Sameer Ajmani

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Education	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	Cambridge, MA

PhD candidate in Computer Science, 2004
Dissertation: Automatic Software Upgrades for Distributed Systems
Advisor: Barbara Liskov   *Readers:* Michael Ernst, Daniel Jackson, and Liuba Shrira
Minor in Quantitative and Computational Biology, 2003

SM in Computer Science, GPA 4.9/5.0, 2000
Thesis: A Trusted Execution Platform for Multiparty Computation
Advisors: Barbara Liskov and Robert Morris

CORNELL UNIVERSITY	Ithaca, NY

BA in Computer Science, GPA 4.0/4.0, 1998
Concentration in Cognitive Science, 1998

Skills   Development of distributed and security-related systems in C, C++, Java, Python and Perl. Development of machine learning applications in MATLAB.

Research Interests

Methods and infrastructures for building secure, robust, and evolvable distributed systems.

Research Experience

2002–	**Automatic Software Upgrades for Distributed Systems**	MIT

For my PhD research, I am designing and implementing an infrastructure that enables long-lived distributed systems to upgrade their software with limited service disruption. The upgrade infrastructure supports secure dissemination of software, asynchronous node upgrades according to an upgrade schedule, and safe and efficient communication between nodes running different software versions. I am also developing formal correctness criteria for upgrade schedules, state transforms, and cross-version simulation.

2001–2002	**Large-Scale Certificate Distribution**	MIT

I designed and implemented ConChord, a peer-to-peer storage system for SDSI certificates. ConChord accelerates the resolution of SDSI names by maintaining the closure over the set of certificates it stores. To support storage of variable-sized data sets, our group designed a new layer on top of the Chord/DHash distributed hash table. I also developed new algorithms for resolving SDSI names without closure, since ConChord maintains closure lazily.

1998–2000	**Trusted Execution Platform**	MIT

For my SM research, I designed and implemented a trusted execution service: one that enables mutually-distrusting parties to share private data in a computation without exposing that data to one another. I combined Myers' static information flow analysis with the SDSI public key infrastructure to allow participants to verify the security of the computation end-to-end.

| 1997 | **Normalized Recurrence for Neural Nets and Human Data** | Cornell University |

As an undergraduate, I implemented an extended version of Spivey's normalized recurrence algorithm in a neural net. By searching the parameter space, I fit the neural net to data on human response time to ungrammatical sentences. I showed that while the response of the net was similar to that of humans, the net could not simultaneously fit the slope and peak of the human data.

| 1995 | **Solving Logic Puzzles using the Propositional Calculus** | Cornell University |

As an undergraduate, I translated logic puzzles from Raymond Smullyan's book *What is the Name of This Book?* into Gries' propositional calculus. These exercises demonstrated that Smullyan's challenging word problems were often easy to solve using propositional logic.

Teaching Experience

| 2003 | **Teaching Assistant** MIT course 6.170, Lab in Software Engineering, with Prof. Srini Devadas. |

| 2001 | **Teaching Assistant** MIT course 6.170, Lab in Software Engineering, with Prof. Michael Ernst. |

In each term, I taught a weekly section of sixteen to twenty students. I also developed and maintained autograder software to evaluate student assignments using a staff-provided test suite.

Work Experience

| 2001 | **Software Security Consultant** | ArsDigita, Inc., Cambridge, MA |

I designed and implemented a pluggable authentication infrstrcuture for the ArsDigita Community System. This infrastructure allows the product to adapt easily to the security needs of customers.

| 2000 | **Software Engineering Intern** | Sightpath/Cisco Inc., Waltham, MA |

I collaborated with the senior architect to write and maintain a design document for the Cisco Content Distribution Network architecture. I also designed and implemented software for integrating Arrowpoint Content Switch hardware with Cisco CDN software.

| 1996–1998 | **Software Engineering Co-op** | Teradyne, Inc., Boston, MA |

I designed a language for specifying specialized serial communication protocols, and implemented compiler and virtual machine to simulate and execute those protocols. I extended the online test logging and filtering system to handle complex filters. I also designed language for automatically booting and monitoring devices over a serial line, and implemented a compiler for that language.

Refereed Publications

[1] Sameer Ajmani, Barbara Liskov, and Liuba Shrira. Scheduling and simulation: How to upgrade distributed systems. In *Ninth Workshop on Hot Topics in Operating Systems (HotOS-IX)*, May 2003.

[2] Sameer Ajmani, Dwaine E. Clarke, Chuang-Hue Moh, and Steven Richman. ConChord: Cooperative SDSI certificate storage and name resolution. In *First International Workshop on Peer-to-Peer Systems, (IPTPS)*, number 2429 in Lecture Notes in Computer Science, pages 141–154, March 2002.

[3] M. Spivey, S. Fitneva, W. Tabor, and S. Ajmani. The time course of information integration in sentence processing. In P. Merlo and S. Stevenson, editors, *The Lexical Basis of Sentence Processing: Formal, Computational, and Experimental Issues*, pages 207–232. John Benjamins Publishing, 2002.

Reports and Presentations

[4] Sameer Ajmani. Automatic software upgrades for distributed systems, October 2003. Poster presented at the 19th ACM SOSP.

[5] Sameer Ajmani.   JSDSI: A Java SPKI/SDSI implementation.   `http://jsdsi.`
     `sourceforge.net`.

[6] Sameer Ajmani. How to resolve SDSI names without closure, June 2002.

[7] Sameer Ajmani, Robert Morris, and Barbara Liskov. A trusted third-party computation service.
     Technical Report MIT-LCS-TR-847, MIT, May 2001.

[8] Sameer Ajmani. A trusted execution platform for multiparty computation. Master's thesis, MIT,
     September 2000. Also available as MIT technical report MIT-LCS-TR-846.

Service and Other Activities

1998–	External reviewer for USENIX NSDI, USENIX OSDI, ACM SOSP
1994–1998	Various service projects with Sigma Chi Delta fraternity

Selected Honors and Awards

2003	Siegel Fellowship
1998	Rosenblith Fellowship
1994–1998	Cornell University Dean's List
1994–1998	Member of Sigma Xi, Phi Beta Kappa, Phi Kappa Phi, Golden Key academic honor socities
1994	National Merit Scholar

References

Available upon request.

April 11, 2004