

Madhu Sudan
Gordon McKay Professor, John A. Paulson School of Engineering and Applied Sciences,
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Areas of Special Interests

Theory of Computing, Algorithms, Computational Complexity, Reliable Communication, Optimization.

Ph.D. Title

Efficient Checking of Polynomials and Proofs and the Hardness of Approximations.

Supervisor: Umesh Vazirani

Educational Background

Ph.D.	Computer Science; University of California at Berkeley, 1992
B.Tech.	Computer Science; Indian Institute of Technology at New Delhi, 1987

Work Experience

1990 Summer	Student Researcher at IBM Almaden Research Center
1992-1997	Research Staff Member, IBM Thomas J. Watson Research Center Mathematical Sciences Department
Sept. 1997 - Dec. 2002	Associate Professor, Massachusetts Institute of Technology Department of Electrical Engineering and Computer Science
Jan. 2003 – Jan. 2005	Professor, MIT EECS.
Feb. 2005 – June 2011	Fujitsu Chair Professor, MIT EECS (on leave since June 2009)
July 2005 – June 2011	Danny Lewin Outstanding Professor, MIT EECS (on leave since June 2009)
July 2007 – June 2009	Associate Director, MIT CSAIL
June 2009 – Sept. 2015	Principal Researcher, Microsoft Research
Dec. 2011 – Sept. 2015	Adjunct Professor, MIT EECS
Oct. 2015 – present	Gordon McKay Professor, Harvard SEAS

Awards

Sakrison Memorial Award (Ph.D. Thesis, EECS, Berkeley)	1993
ACM Doctoral Dissertation Award	1993
Sloan Foundation Fellowship	1998
NSF Career Award	1999
Information Theory Paper Award	2000
Gödel Prize	2001
Nevanlinna Prize	2002

Felicitations, Indian Assoc. Computing Research	2002
Distinguished Alumnus Award, University of California at Berkeley, CS Division	2003
Radcliffe Fellowship	2003-2004
Distinguished Alumnus Award, Indian Institute of Technology at New Delhi	2004
Guggenheim Fellowship	2005-2006
ACM Fellow	2009
IEEE Fellow	2010
American Academy of Arts and Sciences Member	2010
AMS Fellow	2013
Infosys Foundation Prize in Mathematical Sciences	2014

Patents:

A scheme for order invariant fuzzy commitment, Ari Juels & Madhu Sudan	US Patent 7,602,904, October 13, 2009
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Professional Service:

<u>Activity</u>	<u>Beginning</u>	<u>Ending</u>
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Journal activities

(Founding) Editor-in-chief , Foundations and Trends in Theoretical Computer Science	June 2004	present
Editor-in-chief , SIAM Journal on Computing	2010	December 2012
Associate Editor, SIAM Journal on Discrete Mathematics	1997	2002
Associate Editor, SIAM Journal on Computing	2000	2009
Associate Editor, Information and Computation	2000	2006
Guest Editor, Journal of Computer and System Sciences, Special issue devoted to papers from <i>Complexity '2001</i>	May 2001	May 2002
Editor, Journal of the ACM	2003	2008
Guest Co-Editor, SIAM Journal on Computing, Special Issue on <i>Randomness and Complexity</i>	May 2004	May 2006
Associate Editor, IEEE Transactions on Information Theory	2005	2006
Associate Editor, Theory of Computing	2009	present

Conference Program Committee Activities

Chair , Program Committee, <i>Complexity 2001</i> , IEEE Conference on Computational Complexity	2001	2001
Chair , Program Committee, <i>FOCS 2003</i> , IEEE Symposium on Foundations of Computer Science	November 2002	November 2003
Chair , Program Committee, <i>ITCS 2016</i> ,	March 2015	March 2016

ACM Symposium on Innovations in Theoretical Computer Science

<u>Member</u> , Program Committee, <i>STOC '95</i> , ACM Symposium on Theory of Computing	May 1995
<u>Member</u> , Program Committee, <i>FOCS '97</i> , IEEE Symposium on Foundations of Computer Science	October 1997
<u>Member</u> , Program Committee, <i>SODA '98</i> , ACM-SIAM Symposium on Discrete Algorithms	January 1998
<u>Member</u> , Program Committee, <i>RANDOM '98</i> , Workshop on Randomization and Approximation	October 1998
<u>Member</u> , Program Committee, <i>COCOON '99</i> , International Computing and Combinatorics Conference	July 1999
<u>Member</u> , Program Committee, <i>FCT '99</i> , Int'l Symposium on Fundamentals of Computing Theory	September 1999
<u>Member</u> , Program Committee, <i>FOCS '2001</i> , IEEE Symposium on Foundations of Computer Science	October 2001
<u>Member</u> , Program Committee, <i>FSTTCS '2001</i> , Foundations of Software Technology and Theoretical CS	December 2001
<u>Member</u> , Program Committee, <i>STOC '2006</i> , ACM Symposium on Theory of Computing	May 2006
<u>Member</u> , Program Committee, <i>ISIT '2006</i> , International Symposium on Information Theory	July 2006
<u>Member</u> , Program Committee, <i>CCC '2006</i> , IEEE Conference on Computational Complexity	July 2006
<u>Member</u> , Program Committee, <i>RANDOM '2006</i> , 10th Annual Workshop on Randomization and Computation	August 2006
<u>Member</u> , Program Committee, <i>EuroComb '2007</i> , European Conf. Combinatorics, Graph theory, Applications	March 2007
<u>Member</u> , Program Committee, <i>FOCS '2008</i> , IEEE Symposium on Foundations of Computer Science	April 2008
<u>Member</u> , Program Committee, <i>ITCS '2012</i> , ACM Innovations in Theoretical Computer Science	January 2012
<u>Member</u> , Program Committee, <i>CCC '2013</i> , IEEE Conference on Computational Complexity	July 2013
<u>Member</u> , Program Committee, <i>FOCS '2013</i> , IEEE Symposium on Foundations of Computer Science	October 2013
<u>Member</u> , Scientific Committee, <i>ACN '2014</i> , Algebra, Codes and Networks	October 2014
<u>Member</u> , Program Committee, <i>FOCS '2014</i> , IEEE Symposium on Foundations of Computer Science	October 2014

Steering Committees

<u>Member of Scientific Board</u> , Electronic Colloquium on Computational Complexity	1994	present
<u>Conference Committee Member</u> , IEEE Conference on Computational Complexity	1999	2002
<u>Scientific Advisory Committee</u> , Claude Shannon Institute, UC Dublin, Ireland	2005	2012
<u>Scientific Advisory Board</u> , Mathemische Forschungsinstitut, Oberwolfach, Germany	2007	2013

<u>Steering Committee Member,</u> ACM Innovations in Theoretical Computer Science (ITCS)	2009	present
<u>Steering Committee Member,</u> IEEE Conference on Computational Complexity	2012	2014
<u>Steering Committee Member,</u> Computational Complexity Conference	2014	present

Other activities

<u>Chair,</u> Session on Approximation Algorithms 16th Mathematical Programming Symposium	June 1994	
<u>Co-organizer,</u> Dagstuhl Workshop on Combinatorial Optimization Problems	January 2000	
<u>Co-organizer,</u> IAS Workshop on Asymptotic and Computational Aspects of Coding Theory	March 2001	
<u>Member,</u> Committee on Fundamentals of Computer Science, Computer Science and Telecommunications Board, National Academies of Sciences	January 2001	December 2002
<u>Panelist,</u> NSF Workshop on the interface between Information Theory and Computer Science	2003	2003
<u>Co-organizer,</u> IMA special thematic year (2006-2007) on Algebraic Geometry and its Applications	March 2003	June 2007
<u>Co-organizer,</u> Oberwolfach meeting on Complexity Theory	May 2003	May 2003
<u>Co-organizer,</u> Radcliffe Symposium on Privacy and Security: Technology, Policy and Society	September 2003	March 2004
<u>Co-organizer,</u> Banff International Research Station Workshop on Advances in Complexity Theory	April 2004	July 2004
<u>Co-moderator,</u> ACM Computing Research Repository (CoRR), Information Theory Section	April 2004	present
<u>Member,</u> Springer LNCS Series Editorial Board.	April 2004	December 2012
<u>Co-organizer,</u> Oberwolfach meeting on Complexity Theory	June 2005	June 2005
<u>Member,</u> SIGACT Committee on TCS Funding	June 2005	June 2007
<u>Co-organizer,</u> Banff International Research Station Workshop on Advances in Complexity Theory	May 2006	August 2006
<u>Co-organizer,</u> IMA Workshop on Complexity, Coding, and Communications	June 2006	April 2007
<u>Member,</u> Morningside Medal of Mathematics Award Committee,	May 2007	June 2007
<u>Co-organizer,</u> Oberwolfach meeting on Complexity Theory	June 2007	June 2007
<u>Organizer,</u> Session on list-decoding at AAECC'07	December 2007	December 2007
<u>Co-organizer,</u> Oberwolfach meeting on Complexity Theory	November 2009	November 2009
<u>Member,</u> 2010 Nevanlinna Prize Committee	April 2008	June 2010
<u>Chair,</u> Editor-in-Chief Selection Committee, ACM Transactions on Algorithms	July 2010	October 2010
<u>Co-organizer,</u> Oberwolfach meeting on Complexity Theory	November 2012	November 2012
<u>Co-organizer,</u> <i>Lampsonfest</i> , Workshop in honor of Butler Lampson's contributions to Computer Science	January 2014	February 2014
<u>Chair,</u> Selection Committee for session on, Mathematical aspects of Computer Science (Section 14) of the International Congress of Mathematicians (ICM), 2014	August 2014	August 2014
<u>Co-organizer,</u> Oberwolfach meeting on Complexity Theory	November 2015	November 2015
<u>Member,</u> SIGACT-EATCS Gödel Prize Committee	2014	2016

Principal Lectures and Addresses

- Courses, mini-courses, lecture series
 - Six lecture mini-course on *Property Testing*, Warsaw University, Warsaw, October 2007.
 - One week course on *Coding Theory in Modern Computational Complexity*, Barbados, March 2006.
 - Four week course on *Probabilistic Checking of Proofs* at the Scuola Normale Superiore, organized by the Scuola Matematica Interuniversitaria, Cortona, Italy, July 2005.
 - Mini-course on *Coding Theory* at the Estonian Winter School in Computer Science, Palmse, Estonia, March 2004.
 - Mini-course on *Coding Theory* at the IBM Almaden Research Center, November 2000.
 - Mini-course on *Probabilistic Checking of Proofs*, Part of Graduate Summer School on Computational Complexity organized by the Park City Mathematical Institute at the Institute for Advanced Study, Princeton, New Jersey, July-August, 2000.
 - Mini-course on *Coding Theory* at the IBM Thomas J. Watson Research Center, January 2000.
 - Lecture series on *Probabilistic verification of proofs* at the Fields Institute, Toronto, April 1998.
 - Lecture series at the school on *Approximate Solutions to Hard Combinatorial Optimization Problems* at the CISM, Udine, Italy, September 1996.
 - Lecture series on *Approximability of Optimization Problems* at the IBM Tokyo Research Laboratory, March 1996.
 - Lecture series on *Hardness of Approximation Problems* at the IBM Almaden Research Center, October 1995.
 - Mini-course on *Hardness of Approximation Problems* at the University of Toronto, February 1993.
- Invited seminars
 - *Plenary Lecture, IEEE International Symposium on Information Theory*, Hong Kong, June 2015. Mumbai, India, June 2015.
 - *Infosys Science Foundation Public Lectures*, IIT Bombay & TIFR, Mumbai, India, June 2015.
 - *I.G. Sarma Memorial Lecture*, Indian Institute of Sciences, Bengaluru, India, January 2014.
 - Speaker, *1st Heidelberg Laureates Forum*, Heidelberg, Germany, September 2013.
 - Plenary speaker, *Information Theory Workshop (ITW 2012)*, EPFL, Lausanne, Switzerland. September 2012.
 - *Maxson Lecture Series*, Dept. of Mathematics, Texas A&M University, College Station, Texas, April 2009.
 - Public Lecture in the series *Love in the time of the internet* hosted by the University of Rome, La Sapienza, and the Goethe Institute, Rome, Italy, March 2009.
 - Keynote speaker, Workshop on *Information Theory and its Applications (ITA 2009)*, San Diego, California, February 2009.
 - Plenary speaker, *Information Theory Workshop*, San Antonio, Texas, October 2004.
 - Oberwolfach Meetings on *Coding Theory*, Germany, May 2000, and December 2003.
 - Plenary speaker, Winter meeting of the Canadian Mathematical Society, December 6, 2003.
 - Plenary speaker, Annual meeting of the German Mathematical Society, September 30, 2003.
 - New York Theory Day, May 2003.
 - Nevanlinna Prize Lecture, International Congress of Mathematicians, Beijing, 3 August 2002.
 - Workshop on Information Theory in honor of Philippe Delsarte's 60th Birthday at Universite Catholique du Louvain, Belgium, 31 May 2002.

- Erdős Memorial Lecture Series, Hebrew University, Jerusalem, 14-20 March 2002.
- Invited speaker at Applied Algebra, Algebraic Algorithms, and Error-correcting codes (AAECC'01), Melbourne, 26-30 November, 2001.
- Invited Tutorial on *Coding theory* at IEEE Symposium on Foundations of Computer Science, Las Vegas, 14-17 October, 2001.
- Oberwolfach Meetings on *Complexity Theory*, Germany, 1994, 1996, and 2000.
- Invited speaker, Symposium on Discrete Mathematics 2000, Technische Universität, München, 5-6 October 2000.
- Keynote plenary invited speaker at the International Conference IFIP TCS 2000, Sendai, Japan, August 2000.
- Invited speaker, DIMACS Workshop on Computing Approximate Solutions to NP-hard Problems, Princeton, New Jersey, February 20-22, 2000.
- Invited speaker, RANDOM '99, Third International Workshop on Randomization and Approximation Techniques in Computer Science, Berkeley, California, August 1999.
- International Congress of Mathematicians, Berlin, August 1998.
- Foundations of Software Technology and Theoretical Computer Science, Kharagpur, December 1997.
- Workshop in honor of Michael Rabin's 65th Birthday, Jerusalem, June 1997.
- Israeli Theory Seminar, Tel Aviv, April 1994 and January 1997.
- Seminar on Complexity in honor of Shmuel Winograd's 60th Birthday at IBM Yorktown Heights, May 1996.
- *20th Theory Day*, Columbia University, 1992.
- *Bay Area Theory Seminar*, Berkeley, 1990.

Courses taught

Summary

<u>Term</u>	<u>Subject</u>	<u>Title</u>	<u>Role</u>
ST93	*Columbia U.*	Hardness of Approximations	Lectures
FT97	MIT 6.046	Analysis of Algorithms	Recitations + Lectures (w. S. Goldwasser)
FT97		Complexity seminar	Seminar (w. S. Goldwasser)
ST98	MIT 6.001	Structure and Interpretation of Computer Programs	Recitations
ST98		Complexity seminar	Seminar
FT98	MIT 6.966	Algebra and Computation	Lectures + Development
ST99		Complexity seminar	Seminar
FT99	MIT 6.893	Approximability of Optimization Problems	Lectures + Development
ST00	MIT 6.045	Automata, Computability, and Intractability	Lectures
FT00	MIT 6.046	Introduction to Algorithms	Lectures (w. S. Teller)
FT00	MIT 6.897	Complexity Seminar	Seminar
ST01	MIT 6.046	Introduction to Algorithms	Lectures (w. P. Indyk)
FT01	MIT 6.897	Algorithmic Coding Theory	Lectures + Development
ST02	MIT 6.841	Advanced Complexity Theory	Lectures
FT02	MIT 6.896	Essential Coding Theory	Lectures + Development
ST03	MIT 6.841	Advanced Complexity Theory	Lectures
FT04	MIT 6.895	Essential Coding Theory	Lectures
ST05	MIT 6.841	Advanced Complexity Theory	Lectures
FT05	MIT 6.885	Algebra and Computation	Lectures
ST06	MIT 6.441	Transmission of Information	Lectures
FT06	MIT 6.885	Introduction to Algorithms	Lectures (w. E. Demaine)
ST07	MIT 6.841	Advanced Complexity Theory	Lectures
ST07	MIT 6.899	Advanced Seminar in Complexity and Cryptography	Seminar
FT07	MIT 6.046	Introduction to Algorithms	Lectures (with R. Rubinfeld)
FT07	MIT 6.899	Reading seminar in Algorithms, Complexity and Cryptography	Seminar
ST08	MIT 6.440	Essential Coding Theory	Lectures
ST09	MIT 6.841	Advanced Complexity Theory	Lectures
ST12	MIT 6.S897	Algebra and Computation	Lectures
ST13	MIT 6.440	Essential Coding Theory	Lectures
ST14	MIT 6.045	Introduction to Automata, Computability and Complexity	Lectures
ST15	MIT 6.S897	Algebra and Computation	Lectures

Theses Supervised by Madhu Sudan

Engineer's Theses

- Hon, Kenneth, S., "Design of Prototype Real-Time Broadcast System over the Internet," January 1998.
- Feng, Yuan, "Analysis and Implementation of Generic MPEG Header and Transport Decoders," May 1999.
- Krevat, Elie, "Scheduling Algorithms to improve utilization in Toroidal Interconnected Systems", May 2003.
- Preda, Daniel, "Quantum Communication Complexity Revisited", May 2003.

Master's Theses

- Dodis, Yevgeniy, "Space-Time Tradeoffs for Graph Properties," May 1998.
- Sherman, Alexander, "Distributed Web Caching System with Consistent Hashing," February 1999.
- Guruswami, Venkatesan, "Query-Efficient Checking of Proofs and Improved PCP Characterizations of NP," May 1999.
- Harsha, Prahladh, "Small PCPs with low query complexity," May 2000.
- Shelat, Abhi, "Evaluating Grammar-Based Data Compression Algorithm", August 2001.
- Smith, Adam, "Multi-party Quantum Computation", August 2001.
- Grigorescu, Elena, "Local decoding and testing of Homomorphisms", August 2006.
- Kopparty, Swastik, "The list-decoding radius for Reed-Solomon codes," August 2006.
- Saraf, Shubhangi, "Kakeya sets and the Method of Multiplicities", June 2009.
- Guo, Alan, "Some closure features of locally testable affine-invariant properties", February 2013.
- Ghazi, Badih, "LP/SDP Hierarchy Lower Bounds For Decoding Random LDPC Codes", January 2015.
- Kamath, Pritish, "Communication Complexity of Permutation Invariant Functions", June 2015.

Doctoral Theses, Reader

- Khanna, Sanjeev, "A Structural View of Approximation," Stanford University, August 1996.
- Alimonti, Paola, "Local Search and approximability of MAX SNP problems," University of Rome, September 1997.
- Micciancio, Daniele, "On the Hardness of the Shortest Vector Problem," MIT, September 1998.
- Sahai, Amit, "Frontiers in Zero Knowledge", MIT, September 2000.
- Ramzan, Zulfikar, "A Study of Luby-Rackoff Ciphers", MIT, January 2001.
- Reyzin, Leonid, "Zero-knowledge without public keys", MIT, May 2001.
- Nielsen, Rasmus Refslund, "List-decoding of Linear Block Codes", Denmark Technical University, Lyngby, Denmark, November 2001.
- Forster, Jürgen, "Some Results Concerning Arrangements of Half Spaces and Relative Loss Bounds", Universitat Bochum, February 2002.

- Lysyanskaya, Anna, “Signature Schemes and Applications to Cryptographic Protocol Design,” May 2002.
- Raskhodnikova, Sofya, “Property Testing: Theory and Applications,” May 2003.
- Feldman, Jonathan, “Decoding Error-Correcting Codes via Linear Programming,” May 2003.
- Bazzi, Louay, “Error Correcting Codes Minimum Distance versus: Encoding Complexity, Symmetry, and Pseudo-randomness”, August 2003.
- Chan, Albert, “A Framework for Low-Complexity Iterative Interference Cancellation in Communication Systems,” June 2004.
- Newman, Alantha, “Algorithms for String and Graph Layout,” August 2004.
- Immorlica, Nicole, “Computing with Strategic Inputs,” June 2005.
- Kleinberg, Robert David, “Online Decision Problems with Large Strategy Sets,” June 2005.
- shelat, abhi, “Etudes in Zero-Knowledge”, December 2005.
- Bădoiu, Mihai, “Algorithmic Embeddings”, May 2006.
- Pass, Rafael, “A Precise Computational Approach to Knowledge”, May 2006.
- Rademacher, Luis, “Dispersion of Mass and the Complexity of Geometric Problems,” MIT, May 2007.
- Woodruff, David P., “Efficient and Private Distance Approximation in the Communication and Streaming Models,” MIT, Summer 2007.
- Akavia, Adi, “Learning Noisy Characters, Multiplication Codes, and Cryptographic Hardcore Predicates,” MIT, August 2007.
- Harvey, Nicholas James Alexander, “Matchings, Matroids, and Submodular Functions,” MIT, May 2008.
- Valiant, Paul, “Testing Symmetric Properties of Distributions,” MIT, June 2008.
- Nolte, Tina Ann, “Virtual Stationary Timed Automata for Mobile Networks,” MIT, October 2008.
- Vaikuntanathan, Vinod, “Randomized Algorithms for Byzantine Agreement,” MIT, October 2008.
- Nelson, Jelani, “Sketching and Streaming High-Dimensional Vectors”, MIT, May 2011.
- Moitra, Ankur, “Vertex Sparsification and Universal Rounding Algorithms”, MIT, May 2011.
- Bhattacharyya, Arnab, “Testability of Linear-Invariant Properties,” MIT, July 2011.
- Maymounkov, Petar, “Dynamics of Spectral Algorithms for Distributed Routing”, MIT, February 2012.
- Xie, Ning, “Testing k -wise Independent Distributions,” MIT, July 2012.
- Haeupler, Bernhard, “Probabilistic Methods for Distributed Information Dissemination”, MIT, June 2013.
- Michael Forbes, “Polynomial Identity Testing of Read-Once Oblivious Algebraic Branching Programs”, MIT, June 2014.
- Aaron Potechin, “Analyzing Monotone Space Complexity Via the Switching Network Model”, MIT, June 2015.
- Carol Wang, “Beyond unique decoding: topics in error-correcting codes”, CMU, July 2015.

Ph.D. Supervision (Completed)

- Dodis, Yevgeniy, “Exposure-Resilient Cryptography,” MIT, August 2000. (Currently Professor at NYU.)
- Guruswami, Venkatesan, “List-decoding of Error-Correcting Codes” MIT, August 2001. (Currently Professor at CMU.)
- Lehman, Eric, “Approximation Algorithms for Grammar-based Data Compression”, MIT, January 2002. (Currently at Google.)
- O’Donnell, Ryan William, “Computational Applications of Noise Sensitivity”, MIT, June 2003. (Currently Associate Professor at CMU.)
- Alekhnovitch, Mikhail, “Propositional Proof Systems: Efficiency and Automatizability”, MIT, June 2003. (Died in rafting accident, August 5, 2006)
- Smith, Adam Davison, “Maintaining Secrecy when Information Leakage is Unavoidable”, MIT, June 2004. (Currently an Associate Professor at Penn. State U.)
- Harsha, Prahladh, “Robust PCPs of Proximity and Shorter PCPs”, MIT, August 2004. (Currently an Associate Professor at Tata Institute of Fundamental Research, Mumbai, India).
- Lehman, April Rasala, “Network Coding”, MIT, January 2005. (Currently at Google.)
- Kelner, Jonathan A., “New Geometric Techniques for Linear Programming and Graph Partitioning”, (I was co-supervisor on this thesis for formal reasons only; real supervisor was Dan Spielman at Yale University), MIT, September 2006. (Currently Associate Professor at MIT.)
- Yekhanin, Sergey, “Locally Decodable Codes and Private Information Retrieval Schemes”, MIT, July 2007. (Currently at Microsoft Corporation.)
- Chen, Victor, “The Gowers Norm in the testing of Boolean Functions”, MIT, May 2009. (Currently at Google.)
- Grigorescu, Elena, “Symmetries in Algebraic Property Testing”, MIT, August 2010. (Currently Assistant Professor at Purdue.)
- Juba, Brendan, “Universal Semantic Communication”, MIT, August 2010. (Currently Assistant Professor at Washington University in St. Louis.)
- Kopparty, Swastik, “Algebraic Methods in Randomness and Pseudorandomness”, MIT, August 2010. (Currently Assistant Professor at Rutgers University.)
- Rossman, Benjamin, “Average-Case Complexity of Detecting Cliques”, MIT, August 2010. (Currently Assistant Professor at National Institute of Informatics, Tokyo, Japan.)
- Saraf, Shubhangi, “The Method of Multiplicities”, MIT, June 2010. (Currently Assistant Professor at Rutgers University.)
- Guo, Alan Xinyu, “New Error Correcting Codes from Lifting”, MIT, May 2015. (Currently at Weiss Asset Management.)

Ph.D. Supervision (Current)

- Bavarian, Mohammad (expected 2017)
- Ghazi, Badih (expected 2017)
- Kamath, Pritish (expected 2018)

Post-Doctoral Supervision

- Trevisan, Luca: September 1997 - August 1998.
- Vadhan, Salil: September 1999 - August 2000.
- Engebretsen, Lars: September 2000 - August 2001.
- Ben-Sasson, Eli: September 2001 - August 2003.
- Shpilka, Amir: August 2002 - July 2003.
- Chuzhoy, Julia: August 2004 - July 2006.
- Kaufman, Tali: August 2007 - July 2009.
- Nordström, Jakob: August 2008 - July 2010.
- Juba, Brendan: August 2010 - June 2011.

Interns Mentored at MSR

- Grant Schoenebeck (2009)
- Ghid Maatouk (2010)
- Jelani Nelson (2010)
- Michael Viderman (2010)
- Richard Peng (2011)
- Girija Ranade (2011)
- Noga Ron-Zewi (2011)
- Elad Haramaty (2012)
- Sreeram Kannan (2012)
- Huy Nguyen (2012)
- Madalina Elena Persu (2013)
- Clément L. Canonne (2014)
- Pravesh Kothari (2014)
- Mrinal Kumar (2015)

Publications

1. Books and Book Chapters.

1. Madhu Sudan. **Efficient Checking of Polynomials and Proofs and the Hardness of Approximation Problems**. ACM Distinguished Theses. Lecture Notes in Computer Science, no. 1001, Springer, 1996.
2. Nadia Creignou, Sanjeev Khanna, and Madhu Sudan. **Complexity Classifications of Boolean Constraint Satisfaction Problems**. SIAM Press, Philadelphia, PA, USA, March 2001.
3. Madhu Sudan. Chapter on “Cryptography” in **Computer Science: Reflections on the Field, Reflections from the Field**, Mary Shaw (Chair), pages 144–150, The National Academies Press, Washington D.C., 2004.
4. Madhu Sudan. Chapter on “Probabilistically checkable proofs”, in **Computational Complexity Theory**, Steven Rudich and Avi Wigderson (Eds.), pages 349–389, IAS/Park City Mathematics Series, volume 10, American Mathematical Society, 2004.
5. Madhu Sudan. Chapter on “Reliable Transmission of Information”, in **Princeton Companion to Mathematics**, Tim Gowers (Ed.), Chapter VII.6, pages 878–887, Princeton University Press, 2008.
6. Madhu Sudan, Chapter on “Il problema $P = NP$ ” in **La matematica, vol. 4**, Pensare il mondo, edited by Claudio Bartocci and Piergiorgio Odifreddi, pages 161–179, Einaudi, Torino, 2010.

2. Papers in refereed journals.

1. Peter Gemmell and Madhu Sudan, “Highly resilient correctors for multivariate polynomials,” *Information Processing Letters*, 43(4): 169–174, September 1992.
2. Marshall Bern, Daniel H. Greene, Arvind Raghunathan, and Madhu Sudan, “Online algorithms for locating checkpoints,” *Algorithmica*, 11(1): 33–52, January 1994.
3. Rajeev Motwani and Madhu Sudan, “Computing roots of graphs is hard,” *Discrete Applied Mathematics*, 54(1):81–88, September 1994.
4. Ronitt Rubinfeld and Madhu Sudan, “Robust characterizations of polynomials with applications to program testing,” *SIAM Journal on Computing*, 25(2):252–271, April 1996.
5. Alok Aggarwal, Amotz Bar-Noy, Don Coppersmith, Rajeev Ramaswami, Baruch Schieber, and Madhu Sudan, “Efficient routing algorithms in optical networks,” *Journal of the ACM*, 43(6):973–1001, November 1996.
6. Andres Albanese, Johannes Blömer, Jeff Edmonds, Michael Luby, and Madhu Sudan, “Priority encoding transmission,” *IEEE Transactions on Information Theory*, Special Issue on Codes and Complexity, 42(6): 1737–1744, November 1996.
7. Mihir Bellare, Don Coppersmith, Johan Håstad, Marcos Kiwi, and Madhu Sudan, “Linearity testing over characteristic two,” *IEEE Transactions on Information Theory*, Special Issue on Codes and Complexity, 42(6): 1781–1795, November 1996.
8. Madhu Sudan, “Decoding of Reed Solomon codes beyond the error-correction bound,” *Journal of Complexity*, special issue dedicated to Shmuel Winograd, 13(1): 180–193, March 1997.
9. Guy Even, Joseph (Seffi) Naor, Baruch Schieber, and Madhu Sudan, “Approximating minimum feedback sets and multicuts in directed graphs,” *Algorithmica*, 20(2): 151–174, February 1998.
10. David Karger, Rajeev Motwani, and Madhu Sudan, “Approximate graph coloring by semidefinite programming,” *Journal of the ACM*, 45(2): 246–265, March 1998.
11. Sanjeev Arora, Carsten Lund, Rajeev Motwani, Madhu Sudan, and Mario Szegedy, “Proof verification and the hardness of approximation problems,” *Journal of the ACM*, 45(3): 501–555, May 1998.

12. Mihir Bellare, Oded Goldreich, and Madhu Sudan, “Free bits, PCP and non-approximability — towards tight results,” *SIAM Journal on Computing*, 27(3): 804–915, June 1998.
13. Amotz Bar-Noy, Alain Mayer, Baruch Schieber, and Madhu Sudan, “Guaranteeing fair service to persistent dependent tasks,” *SIAM Journal on Computing*, 27(4): 1168–1189, August 1998.
14. Sanjeev Khanna, Rajeev Motwani, Madhu Sudan, and Umesh Vazirani, “On syntactic versus computational views of approximability,” *SIAM Journal on Computing*, 28(1): 164–191, February 1999.
15. Sigal Ar, Richard J. Lipton, Ronitt Rubinfeld, and Madhu Sudan, “Reconstructing algebraic functions from mixed data,” *SIAM Journal on Computing*, 28(2): 487–510, April 1999.
16. Benny Chor and Madhu Sudan. “A geometric approach to betweenness,” *SIAM Journal on Discrete Mathematics*, 11(4): 511–523, November 1998.
17. Benny Chor, Oded Goldreich, Eyal Kushilevitz, and Madhu Sudan, “Private information retrieval,” *Journal of the ACM* 45(6): 965–981, November 1998.
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5. Technical reports

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2. Sanjeev Khanna and Madhu Sudan, “The optimization complexity of constraint satisfaction problems,” Technical Note, Stanford University, Computer Science Department, CS-TN-96-29, January 1996.
3. Brendan Juba and Madhu Sudan, “Universal Semantic Communication II: A Theory of Goal-Oriented Communication”, Electronic Colloquium on Computational Complexity (ECCC) TR08-095, October 2008.
4. Alan Guo and Madhu Sudan, “Some closure features of locally testable affine-invariant properties,” Electronic Colloquium on Computational Complexity (ECCC) TR12-048, 25 April, 2012.
5. David Gamarnik and Madhu Sudan, “Performance of the Survey Propagation-guided decimation algorithm for the random NAE-K-SAT problem,” arXiv:1402.0052 [math.PR], 1 February, 2014.
6. Seminars: Approximately 300 invited seminars. Recent talks are available online from <http://people.csail.mit.edu/madhu/talks.html>.