

Daniel T. Welch

Graduate Teaching Assistant (<https://dtwelch.github.io/>)

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Research Interests

My research interests broadly include software engineering, systems development, programming languages and compilers, and computer science education.

Education

Clemson University, Clemson, South Carolina

Ph.D. Candidate, Computer Science (Fall 2013 - present)

Denison University, Granville, Ohio

Bachelor of Arts, Computer Science

Minor, English Literature (Spring 2013)

Honors & Awards

Upsilon Pi Epsilon Member, South Carolina Alpha Chapter

First Place, SIGCSE 2017 ACM Student Research Competition (SRC)

Graduate division, awarded a gold medal and \$500

Outstanding Ph.D. Student in Computer Science Award

Clemson University, School of Computing, 2018.

Travel Awards: SIGSCE 2017 Graduate poster session (Seattle, WA), SRI Formal Methods 2015 Summer Camp (Menlo, CA)

Research/ Teaching Experience

Graduate Teaching Assistant (Spring 2016 - present)

School of Computing, Clemson, South Carolina

Served as a teaching assistant and grader for a number of courses including Algorithms and Data Structures (CpSc 2120), Intermediate Computer Science (CpSc 2100), and Computer Organization (CpSc 2310). For several semesters, I've served as the lead TA for Computer Organization and have been responsible for organizing labs, TA meetings, and overseeing logistical aspects of the course's lab sections.

Graduate Research Assistant (Fall 2013 - Spring 2015)

School of Computing, Clemson, South Carolina

Undergraduate REU Research Assistant (Summer 2013)

School of Computing, Clemson, South Carolina

Designed and implemented a translator which, from formally verified RESOLVE code, generates property-preserving Java for execution.

Undergraduate REU Research Assistant (Summer 2012)

Department of Mathematics and Computer Science, Denison University, Ohio
Worked with an early, prototype version of the RESOLVE verifying compiler to produce a proof of concept of a formally specified spanning forest finding library component.

Proposals Submitted	NSF Graduate Research Fellowship, “Scaling Up Automated Verification: A Component Based Case Study” (Spring 2015)
Doctoral Dissertation	Daniel Welch. Scaling Up Automated Verification: A Case Study and A Formalization IDE for Building High Integrity Software. <i>PhD Dissertation (in progress)</i> , Expected Completion Date: Summer 2019
Refereed Publications	Yu-Shan Sun, Daniel Welch, Murali Sitaraman. F-IDEs with Features and VCs Designed to Assist Human Reasoning When Verification Fails. <i>Under review</i>. NASA Formal Methods (NFM) 2019. Daniel Welch, Murali Sitaraman, Blair Durkee. A Formalization IDE Integrated with a Verifying Compiler. <i>Proceedings of the 12th Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems, ICIOOLPS 2017</i>, 6:1-6:4, ACM. Daniel Welch and Murali Sitaraman. Engineering and Employing Reusable Software Components for Modular Verification. In: Botterweck G. and Werner C. (eds.). <i>Proceedings of the 16th International Conference on Software Reuse, ICSR 2017</i>. LNCS, vol. 10221 Daniel Welch. Scaling Up Automated Verification: A Case Study and A Formalization IDE for Building High Integrity Software. <i>ACM Student Research Competition Grand Finalist Paper Submission</i>, 2017, 5 pages, https://src.acm.org/binaries/content/assets/src/2016/danielwelch.pdf Nabil M. Kabbani, Daniel T. Welch, Caleb Priester, Stephen Schaub, Blair Durkee, Yu-Shan Sun, Murali Sitaraman. Formal Reasoning Using an Iterative Approach with an Integrated Web IDE. In: C. Dubois, P. Masci and D. Méry. (eds.). <i>Proceedings of the 2nd International Workshop on Formal Integrated Development Environments, F-IDE 2015</i>, pages 56-71. Daniel Welch, Charles Cook, Yu-Shan Sun, and Murali Sitaraman. A Web-Integrated Verifying Compiler for RESOLVE: A Research Perspective. In <i>Proceedings of the 7th India Software Engineering Conference, ISEC 2014</i>, pages 12:1-12:6. ACM.
RESOLVE Workshops	Daniel Welch. Formalization Integrated Development Environments: A Survey of the Current Landscape. RESOLVE 2018 (May 2018). To appear, ACM SIGSOFT Software Engineering Notes (SEN). Daniel Welch. Designing a Fully Featured IDE for Engineering Modular, Verified Software. RESOLVE 2016 (May 2016).

Presentations	Formally Verifying Components Involving Set Operators Using RESOLVE. <i>CISEEDS: Research Experiences for Undergraduates/Graduates in Data Intensive Computing, Poster</i>. Clemson University. Summer 2014 Scaling Up Automated Verification: A Case Student and A Formalization IDE (F-IDE) for Building High Integrity Software. <i>SIGCSE 2017: ACM Graduate Student Research Competition, Poster Presentation + Juried Talk (First Place)</i>. Seattle, WA. Spring 2017 Engineering and Employing Reusable Software Components for Modular Verification. <i>ICSR 2017: Conference Paper Presentation</i>. Salvador, Brazil. May 2017 Integrating a Verifying Compiler with an IDE. <i>ICOOOLPS 2017: Workshop Paper Presentation</i>. Barcelona, Spain. June 2017
Doctoral Symposia	Scaling Up Automated Verification: A Case Study and A Formalization IDE for Building High Integrity Software. <i>ECOOP 2017 Doctoral Symposium: Paper + Presentation</i>. Barcelona, Spain. June 2017
Professional Service	PLDI/ECOOP 2017: Student volunteer. Responsibilities included distribution of various conference materials, attending to the conference help desk, setting up rooms, and providing technical assistance at various workshop sessions. Paper Referee/Reviewer: <i>International Conference on Software Reuse</i> (ICSR 2017), <i>International Conference on Software Engineering</i> (ICSE 2016, 2017), <i>Joint Software Engineering Education and Training</i> (JSEET), <i>Modularity 15': Aspect Oriented Software Development</i> (AOSD).
Professional References	• Dr. Murali Sitaraman, Professor, School of Computing, Clemson University (msitara@clemson.edu) • Dr. Jason Hallstrom, Professor & Director of <i>I-SENSE</i>, Florida Atlantic University (jhallstrom@fau.edu) • Dr. Bruce Weide, Professor Emeritus, Computer Science and Engineering, The Ohio State University (bweide@gmail.com)