Ciera N.C. Jaspan

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Research Interests

Software Engineering, Software Frameworks, Static Analysis, Quality Assurance, Software Design, Developer Productivity, Software Engineering Education

Education

Carnegie Mellon University **Pittsburgh, PA** **2005-Present**
Software Engineering Ph.D. student
Advisor: Dr. Jonathan Aldrich
Expected graduation date: Spring 2011
Thesis title: Proper Plugin Protocols: Cost-effective Verification of Framework Clients

California Polytechnic State University **San Luis Obispo, CA** **2000-2005**
B.S. in Software Engineering
Major GPA: 3.82

Honors and Awards

1st place SPLASH ACM Student Research Competition. 2010
Awarded by ACM SIGPLAN at SPLASH 2010. Given for individual graduate research in programming languages and software engineering.

Los Alamos National Lab Fellowship. 2008-Present
Awarded by Los Alamos National Laboratory, Institute for Reliable High Performance Information Technology. Given for research in high-performance software frameworks.

John Vlissides Award. 2008
Awarded by ACM SIGPLAN at OOPSLA 2008. Given to an outstanding doctoral student showing significant promise in applied software research.

J.L. Moore Fellowship. 2005
Awarded by the Computer Science Department, Cal Poly. Given for academic achievement to pursue a Ph.D. in computer science.

Outstanding Graduating Senior for Academic Excellence. 2005
Awarded by the College of Engineering, Cal Poly. Given for academic achievement in the College of Engineering.

Accenture Outstanding Junior in Computer Science. 2002
Awarded by the Computer Science Department, Cal Poly. Given for academic achievement in computer science.

Competitive Edge Scholarship. 2000-2005
Awarded by the Walmart Foundation. Given for academic achievement and community leadership to pursue a career in computer science.

California 4-H Diamond Star (State Ambassador). 1999-2000
Awarded by California State 4-H Program. Given for proven leadership at the state and regional level.

Publications

Journals and Conferences

Ciera Jaspan, Michael Keeling, Larry Maccharone, Gabriel L. Zenarosa, and Mary Shaw, "Software Mythbusters Explore Formal Methods", *IEEE Software*, vol. 26, no. 6, pp. 60-63, November/December 2009.

Ciera Jaspan and Jonathan Aldrich, "Checking Framework Interactions with Relationships", in *Proceedings of the European Conference on Object-Oriented Programming (ECOOP '09)*, Genova, Italy, July 2009. (Acceptance rate: 21%)

Ciera Jaspan, Trisha Quan, and Jonathan Aldrich, "Error Reporting Logic", in *Proceedings of the Conference on Automated Software Engineering (ASE '08)*, L'Aquila, Italy, July 2008. (Acceptance rate: 12%)

Symposia, Workshops, and Experience Reports

Ciera Jaspan, "Verifying Configuration Files", in the *SPLASH Student Research Competition*, Reno, USA, October 2010. Received 1st place in the ACM Student Research Competition at SPLASH.

Leigh Ann Sudol and Ciera Jaspan, "Analyzing the Strength of Undergraduate Misconceptions about Software Engineering", in *Proceedings of International Computing Education Research (ICER '10)*, Århus, Denmark, July 2010.

Ciera Jaspan and Jonathan Aldrich, "Retrieving Relationships in Declarative Files", in *Proceedings of the Workshop on Relationships and Associations in Object-Oriented Languages (RAOOL '09)*, Genova, Italy, July 2009.

Ciera Jaspan, "Checking Framework Interactions with Relationships", in *the OOPSLA Doctoral Symposium*, Nashville, USA, October 2008. Received the ACM SIGPLAN John Vlissides Award.

Ciera Jaspan and Jonathan Aldrich, "Checking Semantic Usage of Frameworks", in *Proceedings of the Symposium on Library Centric Software Design (LCSD '07)*, Montreal, Canada, October 2007.

Ciera Jaspan, I-Chin Chen, and Anoop Sharma, "Understanding the Value of Program Analysis Tools", practitioner's report in *Companion to the Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA '07 Companion)*, Montreal, Canada, October 2007.

Technical Reports

Ciera Jaspan and Jonathan Aldrich, "Checking Framework Interactions with Relationships: Extended", Institute for Software Research, Carnegie Mellon University, Technical report CMU-ISR-08-140, December 2008.

Ciera Jaspan and Jonathan Aldrich, "Checking Temporal Relations between Multiple Objects", Institute for Software Research, Carnegie Mellon University, Technical report CMU-ISR-08-119, June 2008, originally written December 2007.

Teaching Experience

Lecturer **Carnegie Mellon** **Spring 2009**
15-313, Foundations for Software Engineering
Co-taught with Dr. William Scherlis

- ◊ Gave 60% of the lectures for the course
- ◊ Redesigned instructional units on software design, software architecture, and measurement and metrics, including in-class exercises
- ◊ Added four overarching themes to the course to connect units together
- ◊ Designed and graded exam questions

Teaching Assistant **Carnegie Mellon** **Spring 2008**
17-654, Analysis of Software Artifacts
Dr. Jonathan Aldrich

- ◊ Assisted students in weekly office hours
- ◊ Designed and graded exam questions and several of the assignments

Teaching Assistant **Carnegie Mellon** **Spring 2007**
15-313, Foundations for Software Engineering
Dr. William Scherlis and Dr. Jonathan Aldrich

- ◊ Assisted with the overall curriculum for this new course offering
- ◊ Designed and graded six of the assignments for the course
- ◊ Gave half of the presentations in the weekly recitation and one lecture in class
- ◊ Designed and graded exam questions

Teaching Assistant **California Polytechnic** **Fall 2002 and Fall 2001**
CPE 109, Accelerated Intro to Computer Science
Dr. Clint Staley

- ◊ Assisted students in weekly office hours, both online and in-office
- ◊ Designed and graded exam questions

Additional Educational Training

- ◊ Took Introduction to CS Education. Final project was a unit on software process for undergraduate students.
- ◊ Attended several seminars with the Eberle Education Center, including Student Cognition and a lecture practice course.

Research Projects

Analysis of Framework Constraints **Fall 2005 - Present**

Ongoing work towards a Ph.D. thesis; supervised by Jonathan Aldrich

- ◊ Created a specification language to describe framework constraints across multiple types of files, including Java and XML
- ◊ Implemented a static analysis to analyze plugins for conformance to specified framework constraints
- ◊ Designed entire system to be adoptable and cost-effective for industry use
- ◊ Comparing the difference between three variants of the analysis: a sound variant, a complete variant, and a hybrid variant
- ◊ Validating that it detects defects when using industry frameworks such as Spring, Eclipse, and ASP.NET
- ◊ http://code.google.com/p/fusion

Inferring and Checking Multi-object Protocols **Spring 2010 - Present**

International collaboration with researchers at ETH Zürich

- ◊ Combining a dynamic analysis that infers correct finite state machines from program traces with my static checker
- ◊ Defined a translation of the finite state machines into the Fusion specification language
- ◊ Currently running the combined system on the 1.5 MLOC DaCapo suite to find misuses of the Java SDK

Modern Software Frameworks **Summer 2009 - Present**

Distributed collaboration effort with seven researchers

- ◊ Investigating the properties of modern software frameworks in several languages
- ◊ Creating a taxonomy of frameworks to improve research in frameworks and current designs
- ◊ Worked on an NSF grant proposal on an architectural perspective to understand frameworks

Student Perceptions of Software Engineering **Summer 2009 - Summer 2010**

Co-investigator with Leigh Ann Sudol in CS Education

- ◊ Designed a survey to determine computer science undergraduate perceptions and misconceptions of software engineering
- ◊ Analyzed data and compared to data from industry professionals
- ◊ Results will be used to improve the software engineering curriculum at Carnegie Mellon

Crystal Static Analysis Framework **Fall 2007 - Summer 2009**

Developer and lead for redesign effort on a team of four; advised by Jonathan Aldrich

- ◊ On-going development of a pedagogical static analysis framework for Java
- ◊ Analyses built as an Eclipse plugin and are defined using concepts from abstract interpretation
- ◊ Crystal framework builds in support for branch-sensitive analyses, three-address code, Java 5 annotations, concurrent analyses, and a control flow graph with exception paths
- ◊ Used for several years in the master's level analysis course to teach program analysis
- ◊ Supporting five research-level analyses, all of these have been published
- ◊ http://code.google.com/p/crystalsaf

Error Reporting Logic **Fall 2006 - Spring 2008**

Primary investigator of the work; co-advised undergraduate Trisha Quan with Jonathan Aldrich

- ◊ Automatically generates human-readable error messages from failing first-order predicate logic specifications
- ◊ Uses a heuristic to determine which object is at the cause of the error
- ◊ Currently being used by ACMEStudio, a checker for software architecture specifications
- ◊ http://code.google.com/p/erl

Professional Experience

Static Analysis Engineer **eBay** **May 2006 – Aug. 2006**

Static analysis engineer for eBay Marketplaces

- ◊ Ran a cost-benefit analysis of static analysis tools, including Fortify, Klocwork, Daikon, FindBugs, and Fluid
- ◊ Created a process for managing static analysis tools within eBay's intricate and tightly controlled software lifecycle
- ◊ Implemented the tool management process by integrating FindBugs into the eBay development and quality assurance cycles

Team Lead/Developer **Vizolutions, Inc.** **Aug. 2004 – June 2005**

Team lead and developer on a content management system (CMS) for Web Associates

- ◊ Ported Web Associates's CMS from EJB to .NET
- ◊ Architected the database layer and wrote key utilities and modules on the web layer
- ◊ Created a process that allowed our 10 person team to separate core functionality from vendor specific functionality

Program Manager **Microsoft** **June 2003 – Aug. 2003**

Intern Program Manager on Visual Studio Tools for Office (VSTO)

- ◊ Wrote full specifications for two new features
- ◊ Carried out a usability study, reported the data, and presented suggestions to improve VSTO
- ◊ Wrote three mini-specs for controversial features and gained team consensus on solutions

Project Lead/Developer **Vizolutions, Inc.** **May 2001 – May 2003**

Project lead of a Java Swing project that surveys oil wells for Applied Technology Associates

- ◊ Filtered, merged, and prioritized feature requests from three user classes
- ◊ Organized releases and decided if patches should be sent out

Developer on a Java Swing project

- ◊ Designed and implemented over 30,000 lines of safety critical code in a 100,000 line application
- ◊ Tested teammate's code through code reviews, automated test scaffolds, and black-box testing
- ◊ Received bugs from a world-wide field and debugged them using software and hardware log files

Developer on a mature MFC project

- ◊ Developed functionality that computed user-defined algebraic functions on generic data sets
- ◊ Maintained a drag and drop dialog that assisted a user in creating an oil drill-string

Tutorials and Talks

- ◊ Designing Frameworks for High Performance Computing. Invited talk, Los Alamos National Labs. June 2010.
- ◊ Proper Plugin Protocols. Demonstration, Dagstuhl seminar on Relationships, Objects, Roles, and Queries in Modern Programming Languages. April 2010.
- ◊ Proper Plugin Protocols. Invited talk, Ecole Polytechnique Ferderale de Lausanne. April 2010.
- ◊ Crystal-izing Sophisticated Code Analyses. Tutorial, European Conference on Object-Oriented Programming (ECOOP). July 2009.
- ◊ Understanding Software Frameworks with Static Analysis. Invited talk, California Polytechnic State University, San Luis Obispo. January 2007.

Service and Societies

- ◊ Student Volunteer Chair for SPLASH 2010
- ◊ Student Volunteer Captain for OOPSLA 2009
- ◊ Co-reviewer for ECOOP 2006, ECOOP 2007, FOOL 2008, OOPSLA 2008, and PLDI 2010
- ◊ Member of the Association for Computing Machinery and SIGSOFT, SIGPLAN, and SIGCSE
- ◊ Member of Upsilon Pi Epsilon, Computer Science Honor Society
- ◊ Volunteer for Dec/5, Inc., computer science graduate student organization
- ◊ Member of the Association for Computational Heresy and SIGBOVIK

Additional Projects

Educational Tools Project **Fall 2004 – Spring 2005**

- ◊ Wrote a module that randomly generated test questions for an online testing tool for the Algorithms Analysis course
- ◊ Created and implemented an algorithm that, given a graph, would find a breadth first tree that could not have been generated by a breadth first search (non-BFS BFT)
- ◊ Created and implemented an algorithm to randomly create a graph with a particular set of parameters, including a probability that the graph contains a non-BFS BFT
- ◊ Work completed under the supervision of Dr. Clint Staley

Senior Project: Hold Interaction Manager **Fall 2003 - Spring 2004**

- ◊ Part of a three person team that created software to manage a rock climbing wall
- ◊ Evaluated three AI algorithms for creating new climbing routes with a specified difficulty level and rating the difficulty of existing climbing routes
- ◊ Implemented the AI component using a greedy bi-directional ordering algorithm and a k-nearest neighbor algorithm
- ◊ Wrote the user interface in Swing and worked with a MySQL backend
- ◊ Work completed under the supervision of Dr. Gene Fisher

Upper Division Software Engineering Series **Fall 2002 – Spring 2003**

- ◊ Worked on a year long project for Brocade to test their Common Information Object Model Manager implementation
- ◊ Managed four upperclassmen during the requirements phase
- ◊ Lead five lowerclassmen through development and testing
- ◊ Taught the lowerclassmen software engineering processes, tools, and design

References

Dr. Jonathan Aldrich
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Dr. Mary Shaw
Alan J. Perlis Professor of Computer Science
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