Madhu Sudan

Gordon McKay Professor, John A. Paulson School of Engineering and Applied Sciences, Harvard University

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

Positions Held

1992-1997	Research Staff Member, IBM Thomas J. Watson Research Center Mathematical Sciences Department
Sept. 1997 - Dec. 2002	Associate Professor, Massachussetts 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
Felicitation, 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
Fellow of ACM (Association for Computing Machinery)	2009
Fellow of IEEE (Institute of Electrical and Electronics Engineers)	2010
American Academy of Arts and Sciences Member	2010
Fellow of AMS (American Mathematical Society)	2013
Infosys Foundation Prize in Mathematical Sciences	2014
Jubilee Professor, Indian Academy of Sciences	2015
N.R. Kamath Chair Visiting Professor, Indian Institute of Technology Bombay	2016
National Academy of Sciences Member	2017

Journal Editorial Boards SIAM Journal on Discrete Mathematics (1997-2003), Information and Computation (2000-2006), SIAM Journal on Computing (2000-2012, EIC 2009-2012), Journal of the ACM (2003-2008), Springer LNCS Series (2004-2012), Foundations & Trends in Theoretical Comp. Sc. (Chief Editor, 2004-present), IEEE Transactions on Information Theory (2005-2006), Theory of Computing (2009-present).

Conference Program Committees ACM STOC '95, IEEE FOCS '97, ACM-SIAM SODA '98, RANDOM '98, COCOON '99, FCT '99, CCC '01 (Chair), FOCS '01, FSTTCS '01, FOCS '03 (Chair), STOC '06, CCC '06, ISIT '06, RANDOM '06, EuroComb '07, FOCS '08, ITCS 2012, CCC 2013, FOCS 2013.

Steering committees Electronic Colloquium on Computational Complexity (Scientific Board Member, 1994-present), IEEE Conference on Computational Complexity (Conference Committee Member, 1999-2002), Claude Shannon Institute in Ireland (Scientific Advisory Board, 2005-2012), Mathematische Forschungsinstitut Oberwolfach (Scientific Advisory Board, 2007-present).

Selected Publications

- Ronitt Rubinfeld and Madhu Sudan, "Robust characterizations of polynomials with applications to program testing," SIAM Journal on Computing, 25(2):252–271, April 1996.
- 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.
- 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.
- Venkatesan Guruswami and Madhu Sudan, "Improved decoding of Reed-Solomon codes and algebraic-geometric codes," IEEE Transactions on Information Theory, 45(6): 1757–1767, September 1999.
- Oded Goldreich, Brendan Juba, and Madhu Sudan, "A theory of goal-oriented communicationi," J. ACM 59(2): 8:1–8:65, 2012.

Principal lectures

- Invited speaker, International Congress of Mathematicians, Berlin, August 1998.
- Nevanlinna Prize Lecture, International Congress of Mathematicians, Beijing, August 2002.
- *Plenary Lecture, IEEE International Symposium on Information Theory*, Hong Kong, June 2015.
- *Infosys Science Foundation Public Lectures*, IIT Bombay & TIFR, Mumbai, India, June 2015.
- Speaker, *1st Heidelberg Laureates Forum*, Heidelberg, Germany, September 2013.

Ph.D. Students

Yevgeniy Dodis (2000, currently at NYU), Venkatesan Guruswami (2001, CMU), Eric Lehman (2002, Google), Mikhail Alekhnovitch (2003, died August 5, 2006), Ryan William O'Donnell (2003, CMU), Prahladh Harsha (2004, TIFR), Adam Davison Smith (2004, Penn. State), April Rasala Lehman (2005, Google), Sergey Yekhanin (2006, Microsoft Research), Victor Chen (2009, Google), Elena Grigorescu (2010, Purdue), Brendan Juba (2010, Washington U., St. Louis), Swastik Kopparty (2010, Rutgers), Benjamin Rossman (2010, U. Toronto), Shubhangi Saraf (2011, Rutgers). Alan Guo (2015, Weiss Asset Management), Mohammad Bavarian (2017, Rubric), Badih Ghazi (2018, Google), Pritish Kamath (2019, TTI).

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