

Curriculum Vitae¹

Rahul Tripathi

Contact Information

ENB 339
Dept. of Computer Science and Engineering
4202 East Fowler Avenue
University of South Florida
Tampa, FL 33620

Office: +1-813-974-2126
Home: +1-813-yyy-zzzz
Fax: +1-813-974-5456
Email: lastname@cse.usf.edu
Web: <http://www.cse.usf.edu/~tripathi>

Personal Information

- Citizenship: Indian.
- US visa status: Permanent Resident

Research Interests

- **Algorithmic Applications:** social network analysis, mining associations in databases, co-scheduling on chip multiprocessors
- **Design and Analysis of Algorithms:** algorithms for stochastic games; graph algorithms; randomized algorithms
- **Computational Complexity Theory:** complexity classes and reducibilities; complexity measures of functions; counting-based computation; information-hiding schemes in cryptography, probabilistic computation; quantum computation; relativization; unambiguous computation

Education

- Ph.D., 2001–2005. University of Rochester, NY, Computer Science.
Advisor: Professor Dr. Lane A. Hemaspaandra.
- M.S., 2001–2003. University of Rochester, NY, Computer Science.
- B.Tech., 1996–2000. Indian Institute of Technology, Kanpur, India, Computer Science and Engineering.

Appointment

- August 2005–present
Assistant Professor
Department of Computer Science and Engineering,
University of South Florida, Tampa, Florida.

¹Last updated on March 21, 2011.

Teaching Experience

- Participated in the workshop titled **National Effective Teaching Institute**, organized by the American Society for Engineering Education, at Pittsburgh, Pennsylvania, from June 19–21, 2008.
- Instructed the following courses in the Department of Computer Science and Engineering at the University of South Florida, Tampa:
 - *Advanced Algorithms (CIS 6930 901)*: Spring 2010, Spring 2009
 - *Advanced Algorithm Theory (CIS 4930 901)*: Spring 2009
 - *Introduction to Theory of Algorithms (COT 6405 001)*: Fall 2010, Fall 2009, Fall 2008, Fall 2007
 - *Automata Theory/Formal Languages (COT 4210 001)*: Spring 2011, Fall 2008
 - *Randomized Algorithms (CIS 6930 901)*: Spring 2008, Spring 2007, Spring 2006
 - *Analysis of Algorithms (COT 4400 001)*: Spring 2011, Fall 2009, Fall 2007, Fall 2006, Fall 2005
 - *Independent Study (CIS 4900/6900 009)*: Fall 2009 (1 student), Summer 2009 (2 students), Spring 2009 (1 student), Fall 2008 (3 students), Spring 2008 (1 student), Summer 2007 (1 student)
 - *Directed Research (CIS 7910 009)*: Spring 2010 (1 student), Fall 2009 (1 student), Summer 2009 (1 student), Spring 2009 (1 student)
- Assisted in Teaching (as a TA) of the following courses in the Department of Computer Science at the University of Rochester, NY:
 - *Computer Models and Limitations*: Spring 2003
 - *Computational Complexity*: Fall 2002
 - *Data Structures*: Spring 2002
- Given guest lectures in the following courses in the Department of Computer Science at the University of Rochester, NY:
 - *Advanced Modes in Computation*: Fall 2003
 - *Randomized, Parallel, and Other Advanced Modes of Computation*: Spring 2002
 - *Data Structures*: Spring 2002
- Co-mentored an undergraduate student in research in **Computational Complexity Theory** in Spring 2002 in the Department of Computer Science at the University of Rochester, NY.

Industrial and Research Lab Experience

- **University of Rochester**—Rochester, NY **September 2001–May 2005**
Teaching and Research Assistant

titled “*Quantum and Classical Locally Random Reductions: Applications, Strengths, and Tradeoffs*” for the grant period May 1, 2007 to April 30, 2008.

- Ranked 77th out of more than 150,000 candidates in the entrance examination of the IITs (1996).
- Ranked 33rd in the Roorkee Entrance Examination (1996), held all across India.
- Ranked 5th in the Regional Mathematics Olympiad (U.P.), India, 1995.

Talks and Presentations

- Presented a paper titled “*On Strategy Improvement Algorithms for Simple Stochastic Games*” at the 7th International Conference on Algorithms and Complexity, Rome, Italy (May 26, 2010).
- Talk on “*Research in Algorithms and Computational Complexity Theory*” in the Research Experience for Undergraduates (REU) Summer Program at the University of South Florida, Tampa, Florida (June 19, 2009).
- Invited talk on “*An Application of Randomness: Locally Random Reductions and Private Information Retrieval Schemes*” in the Department of Computer Science Faculty Lecture Series at Florida International University, Miami, Florida (October 10, 2008).
- Invited talk on “*An Application of Randomness: Locally Random Reductions and Private Information Retrieval Schemes*” in the Department of Computer Science Pizza Seminar Series at the University of Miami, Coral Gables, Florida (October 8, 2008).
- Talk on “*Research in Algorithms and Computational Complexity Theory*” in the Research Experience for Undergraduates (REU) Summer Program at the University of South Florida, Tampa, Florida (July 18, 2008).
- Invited talk on “*Some Connections Between Classical Complexity and Quantum Computing*” in the Discrete Mathematics seminar in the Department of Mathematics at the University of South Florida, Tampa, Florida (February 11 and 18, 2008).
- Invited talk on “*Complexity Bounds for Classical LRRs Using a Quantum Argument*” in the Quantum Computing group at the Japan Science and Technology Agency ERATO-SORTS, Tokyo, Japan (December, 2007).
- Presented a paper titled “*The 1-Versus-2 Queries Problem Revisited*” at the 18th International Symposium on Algorithms and Computation, Sendai, Japan (December, 2007).
- Presented a paper titled “*Complexity Upper Bounds for Classical Locally Random Reductions Using a Quantum Computational Argument*” at the 32nd International Symposium on Mathematical Foundations of Computer Science, Český Krumlov, Czech Republic (August, 2007).
- Invited talk on “*Program Checkers and Self-Testing/Correcting Pairs*” at the University of South Florida IEEE Computer Society Colloquium (April, 2007).

- Presented a paper titled “*Hierarchical Unambiguity*” at the 31st International Symposium on Mathematical Foundations of Computer Science, Stará Lesná, Slovakia (August, 2006).
- Invited talk on “*Unambiguity in Alternating and Hierarchical Models of Computation*” in the Atlantic Theory Seminar (August, 2006), jointly organized by the Iowa State University, Ames and the University of Nebraska, Lincoln.
- Presented a paper titled “*On the Power of Unambiguity in Alternating Machines*” at the 15th International Symposium on Fundamentals of Computation Theory, Lübeck, Germany (August 2005).
- Talk on “*Understanding Relationships Between Quantum and Classical Complexity Classes: Separations, Collapses, and Closures*” in the Department of Computer Science and Engineering at the Indian Institute of Technology, Kanpur, India (December 2004)
- Presented a paper titled “*On the Complexity of Linear Connectivity Problems in Directed Hypergraphs*” at the 24th Conference on Foundations of Software Technology and Theoretical Computer Science, Chennai, India (December 2004).
- Talk on “*Stochastic Games*” in the Basic and Applied Simulation Science (CCS-5) group at Los Alamos National Laboratory, Los Alamos, NM (August 2004).

Master’s Thesis Supervision

- Ramanuja Simha (March 2011)
Title: *Mining Associations Using Directed Hypergraphs*
- Vincent Williams (October 2010)
Title: *An Experimental Study of Distance-Sensitivity Oracles*
- Tharaka Alahakoon (June 2009)
Title: *Path Centrality: A New Centrality Measure in Networks*
- Elena Valkanova (May 2009)
Title: *Algorithms for Simple Stochastic Games*
- Subramanya Nagalakshmi (April 2008)
Title: *Study of FPGA Implementation of Entropy Norm Computation for IP Data Streams*
Co-adviser: Dr. Srinivas Katkoori

Mentoring of REU Students

- Daniel Allen (June 1, 2009 – August 7, 2009)
Affiliation: Rutgers University, Camden
Project title: *Traffic Analysis of IP Networks*
- Andrew Harris (May 28, 2008 – August 8, 2008)
Affiliation: Virginia Commonwealth University
Project title: *Analyzing Community Structure in Massive Networks*

Master's Thesis Committees

- Sadhana Sharma (October 2009)
Affiliation: Computer Science and Engineering, University of South Florida, Tampa
Title: *Performance Analysis of a Binary-Tree-Based Algorithm for Computing Spatial Distance Histogram Efficiently in Scientific Databases*
Supervisor: Yicheng Tu
- Srikar Reddy (July 2009)
Affiliation: Computer Science and Engineering, University of South Florida, Tampa
Title: *Program Monitoring in a Mandatory-result Model*
Supervisor: Jarred Ligatti
- Rebecca Anderson (April 2009)
Affiliation: Information Systems and Decision Sciences, University of South Florida, Tampa
Title: *Social Shopping*
Supervisor: Balaji Padmanabhan

Ph.D. Thesis Committees

- Jennifer Gage (June 2009)
Affiliation: Computer Science and Engineering, University of South Florida, Tampa
Title: *An Inconsistency-Based Approach to Detect and Characterize Sensing Anomalies in Unknown Environment*
Supervisor: Robin Murphy and Lawrence Hall
- Miguel Jimeno (December 2009)
Affiliation: Computer Science and Engineering, University of South Florida, Tampa
Title: *Saving Energy in Network Hosts with an Application Layer Proxy: Design and Evaluation of New Methods that Utilize Improved Bloom Filters*
Supervisor: Kenneth Christensen

Professional Activities

- Refereed papers for the following conferences:
 - International Symposium on Fundamentals of Computation Theory (2005)
 - Foundations of Software Technology and Theoretical Computer Science (2007)
 - International Conference on Parallel and Distributed Systems (2004)
 - IEEE International Symposium on Circuits and Systems (2007)
 - IEEE Conference on Local Computer Networks (2008)
 - Mathematical Foundations of Computer Science (2005)
 - International Symposium on Mobile Ad Hoc Networking and Computing (2005)
 - Symposium on Theoretical Aspects of Computer Science (2004)

- International Symposium on Algorithms and Computation (2010)
- International Colloquium on Automata, Languages, and Programming (2011)
- Refereed papers for the following journals:
 - Ars Combinatoria (2007, 2008)
 - Discrete Applied Mathematics (2010)
 - Information Processing Letters (2005)
 - Journal of Computer and System Sciences (2007)
 - Theoretical Computer Science (2005, 2010)
 - International Journal of Foundations of Computer Science (2008)
 - Graphs and Combinatorics (to be submitted)
- Reviewed papers for the following online database/journals:
 - Mathematical Reviews
 - Zentralblatt MATH
- Membership in the following professional organizations
 - Association for Computing Machinery (ACM)
 - ACM Special Interest Group on Algorithms and Computation Theory (ACM SIGACT)
 - American Mathematical Society (AMS)
 - The Institute of Electrical and Electronics Engineers (IEEE)

Department and University Service

- Advisor and Proctor, the IEEEExtreme Programming Competition, University of South Florida, Oct 22–23, 2010
- Advisor, IEEE-Computer Society, USF Student Chapter (June 2009–present)
- Judge, Annual Undergraduate Research Symposium at the University of South Florida (April 2009 and 2011)
- Member, Graduate Committee (University of South Florida, Tampa, FL), 2010–2011, 2009–2010, 2008–2009, 2007–2008
- Member, Graduate Qualifiers Examination Committee, Representative of the Theory of Algorithms track (University of South Florida, Tampa, FL), Spring 2011, Fall 2010, Spring 2010, Fall 2009, Spring 2009, Fall 2008, Spring 2008, Fall 2007, Spring 2007, Fall 2006, Spring 2006
- Member, Representatives for Graduation Committee (University of South Florida, Tampa, FL), 2006–2007
- Member, Faculty Search Committee (University of South Florida, Tampa, FL), 2006–2007, 2005–2006

List of Publications²

Rahul Tripathi

THESIS

1. **Complexity of Concrete Problems and Test Languages**, R. Tripathi, 2005.

REFEREED JOURNAL PUBLICATIONS

2. **On Strategy Improvement Algorithms for Simple Stochastic Games**, R. Tripathi, E. Valkanova, and V. Kumar, Journal of Discrete Algorithms, to appear.
3. **The Complexity of Optimal Job Co-Scheduling on Chip Multiprocessors and Heuristics-Based Solutions**, Y. Jiang, K. Tian, X. Shen, J. Zhang, C. Jie, and R. Tripathi, IEEE Transactions on Parallel and Distributed Systems, to appear.
4. **The 1-Versus-2 Queries Problem Revisited**, R. Tripathi, Theory of Computing Systems, V. 46, #2, pp. 193–221, 2010.
5. **Hierarchical Unambiguity**, H. Spakowski and R. Tripathi, SIAM Journal on Computing, V. 38, #5, pp. 2079–2112, 2009.
6. **Linear Connectivity Problems in Directed Hypergraphs**, M. Thakur and R. Tripathi, Theoretical Computer Science, V. 410, #(27–29), pp. 2592–2618, 2009.
7. **On the Power of Unambiguity in Alternating Machines**, H. Spakowski and R. Tripathi, Theory of Computing Systems, V. 41, #2, pp. 291–326, 2007.
8. **Complexity Results in Graph Reconstruction**, E. Hemaspaandra, L. Hemaspaandra, S. Radziszowski, and R. Tripathi, Discrete Applied Mathematics, V. 155, #2, pp. 103–118, 2007.
9. **LWPP and WPP Are Not Uniformly Gap-Definable**, H. Spakowski and R. Tripathi, Journal of Computer and System Sciences, V. 72, #4, pp. 660–689, 2006.
10. **Quantum and Classical Complexity Classes: Separations, Collapses, and Closure Properties**, H. Spakowski, M. Thakur, and R. Tripathi, Information and Computation, V. 200, #1, pp. 1–34, 2005.

REVIEWS

11. Review (with Ravikiran Krishnan) of “*Discrete Mathematics in Statistical Physics: Introductory Lectures by M. Loeb*,” Zentralblatt MATH, submitted.

²As is standard in the theoretical computer science community, author names for papers published in theoretical computer science journals or conferences proceedings are listed in alphabetical order of surnames.

12. Review of “*Complexity of Counting the Optimal Solutions by M. Hermann and R. Pichler*,” Mathematical Reviews, submitted.
13. Review of “*Probabilistic Proof Systems: A Primer by O. Goldreich*,” Zentralblatt MATH, Zbl pre05354495, 2010.
14. Review of “*Computational Complexity of Computing a Partial Solution for the Graph Automorphism Problems by T. Nagoya and S. Toda*,” Mathematical Reviews, V. 2010i, 2010i:68055, 2010.
15. Review of “*Satisfiability Parsimoniously Reduces to the TantrixTM Rotation Puzzle Problem by D. Baumeister and J. Rothe*,” Mathematical Reviews, V. 2010f, 2010f:68054, 2010.
16. Review of “*A Rice-Style Theorem for Parallel Automata by T. Hirst*,” Mathematical Reviews, V. 2009m, 2009m:68097, 2009.
17. Review of “*Universal Relations and $\#P$ -Completeness by H. Fournier and G. Malod*,” Mathematical Reviews, V. 2009k, 2009k:68072, 2009.
18. Review of “*The Randomized Communication Complexity of Set Disjointness by J. Håstad and A. Wigderson*,” Mathematical Reviews, V. 2009f, 2009f:68071, 2009.
19. Review of “*Polylogarithmic-Round Interactive Proofs for $coNP$ Collapse the Exponential Hierarchy by A. Pavan, A. Selman, S. Sengupta, and N. Vinodchandran*,” Mathematical Reviews, V. 2009b, 2009b:68050, 2009.

PUBLICATIONS IN PROCEEDINGS OF CONFERENCES AND WORKSHOPS

20. **K-Path Centrality: A New Centrality Measure in Social Networks**, T. Alahakoon, R. Tripathi, N. Kourtellis, R. Simha, A. Iamnitchi, *Proceedings of the 4th workshop on Social Network Systems (SNS 2011)*, to appear.
21. **On Strategy Improvement Algorithms for Simple Stochastic Games**, R. Tripathi, E. Valkanova, V. Kumar *Proceedings of the 7th International Conference on Algorithms and Complexity (CIAC 2010)*, pp. 240–251, Springer-Verlag Lecture Notes in Computer Science #6078, 2010.
22. **Analysis and Approximation of Optimal Co-Scheduling on Chip Multiprocessors**, Y. Jiang, X. Shen, C. Jie, R. Tripathi, *Proceedings of the 17th International Conference on Parallel Architectures and Compilation Techniques (PACT 2008)*, pp. 220–229, ACM, 2008.
23. **The 1-Versus-2 Queries Problem Revisited**, R. Tripathi, *Proceedings of the 18th International Symposium on Algorithms and Computation (ISAAC 2007)*, pp. 137–147, Springer-Verlag Lecture Notes in Computer Science #4835, 2007.
24. **Complexity Upper Bounds for Classical Locally Random Reductions Using a Quantum Computational Argument**, R. Tripathi, *Proceedings of the 32nd*

- International Symposium on Mathematical Foundations of Computer Science (MFCS 2007)*, pp. 548–558, Springer-Verlag Lecture Notes in Computer Science #4708, 2007.
25. **Hierarchical Unambiguity**, H. Spakowski and R. Tripathi, *Proceedings of the 31st International Symposium on Mathematical Foundations of Computer Science (MFCS 2006)*, pp. 777–788, Springer-Verlag Lecture Notes in Computer Science #4162, 2006.
 26. **On the Power of Unambiguity in Alternating Machines**, H. Spakowski and R. Tripathi, *Proceedings of the 15th International Symposium on Fundamentals of Computation Theory (FCT 2005)*, pp. 125–136, Springer-Verlag Lecture Notes in Computer Science #3623, 2005.
 27. **On the Complexity of Linear Connectivity Problems in Directed Hypergraphs**, M. Thakur and R. Tripathi, *Proceedings of the 24th Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2004)*, pp. 481–493, Springer-Verlag Lecture Notes in Computer Science #3328, 2004.
 28. **Complexity Results in Graph Reconstruction**, E. Hemaspaandra, L. Hemaspaandra, S. Radziszowski, and R. Tripathi, *Proceedings of the 29th International Symposium on Mathematical Foundations of Computer Science (MFCS 2004)*, pp. 287–297, Springer-Verlag Lecture Notes in Computer Science #3153, 2004.
 29. **Degree Bounds on Polynomials and Relativization Theory**, H. Spakowski and R. Tripathi, *Proceedings of the 3rd IFIP International Conference on Theoretical Computer Science (IFIP-TCS 2004)*, pp. 105–118, Kluwer Academic Publishers, 2004.
 30. **Quantum and Classical Complexity Classes: Separations, Collapses, and Closure Properties**, H. Spakowski, M. Thakur, and R. Tripathi, *Proceedings of the 23rd Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2003)*, pp. 375–386, Springer-Verlag Lecture Notes in Computer Science #2914, 2003.

TECHNICAL REPORTS

31. **Hierarchical Unambiguity**, H. Spakowski and R. Tripathi, ACM Computing Research Repository Technical Report cs.CC/0702047, February 2007.
32. **Algorithmic Results in Simple Stochastic Games**, V. Kumar and R. Tripathi, University of Rochester Department of Computer Science Technical Report 855, November 2004.
33. **Complexity Results in Graph Reconstruction**, E. Hemaspaandra, L. Hemaspaandra, S. Radziszowski, and R. Tripathi, University of Rochester Department of Computer Science Technical Report 852, October 2004. (Also appears as ACM Computing Research Repository Technical Report cs.CC/0410021, October 2004.)

34. **On the Power of Unambiguity in Alternating Machines**, H. Spakowski and R. Tripathi, University of Rochester Department of Computer Science Technical Report 851, October 2004.
35. **Degree Bounds on Polynomials and Relativization Theory**, H. Spakowski and R. Tripathi, University of Rochester Department of Computer Science Technical Report 820, November 2003.
36. **Cyclomatic Number of Directed Hypergraphs**, M. Thakur and R. Tripathi, University of Rochester Department of Computer Science Technical Report 814, September 2003.
37. **Quantum and Classical Complexity Classes: Separations, Collapses, and Closure Properties**, H. Spakowski, M. Thakur, and R. Tripathi, University of Rochester Department of Computer Science Technical Report 801, July 2003.

SUBMISSIONS, MANUSCRIPTS, MISC. ³

38. **On the Computational Power of Locally Random Reductions**, R. Tripathi, submitted for journal review.
39. **Mining Associations Using Directed Hypergraphs**, R. Simha, R. Tripathi, and M. Thakur, submitted for conference review.
40. **An Experimental Study of Shortest-Distance Oracles for Avoiding a Failed Vertex or Edge**, R. Tripathi and V. Williams, in preparation.
41. **An Experimental Study of Streaming Algorithms for PageRank Computation**, R. Simha and R. Tripathi, in preparation.
42. **Influence Maximization in Distribution Networks**, R. Simha, R. Tripathi, and B. Padmanabhan, manuscript.
43. **Identifying Minimal Sources in Networks**, R. Simha, R. Tripathi, and B. Padmanabhan, manuscript.

³This section includes all papers currently in process of submission to a conference or a journal.