heckman**, "A Continuous Integration Framework for Promoting Software Engineering Best Practices," Poster: International Computer Education Research Conference, 2015.
- [46] **S. Heckman**, "An Investigation of In-class Labs on Student Learning of Linear Data Structures," Poster: NC State 2015 Teaching and Learning Symposium, 2015.
- [47] **S. Heckman**, J. King, M. Winters, "Automating Software Engineering Best Practices Using an Open Source Continuous Integration Framework," Poster: 2015 SIGCSE Technical Symposium, 2015, p. 677. Acceptance Rate: 44%.
- [48] **S. Heckman**, "Integrating Communication Assessments into Undergraduate Computer Science Core Courses," Poster: NC State 2014 Teaching and Learning Symposium, 2014.
- [49] E. Gehringer and **S. Heckman**, "Google Forms as an Enhanced Classroom Response System," Poster: NC State 2013 Teaching and Learning Symposium, 2013.

- [50] **S. Heckman**, L. Layman, S. Thomas, L. Williams, T. Xie., "On Expediting Software Engineer AWAREness of Anomalous Code," Poster: Center for Advanced Computing and Communication and IBM University Day, 2006.
- [51] **S. E. Smith**, L. Williams, and J. Xu, "Continuous Checking of Static Analysis and Automated Unit Test for Java Programs," Poster: Center for Advanced Computing and Communication and IBM University Day, 2005 – 2006.
- [52] **S. E. Smith**. "Collaborative Courseware Development," Poster: The 13th Annual NC State University Undergraduate Research Symposium, 2004.

Other Papers

- [53] **S. S. Heckman**, "Adaptively Ranking Alerts Generated from Automated Static Analysis," Institute for Software Research (ISR) Graduate Student Research Symposium (GSRs), University of California, Irvine, June 1, 2007.

Assignments

- [54] **Sarah Heckman**, "Testing the Java Collections Framework," *EngageCEdu*, <https://www.engage-csedu.org/find-resources/testing-java-collections-framework>
- [55] **Sarah Heckman**, "Black Box Test Plan - Bug Hunt," *Incorporating Communication Outcomes into the Computer Science Curriculum*, accessed May 29, 2014, <http://cs-comm.lib.muohio.edu/items/show/16>.
- [56] **Sarah Heckman**, Ed Gehringer, "Design Proposal and Rationale," *Incorporating Communication Outcomes into the Computer Science Curriculum*, accessed May 29, 2014, <http://cs-comm.lib.muohio.edu/items/show/38>.

Invited Presentations, Judge, & Panelist

- Panelist, INTech Foundation Middle School Girls Summer Camp, 2017
- Panelist, Middle School Girls Gaming Camp, July 2014 and 2016
- Panelist, WiCS Grad School Panel, April 11, 2014.
- Judge, WiCS Symposium, April 4, 2014.
- Panelist, SHE++ Documentary Screening and Panel Discussion, WiCS, November 2014. (<http://lib.ncsu.edu/event/she-documentary-screening-and-panel-discussion>)
- Speaker, "Computer Science and You," NC State CSC Girls Gaming Camp, July 2013.
- Speaker, "Pair Programming", University of Virginia Tapestry Workshop, June 2012.
- Panelist, CRA-W Panel Discussion, WiCS, November 2011.
- Panelist, Graduate Experiences, CSC GSA, November 2009.
- Speaker, Research Ethics Education: Beyond RCR Training, "OpenSeminar in Research Ethics: A web-based REE course," with D. Edelman, Raleigh, NC, USA, April 2007.
- Speaker, EDUCAUSE NLII (now ELI) 2005 Spring Focus Session, Emerging Practices and Learning Technologies, "What Students Say About Emerging Practices and Learning Technology," with A. Potoczniak, Rice University, Houston, TX, USA, March 2005.

Funding – Career Total \$2,339,444

Sponsored Grants – Total \$1,880,304

- C. F. Lynch, T. M. Barnes, S. Heckman, "Developing Integrated Teaching Platforms to Enhance Blended Learning in STEM," National Science Foundation, 10/1/2018 – 9/30/2021, \$597,529.
- E. Murphy-Hill and **S. Heckman**, "SHF: Small: Enabling Scalable and Expressive Program Analysis Notifications," National Science Foundation, 8/15/2017 – 7/31/2020, \$265,853.
- C. Parnin, E. Murphy-Hill, **S. Heckman**, "REU Site: Science of Software", 2/1/2016 – 1/31/2019, \$355,365.

- **S. Heckman**, “Incorporation of Software Engineering Best Practices in CSC216”, Google CS Engagement Award, Tides Foundation, 7/1/2015 – 1/31/2016, \$5,000.
- **S. Heckman**, “Collaborative Research: Transforming Computer Science Education Research Through Use of Appropriate Empirical Research Methods: Mentoring and Tutorials”, National Science Foundation, 9/1/2015 – 8/31/2020, \$406,557 [Full Grant is: \$1.31M]
- E. Murphy-Hill and **S. Heckman**, “SHF: Small: Expressive and Scalable Notifications for Program Analysis Tools,” National Science Foundation, 10/1/2012 – 9/30/2014, \$250,000.

Extension Grants – Total \$15,800

- E. Youngsteadt, D. S. Carley, S. Heckman, “NC Pollinator Garden Design Website,” 2019 Gore Innovative Grants, April 2019 – April 2020, \$15,800.

Educational Grants – Total \$84,115

- **S. Heckman**, K. Stolee, C. Parnin, “CSC326 Course Redesign – Creating an Agile Course to Support Software Engineering Process,” DELTA Course Redesign Grant, July 2017 – June 2018, \$36,400 + \$9,500 supplement.
- **S. Heckman**, “Incorporating Software Engineering Best Practices into CSC216,” July 2015 – June 2016, \$18,965 + \$10,000 supplement.
- **S. Heckman**, “Bridging the Gap between CS1 & CS2: Flipping the CS1.5 Classroom,” Office of Faculty Development Summer Institute on the Scholarship of Teaching and Learning Grant, July 2014 – June 2015, \$1,250.
- E. Gehringer and **S. Heckman**, “A Classroom Response System Using Google Apps,” DELTA IDEA Grant, September 2011 – June 2012, \$8,000.

Awards – Total \$346,175

- **S. Heckman**, “Research Triangle Peer Teaching Fellows: Scalable Evidence-Based Peer Teaching for Improving CS Capacity and Diversity,” Sub Award from Duke University as part of Google CS Capacity Award, 7/1/2015 – 6/30/2018, \$346,175.77. In collaboration with Duke University, University of North Carolina – Chapel Hill, and University of Florida.

Gifts in Kind – Total \$13,050

- **S. Heckman**, “Real-World, Socially-Relevant Mobile Application Development in CS2” (30 Motorola Droids), Google, Inc., 2010, 30 Motorola Droids, \$13,050.

Professional Service

- Technical Symposium on Computer Science Education (SIGCSE), 2020 – Program Chair (senior)
- Technical Symposium on Computer Science Education (SIGCSE), 2019 – Program Chair
- Guest Editor, Transactions on Computing Education, Special Issue on Capstones, 2016-2017.
- Technical Symposium on Computer Science Education (SIGCSE), 2018 – Posters Chair
- Technical Symposium on Computer Science Education (SIGCSE), 2017 – Demos Chair
- Technical Symposium on Computer Science Education (SIGCSE), 2015, 2016, 2017 – Student Volunteers and Student Activities
- Invited Reviewer, Security and Communications Network, 2015
- Invited Reviewer, *International Journal of Artificial Intelligence in Education* (IJAIED), 2015
- Technical Symposium on Computer Science Education (SIGCSE), 2013 – Affiliated Events Chair
- Technical Symposium on Computer Science Education (SIGCSE), 2012 – Local Arrangements
- Member, National Science Foundation proposal review panel, 2012
- Associate Program Committee (APC), Technical Symposium on Computer Science Education, 2017
- Invited Reviewer, *Software: Practice and Experience*, 2014

- Reviewer, Conference on Innovation and Technology in Computer Science Education (ITiCSE), 2010-2014,2017
- Reviewer, Technical Symposium on Computer Science Education (SIGCSE), 2010-2014
- Reviewer, International Conference on Software Engineering (ICSE) Software Engineering Education Track (SEE), 2013
- Invited Reviewer, *Information and Software Technology* (IST), 2012
- Reviewer, Grace Hopper Celebration of Women in Computing, PhD Forum, 2011
- Reviewer, American Society for Engineering Education (ASEE) Software Engineering Constituent Committee (SwECC), 2010
- Reviewer, Grace Hopper Celebration of Women in Computing, 2010
- Member, Association for Computing Machinery (ACM), 2006-present
- Member, Institute of Electrical and Electronic Engineers (IEEE), 2006-present
- Member, Association for Information Technology Professionals (AITP), 2010-2013

University Service

- Director of Undergraduate Programs, Department of Computer Science, 2018-present
- Assistant Director of Undergraduate Programs, Department of Computer Science, 2016-2018
- Accreditation Co-Coordinator, 2017-2018
- Contributor, University TA Training, 2017
- Coordinator, COE Graduate TA Training, 2015-2016
- Member, CSC Department Task Forces (Undergraduate Research, Strategic Plan Actionable Goals, Curriculum Tracks, Broadening Participation), 2015- present
- Member, Undergraduate Curriculum Committee, 2010-present
- Advisor, ACM/AITP Student Chapter, 2010-2015
- Member, Computer Steering Committee, 2013-present
- Instructor, College of Engineering Summer Programs for High School, 2011, 2012, 2014, 2015
- Member, Teaching Assistant Professor Hiring Committee, 2011, 2012, 2014, 2015
- Instructor, COE Graduate TA Training Extended Workshop on TA'ing Courses with Computer Intensive Assignments, 2012, 2013, 2014
- Co-instructor, COE Graduate TA Training, 2012-2013
- Facilitator, Workshop for visiting High School Computer Science Students, 2012
- Member, Lab Coordinator Hiring Committee, 2009
- Member, Web Redesign Committee, 2009
- CSC Service Lab Co-coordinator, 2009