

# Jared Saia

## Contact Information

saia@cs.unm.edu  
505-277-5446 (office)  
505-255-1277 (home)  
505-277-6927 (fax)  
<http://www.cs.unm.edu/homes/saia/>

## Postal Address

Department of Computer Science  
University of New Mexico  
Albuquerque, NM 87131

## Research Interests

My broad research interests are in theory and algorithms with specific interests in probability, randomized and distributed algorithms, graph theory, and spectral methods. A strong current interest is designing randomized algorithms that are provably robust against a computationally unbounded adversary.

## Education

Ph.D., Computer Science and Engineering, University of Washington, June 2002.  
Thesis: “Algorithms for Managing Data in Distributed Systems”, advised by Prof. Anna Karlin.

B.S., Computer Science, Stanford University, June 1993.

## Professional Experience

Assistant Professor (2002-present), Computer Science Department. University of New Mexico.

Researcher (1993 - 1994): *Advanced Telephony Research Labs*. Nara, Japan.

## Publications

**Note: Former and current students are indicated with a \* in the author lists. Total citations to these publications number over 400. In theory conferences and journals, author names are almost always in alphabetical order.**

## In Preparation

Valerie King, Jared Saia and Bo Wu\*, “Robust Distributed Algorithms for Frequency Counts”.

James Aspnes, Navin Rustagi\* and Jared Saia, “Beating Omniscient Worms with Faulty Detectors”.

Valerie King, Muyiwa Oluwasanmi\* and Jared Saia, “An Empirical Study of Algorithms for Byzantine Agreement”.

Bruce Kapron, David Kempe, Valerie King, Jared Saia and Vishal Sanwalani\*, “Scalable Algorithms for Byzantine Agreement and Leader Election with Full Information” (journal version).

## Journals

Eric Anderson, Joe Hall, Jason Hartline, Michael Hobbes, Anna Karlin, Jared Saia, Ram Swaminathan and John Wilkes, “Algorithms for Data Migration”. Undergoing second review for *Algorithmica*, 2008.

”Reducing Communication Costs in Robust Peer-to-Peer Networks” by Jared Saia and Maxwell Young\*. To appear in *Information Processing Letters (IPL)*, 106(4), 2008, p. 152-158.

Valerie King, Scott Lewis\*, Jared Saia, and Maxwell Young\*, “Choosing a Random Peer in Chord”. *Algorithmica* 49(2), 2007, p 147-169.

Amos Fiat and Jared Saia, “Censorship Resistant Peer-to-peer Networks”. *Theory of Computing (TOC)* 3(1), 2007, pp 1-23.

Shuang Luan, Jared Saia, and Maxwell Young\*, “Approximation Algorithms for Minimizing Segments in Radiation Therapy”. *Information Processing Letters (IPL)*, 101(6), 2007, pp 239-244.

Michael Collins, David Kempe, Jared Saia and Maxwell Young\*, “Nonnegative Integral Subset Representations of Integer Sets” . In *Information Processing Letters (IPL)* 101(3), 2007, pp 129-133.

Tanya Berger-Wolf, Cris Moore and Jared Saia, “A Computational Approach to Animal Breeding”, in *Journal of Theoretical Biology*, 244(3), 2007, pp 433-439.

Tanya Berger-Wolf, William Hart and Jared Saia, “Discrete Sensor Placement Problems in Distribution Networks”, in the *Journal of Mathematical and Computer Modeling*, 42 (13), 2005, pp 1385-1396.

Tracy Kimbrel and Jared Saia, “Online and Offline Preemptive Two-Machine Job Shop Scheduling” in *Journal of Scheduling*, 3(6), 2000, pp 355-364.

Ezra Black, Stephen Eubank, Hideki Kashioka, Jared Saia “Reinventing Part-of-Speech Tagging” in *Journal of Natural Language Processing (Japan)*, 5(1), 1998, pp 3-24.

## Conferences and Workshops

Tom Hayes, Navin Rustagi\*, Jared Saia and Amitabh Trehan\*, “The Forgiving Tree: A Self-Healing Distributed Data Structure”, submitted to *Principles of Distributed Computing (PODC)*, 2008

Valerie King, Cynthia Phillips, Jared Saia and Maxwell Young\*, “Sleeping on the Job: Energy-Efficient Broadcast for Radio Networks”, submitted to *Principles of Distributed Computing (PODC)*, 2008.

Bruce Kapron, David Kempe, Valerie King, Jared Saia and Vishal Sanwalani\*, “Fast Asynchronous Byzantine Agreement and Leader Election with Full Information”. To appear in *Symposium on Discrete Algorithms*, 2008 (135 out of 455 accepted).

Jared Saia and Amitabh Trehan\*, “Picking up the Pieces: Self-Healing in Reconfigurable Networks”, to appear in *IEEE International Parallel and Distributed Processing Symposium*, 2008 (105 out of 410 accepted).

James Aspnes, Navin Rustagi\* and Jared Saia, “Worm versus alert: Who wins in a battle for control of a large-scale network?”. In *International Conference of Principles of Distributed Systems (OPODIS)*, 2007. Lecture Notes in Computer Science volume 4878. Springer-Verlag, December 2007, pp. 443-456.

Valerie King, Jared Saia, Vishal Sanwalani\* and Erik Vee, “Towards Secure and Scalable Computation in Peer-to-peer Networks”. In *Foundations of Computer Science (FOCS)*, 2006.

Iching Boman\*, Chaouki Abdallah, Edl Schamiloglu and Jared Saia,, “Self-Healing Algorithms for Reconfigurable Networks”. In *International Symposium on Stabilization, Safety and Security of Distributed Systems (SSS)*, 2006.

Tanya Berger-Wolf and Jared Saia, “A Framework for the Analysis of Dynamic Social Networks”. In *Knowledge Discovery and Datamining (KDD)*, 2006.

Valerie King, Jared Saia, Vishal Sanwalani\* and Erik Vee, “Scalable Leader Election” in *Symposium on Discrete Algorithms (SODA)*, 2006 (135 out of 432 accepted).

Amos Fiat, Jared Saia and Maxwell Young\*, “Making Chord Robust to Byzantine Faults” in *European Symposium on Algorithms (ESA)*, 2005 (55 out of 185 accepted).

Valerie King and Jared Saia, “Choosing a Random Peer”, to appear in *Principles of Distributed Computing (PODC)*, 2004 (39 papers out of 224 accepted).

Scott Lewis\* and Jared Saia, “Scalable Byzantine Agreement”, in *NIPS Workshop on Robust Communication Dynamics in Complex Networks*, 2003.

Amos Fiat and Jared Saia, “Censorship Resistant Peer-To-Peer Content Addressable Networks” in *Proceedings of the 13th Annual Symposium on Discrete Algorithms*, San Francisco, California, 2002. **In the top 200 most cited computer science papers published in 2002 according to citeseer.**

Jared Saia, Stefan Saroiu, Amos Fiat, Steve Gribble, and Anna R. Karlin, “Dynamically Fault-Tolerant Content Addressable Networks”, in *First International Workshop on Peer-to-Peer Systems*, 2002.

Joe Hall, Jason Hartline, Anna R. Karlin, Jared Saia and John Wilkes, “On Algorithms for Efficient Data Migration” in *Proceedings of the 12th Annual Symposium on Discrete Algorithms*, Washington, D.C., 2001.

Yosi Azar, Amos Fiat, Anna Karlin, Frank McSherry and Jared Saia, “Spectral Analysis of Data” in *Thirty-Third Annual ACM Symposium on Theory of Computing*, Crete, Greece, 2001.

Eric Anderson, Joe Hall, Jason Hartline, Michael Hobbes, Anna Karlin, Jared Saia, Ram Swaminathan and John Wilkes, “An Experimental Study of Data Migration Algorithms” in *Proceedings of the 5th Workshop on Algorithm Engineering*, Aarhus, Denmark, 2001.

Bernard M.E. Moret, Michael Collins, Jared Saia and Ling Yu, “The Ice Rink Problem” in *Proceedings of the 1st Workshop on Algorithm Engineering*, Venice, Italy, 1997.

Zhiqiang Chen, Andrew Holle, Bernard M.E. Moret, Jared Saia and Ali Boroujerdi, “Network Routing Models Applied to Aircraft Routing Problems” in *Proceedings of the Winter Simulation Conference*, Arlington, 1995.

Osamu Furuse, Hitoshi Iida, Kozo Oi, Jared Saia and Eiichiro Sumita. “A Massively Parallel Association Approach For Real Time Spoken Language Translation Systems” in *Proceedings of the Japanese Parallel Processing Conference*, 1994. **Winner of Japanese Society for Artificial Intelligence “Excellence in Research” Award**

## Book Sections and Chapters

Entry on “Randomization in Distributed Computing”, in the book “Encyclopedia of Algorithms”, Springer Publishing, 2007.

“Statistical Natural Language Processing” section (pp 543-550) in the book “Artificial Intelligence, Structures and Strategies for Complex Problem Solving - Third Edition” by George Luger and William Stubblefield, Addison Wesley Longman Inc., 1998.

## Funding

NSF CNS-0644058, “CAREER: Foundations for Attack-Resistant, Collaborative Peer-to-peer Systems”. \$400,000, 2007-2012.

NSF IIS-0705477 “III-CXT: Collaborative Research: Computational Methods for Understanding Social Interactions in Animal Populations.” UNM part is \$294,863 (total is \$800,000), 2007-2010.

AFOSR MURI, “Helix: A Self Regenerative Architecture for Incorruptible Enterprise”. UNM part is \$745,000 (total is \$4.6 Million), 2007-2012.

NSF CCF-0313160, “ITR: Attack-Resistant Peer-to-peer Networks”. \$340,000, 2003-2006.

Sandia University Research Program (SURP), “Scalable, Attack-Resistant Peer-to-peer Networks”, \$80,000, 2002-2004.

## Invited Presentations

Santa Fe Institute Workshop on Scaling in Biological and Social Networks, “Worm vs Anti-worm”, 2007.

University of California, Davis, “Building a Computer out of the Internet: Foundations for Collaborative Computation”, 2007.

University of Maryland, 2007.

Microsoft Research Labs Networking Group, Redmond, WA, 2006.

University of Illinois in Chicago, “Secure Algorithms and Data Structures for Massive Networks”, 2005.

University of Barcelona, Spain, 2005.

CSRI Group, Sandia Labs, 2005.

Los Alamos Labs, 2005.

Santa Fe Institute Workshop on New Perspectives on Complex Systems, 2005.

Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Rutgers NJ, “Choosing a Random Peer”, 2004.

University of Maryland, 2004.

University of Southern California, 2004.

University of Tel Aviv, Tel Aviv, Israel, 2004.

NIPS Workshop on Robust Communication Dynamics in Complex Networks, Vancouver, “Scalable Byzantine Agreement”, 2004.

University of Victoria, 2003.

Dartmouth College, Hanover NH, “Censorship-Resistant Peer-to-peer Networks”, 2002.

University of Minnesota, Minneapolis MN, 2002.

Emory, Atlanta GA, 2002.

University of Florida, Gainesville FL, 2002.

University of Georgia, Athens GA, 2002.

## Patents

Provisional patent filed on “Scalable Algorithms for Byzantine Agreement”

## Press Coverage

“Social Networking Software Tracks Zebras and Consumers”, in *ACM Technical News*, *Newswise Website*, *FOREX Trading*, *Healthcare Industry Today*, and *Ecademy Daily News*, 9/6/07 - 9/10/07

“Professor Fights a Mathematical Battle to Keep the Virtual World Running Smoothly”, *ACM Technical News*, 2/26/07 and *UNM Today*, 2/27/07

“Professor goes to war”, *Front page lead article in University of New Mexico Daily Lobo*, 3/2/07

## Students Supervised

### PhD

Vishal Sanwalani, Ph.D. awarded in 2005. Thesis: “Applications of the Probabilistic Method to Random Graphs” (co-advised with Cris Moore).

Amitabh Trehan, Ph.D. 2005-present

Navin Rustagi, Ph.D. 2005-present

Bo Wu, Ph.D. 2006-present

Olumuyiwa O. Oluwasanmi, Ph.D. 2006-present

### MS

David Robnett, M.S. 2007-present

Vikrant Gaur, M.S. awarded in Fall 2007

IChing Chang Boman, M.S. awarded in 2006, with distinction

Maxwell Young, M.S. awarded in Spring 2006, with distinction

Jake Proctor, M.S. awarded in Fall 2005, with distinction

John Alphonse, M.S. awarded in Fall 2005

Florina Cazaku, M.S. awarded in Spring 2004

### Undergraduate

David De Francisco, 2007-present

Yintao Yu, 2007-present

## Courses Taught

CS 361, “Data Structures and Algorithms”, F’2005, S’2004,S’2003

CS 362, “Data Structures and Algorithms II”, S’2007, S’2006,S’2005,F’2004,F’2003

CS 591, “Algorithms in the Real World”, F’ 2002

CS 510, “Randomized Algorithms”, F’ 2004, S’2007

CS 511, “Cybersecurity: A Theoretical Approach”, S’ 2006, F’ 2007

CS561, “Data Structures and Algorithms”, F’2006,F’2007

## Professional Activities

Program Committee, IEEE International Parallel and Distributed Processing Symposium (IPDPS) - Algorithms Track, 2008.

Program Committee, Principles of Distributed Computing (PODC), 2006.

Program Committee, Principles of Distributed Computing (PODC), 2005.

Program Committee, ACM/SIGMOBILE Annual International Joint Workshop on Foundations of Mobile Computing (DIALM-POMC), 2004.

Panelist for National Science Foundation proposal review panel, 2004, 2005, 2006, 2007.

I have reviewed manuscripts for the following journals and conferences: *Symposium on the Theory of Computation (STOC)*, *Foundations of Computer Science (FOCS)*, *Principles of Distributed Computing(PODC)*, *Symposium on Discrete Algorithms(SODA)*, *Internation Colloquium on Automata, Languages and Programming (ICALP)*,*Symposium on Parallel Algorithms (SPAA)*, *Symposium on Distributed Computing(DISC)*, *Joint Conference of the IEEE Computer and Communications Societies (InfoComm)*, *Journal of Experimental Algorithms(JEA)*, *Journal of Algorithms(JOA)*, *Journal of Computing(JOC)*, *Journal of Distributed Computing (JODC)*, *Journal of Networking (JON)*, and *IEEE Transactions on Computing*.

## Departmental Service

Organized and ran CS Recruitment Day for local high school students, 2006, 2007. This evening activity includes research demos, videos, short talks, and a goody bag. Over 50 students attended in 2006 and about 100 students attended in 2007. *Result: Several of these high school students have been successfully recruited into the UNM CS department.*

Helped organize grad student recruiting event. Activities included: designing flyer for event with our web master, working with students and colleagues to get flyer disseminated at the university and at local organizations, arranging for student volunteers to attend the event and do demos.

Co-organizer of department colloquia. Started a guest lecturer series. Invited and hosted Valerie King, Joan Feigenbaum, Susan Bridges and Tanya Berger-Wolf.

Headed committee to revise requirements for Masters program at UNM. This committee revamped the course requirements and wrote requirements for a new orals exam.

Founded and ran orientation day for new PhD and Masters students, 2003, 2004, 2005, 2006 and 2007.

Wrote, designed and had published the first department brochure for UNM CS Dept, 2005. This brochure was 24 pages in length and contained information on our department and research interests and successes of our faculty and students.

Created first recruiting video for UNM CS Dept, 2006. Video contained interviews with current faculty, grad students and undergrad students along with information on the UNM CS department.

Founded and run Graduate Student Recruitment Drive, 2003-present, University of New Mexico, CS Department. Targetted top PhD applicants to our department for special recruitment. Personally contacted these students; set up peer-recruiting program: each prospective was assigned a current graduate student in our department to personally answer their questions about the department; helped arrange visits for these prospectives to our department. *Results: In past three years, we have successfully recruited about 50% of the targetted students.*

Organized UNM Computer Science departmental colloquium series, 2007-present.

Graduate Admissions Committee 2003-present.

PhD and Master Comprehensive Examination, Theory Section, 2002–present.

Judge at Undergraduate Research Symposium University of New Mexico, 2005.

Organizer of University of Washington Student Theory Seminar, 1998-2000.

Volunteer tutor for Women and Minority Tutoring Program University of Washington, 1998-2002.

## Honors and Awards

NSF Early Career Award, 2006.

Nominated for the School of Engineering Excellence in Research Award, University of New Mexico, 2006

Nominated for the School of Engineering Excellence in Teaching Award, University of New Mexico, 2003 and 2004.

Japanese Society for Artificial Intelligence “Excellence in Research” Award given for paper “A Massively Parallel Association Approach for Real Time Spoken Language Translation Systems”, 1995.

National Merit Scholar, Stanford University, 1989-1993.