

Jay Ligatti

Contact Information

Dept of Computer Science and Engineering
University of South Florida
4202 E Fowler Ave, ENB 118
Tampa, FL 33620, USA

+1-813-974-0908 (phone)
+1-813-974-5456 (fax)
ligatti@cse.usf.edu
<http://www.cse.usf.edu/~ligatti>

Research Interests

Software security and programming languages, including language-based security and reliability, software monitoring, code-injection attacks, formal policy analysis, and aspect-oriented and policy-specification languages.

Appointment

University of South Florida

Assistant Professor, Department of Computer Science and Engineering (2006-present)

Education

Princeton University (2001-2006)

Degrees: Ph.D., Computer Science (2006); M.A., Computer Science (2003)

Dissertation: *Policy Enforcement via Program Monitoring*

Ph.D. Committee: Andrew Appel, Boaz Barak, Ed Felten, Greg Morrisett, and David Walker (adviser)

University of South Carolina (1997-2001)

Degrees: B.S., Computer Science (2001); B.M., Music Composition (2001)

Honors: *summa cum laude*, Fraser award (faculty-voted outstanding music graduate), piano performance certificate

Honors thesis/project: *Scis te id plurimum amare: A thoroughly recursive piece*

Adviser: Reginald Bain

Awards and Honors

- NSF Faculty Early Career Development (CAREER) Award, 2008.
- Best-paper award at ACM SIGPLAN *Conference on Programming Language Design and Implementation (PLDI)*, June 2007 (for [6]).
- Papers from the following conferences/workshops were invited to appear in journals:
 - ACM SIGSAC *Conference on Computer and Communications Security (CCS)*, November 2005 ([8] invited and appeared as [2]).
 - *Foundations of Computer Security Workshop (FCS)*, July 2002 ([14] invited and appeared as [4]).

Refereed Journal Publications

- [1] Composing Expressive Run-time Security Policies. Lujo Bauer, Jay Ligatti, and David Walker. To appear in *ACM Transactions on Software Engineering and Methodology*.
- [2] Control-Flow Integrity: Principles, Implementations, and Applications. Martín Abadi, Mihai Budiu, Úlfar Erlingsson, and Jay Ligatti. To appear in *ACM Transactions on Information and System Security*.
- [3] A Type-theoretic Interpretation of Pointcuts and Advice. Jay Ligatti, David Walker, and Steve Zdancewic. In Pascal Fradet and Ralf Lämmel, editors, *Science of Computer Programming: Special Issue on Foundations of Aspect-Oriented Programming*, Vol 63, No 3, pp 240-266. Elsevier, December 2006.
- [4] Edit Automata: Enforcement Mechanisms for Run-time Security Policies. Jay Ligatti, Lujo Bauer, and David Walker. *International Journal of Information Security*, Vol 4, No 1-2, pp 2-16. Springer-Verlag, February 2005.

Refereed Conference Publications

- [5] A Dynamic Query-rewriting Mechanism for Role-based Access Control in Databases. Jay Jarman, James McCart, Donald Berndt, and Jay Ligatti. Proceedings of the 14th *Americas Conference on Information Systems (AMCIS)*, August 2008.
- [6] Fault-tolerant Typed Assembly Language. Frances Perry, Lester Mackey, George Reis, Jay Ligatti, David August, and David Walker. Proceedings of the *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, June 2007. **Winner of best-paper award.**
- [7] Static Typing for a Faulty Lambda Calculus. David Walker, Lester Mackey, Jay Ligatti, George Reis, and David August. Proceedings of the *ACM SIGPLAN International Conference on Functional Programming (ICFP)*, September 2006.
- [8] Control-Flow Integrity: Principles, Implementations, and Applications. Martín Abadi, Mihai Budiu, Úlfar Erlingsson, and Jay Ligatti. Proceedings of the *ACM SIGSAC Conference on Computer and Communications Security (CCS)*, November 2005.
- [9] A Theory of Secure Control Flow. Martín Abadi, Mihai Budiu, Úlfar Erlingsson, and Jay Ligatti. Proceedings of the *7th International Conference on Formal Engineering Methods (ICFEM)*, November 2005.
- [10] Enforcing Non-safety Security Policies with Program Monitors. Jay Ligatti, Lujo Bauer, and David Walker. Proceedings of the *10th European Symposium on Research in Computer Security (ESORICS)*, September 2005.
- [11] Composing Security Policies with Polymer. Lujo Bauer, Jay Ligatti, and David Walker. Proceedings of the *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, June 2005.

- [12] Types and Effects for Non-interfering Program Monitors. Lujo Bauer, Jarred Ligatti, and David Walker. In M. Okada, B. Pierce, A. Scedrov, H. Tokuda, and A. Yonezawa, editors, *Lecture Notes in Computer Science: Software Security—Theories and Systems (Revised Papers of the 2002 MexT-NSF-JSPS International Symposium)*, Vol 2609, pp 154-171. Springer-Verlag, November 2003.
- [13] A Theory of Aspects. David Walker, Steve Zdancewic, and Jay Ligatti. Proceedings of the ACM SIGPLAN *International Conference on Functional Programming (ICFP)*, August 2003.

Refereed Workshop Publications

- [14] More Enforceable Security Policies. Lujo Bauer, Jarred Ligatti, and David Walker. Proceedings of the *Foundations of Computer Security Workshop (FCS)* (associated with LICS), July 2002.

Ph.D. Thesis

- [15] Policy Enforcement via Program Monitoring. Jarred Adam Ligatti. PhD thesis, Princeton University, June 2006.

Technical Reports

- Fault-tolerant Typed Assembly Language. Frances Perry, Lester Mackey, George Reis, Jay Ligatti, David August, and David Walker. Technical Report TR-699-04, Princeton University, April 2007.
- Control-Flow Integrity. Martín Abadi, Mihai Budiu, Úlfar Erlingsson, and Jay Ligatti. Technical Report MSR-TR-2005-18, Microsoft Research, February 2005 (revised June 2005).
- A Theory of Secure Control Flow. Martín Abadi, Mihai Budiu, Úlfar Erlingsson, and Jay Ligatti. Technical Report MSR-TR-2005-17, Microsoft Research, February 2005 (revised June 2005).
- Enforcing Non-safety Security Policies with Program Monitors. Jay Ligatti, Lujo Bauer, and David Walker. Technical Report TR-720-05, Princeton University, January 2005 (revised June 2005).
- A Language and System for Composing Security Policies. Lujo Bauer, Jay Ligatti, and David Walker. Technical Report TR-699-04, Princeton University, January 2004.
- Edit Automata: Enforcement Mechanisms for Run-time Security Policies. Jay Ligatti, Lujo Bauer, and David Walker. Princeton University Technical Report TR-681-03, May 2003.
- A Calculus for Composing Security Policies. Lujo Bauer, Jarred Ligatti, and David Walker. Technical Report TR-655-02, Princeton University, August 2002.

- More Enforceable Security Policies. Lujo Bauer, Jarred Ligatti, and David Walker. Technical Report TR-649-02, Princeton University, July 2002.

Patent

- USA Patent 7,337,291: *Software memory access control*. Martín Abadi, Úlfar Erlingsson, Jay Ligatti, and Mihai Budiu. Issued Feb, 2008.

Industrial Experience

Microsoft Research (Summer 2003)

Research intern; developed control-flow enforcement mechanisms.

Medical Software and Computer Systems (Winter 2004, Summers 2000-2001)

Security consultant; software engineer.

Teaching Experience

University of South Florida (2006-present)

- Summer 2008: CIS 4900/6900 (*Independent Study*, 4 students)
- Spring 2008: CIS 6930 (*Foundations of Software Security*, 10 students)
- Spring 2008: CIS 4900/6900 (*Independent Study*, 4 students)
- Fall 2007: CIS 4930 (*Compiler Design*, 21 students)
- Fall 2007: CIS 6930 (*Compiler Design Techniques*, 12 students)
- Fall 2007: CIS 4900/6900 (*Independent Study*, 2 students)
- Summer 2007: CIS 4900/6900 (*Independent Study*, 2 students)
- Spring 2007: CIS 6930 (*Foundations of Software Security*, 13 students)
- Spring 2007: CIS 4900/6900 (*Independent Study*, 7 students)
- Fall 2006: COP 4600 (*Operating Systems*, 44 students)

Princeton University (2001-2006)

- Spring 2003 and 2006: Teaching assistant, COS 320 (*Compiling Techniques*)
- Fall 2002: Preceptor (section lecturer), COS 126 (*General Computer Science*)

Students advised

Current Ph.D. Students:

- Nalin Saigal
- Daniel Lomsak

Current Master's Students:

- James Olliff
- Alen Paravinja
- Srikar Reddy

Undergraduate Research Students:

- Christine Cortes Hernandez (REU student Summer 2008)
- Vincent Newman (Honors Thesis completed Spring 2008)
- Billy Rickey (REU student Summer 2007)
- Humberto Gonzalez (REU student Summer 2007)
- Amin Astaneh (Honors Thesis completed Spring 2007)

- Jose Dieppa (Honors junior research completed Spring 2007)

Ph.D. Committees

- Tine Verhanneman. Katholieke Universiteit Leuven (Belgium). *Uniform and Modular Context-based Access Control for Software Applications*, 2007

Talks

- *An Introduction to Cryptography for Homeland Security*. USF Institute for Safety Security Rescue Technology (iSSRt) Distinguished Lecture (02/2008)
- *Coping with Runtime-Policy Complexity*. Invited talk at the International Workshop on Run Time Enforcement for Mobile and Distributed Systems, Dresden Germany (09/2007)
- *Runtime Software Monitoring*. Carnegie Mellon University CyLab (08/2007)
- *Monitoring Software to Enforce Run-time Policies*. Microsoft Research-INRIA Joint Centre, Paris (03/2007)
- *Polymer: A Language and System for Specifying Complex, Modular Run-time Policies*. Katholieke Universiteit Leuven, Belgium (03/2007)
- *An Underappreciated Software-verification Technique*. IEEE-CS's USF-student-chapter meeting (02/2007)
- *Language-based Security*. ACM's USF-student-chapter meeting (02/2007)
- *New Research in Computer Security*. ACM's USF-student-chapter meeting (10/2006)
- *Enforcing Security Policies with Run-time Program Monitors*. Reservoir Labs-NYC (03/2006)
- *Enforcing Security Policies with Run-time Program Monitors*. University of Texas-Arlington (03/2006)
- *Enforcing Security Policies with Run-time Program Monitors*. Florida International University (03/2006)
- *Enforcing Security Policies with Run-time Program Monitors*. University of South Florida (02/2006)
- *Enforcing Security Policies with Run-time Program Monitors*. Kansas State University (02/2006)
- *Enforcing Non-safety Security Policies with Program Monitors*. European Symposium on Research in Computer Security (Milan, 2005)
- *Composing Security Policies with Polymer*. ACM SIGPLAN Conference on Programming Language Design and Implementation (Chicago, 2005)

Service

Program committees:

- 24th Annual ACM Symposium on Applied Computing: Software Verification and Testing Track (*SAC'09*)

Reviewer for:

- IEEE Computer Security Foundations Symposium (*CSF'08*)
- Electronic Commerce and Research Applications (*ECRA*)
- European Symposium on Research in Computer Security (*ESORICS'06*)

- Foundations of Software Technology and Theoretical Computer Science (*FSTTCS'07*)
- IEEE International Conference on Communications (*ICC'06*)
- Journal of Systems and Software (*JSS*)
- ACM SIGPLAN Workshop on Programming Languages and Analysis for Security (*PLAS'07*)
- ACM SIGPLAN Symposium on Programming Languages Design and Methodology (*PLDI'08*)
- ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (*POPL'07*)
- Science of Computer Programming (*SCP*)
- IEEE Transactions on Computers (*TC*)
- IEEE Transactions on Dependable and Secure Computing (*TDSC*)
- ACM Transactions on Software Engineering and Methodology (*TOSEM*)

NSF Service:

- National Science Foundation Reviewer and Panelist, 2008

USF CSE Department Service:

- Graduate Committee (2006-present)

Community Service:

- Judge, Hillsborough County Regional Science Fair (middle and high school divisions): 02/2007, 02/2008.

Funding

- *CAREER: Foundational Theories and Enforcement Tools for Secure Software Systems.* Jay Ligatti (PI). NSF award CNS-0742736. Project dates: 2/1/08-1/31/2013. Amount: \$412,771.
- *CT-ISG: Collaborative Research: Trustworthy Enforcement of Domain-independent Run-time Policies.* Jay Ligatti (PI), Adriana Iamnitchi (co-PI), and Lujio Bauer (co-PI at Carnegie Mellon University). NSF CyberTrust awards CNS-0716343 (USF) and CNS-0716216 (CMU). Project dates: 8/1/07-7/31/10. Amount: \$300,000 (USF) + \$50,000 (CMU).
- *Security-research Partnership between USF and Team TACLAN.* Jay Ligatti (PI), Rangachar Kasturi (co-PI). Sponsor: [Team TACLAN](#) (a Tampa-based company). Project dates: 8/24/07-8/23/08. Amount: \$114,189.