

2005 Morgan Prize

The 2005 AMS-MAA-SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student was awarded at the Joint Mathematics Meetings in San Antonio in January 2006.

The Morgan Prize is awarded annually for outstanding research in mathematics by an undergraduate student (or students having submitted joint work). Students in Canada, Mexico, or the United States or its possessions are eligible for consideration for the prize. Established in 1995, the prize was endowed by Mrs. Frank Morgan of Allentown, Pennsylvania, and carries the name of her late husband. The prize is given jointly by the AMS, the Mathematical Association of America (MAA), and the Society for Industrial and Applied Mathematics (SIAM) and carries a cash award of US\$1,000.

Recipients of the Morgan Prize are chosen by a joint AMS-MAA-SIAM selection committee. For the 2005 prize, the members of the selection committee were: Kelly J. Black, James H. Curry, Herbert A. Medina, Philippe M. Tondeur (chair), Judy L. Walker, and Paul Zorn.

Previous recipients of the Morgan Prize are: Kannan Soundararajan (1995), Manjul Bhargava (1996), Jade Vinson (1997), Daniel Biss (1998), Sean McLaughlin (1999), Jacob Lurie (2000), Ciprian Manolescu (2001), Joshua Greene (2002), Melanie Wood (2003), and Reid Barton (2004).

The 2005 Morgan Prize was awarded to JACOB FOX. The text that follows presents the selection committee's citation, a brief biographical sketch, and the awardee's response upon receiving the prize.

Citation

The winner of the 2005 Morgan Prize for Outstanding Research in Mathematics by an Undergraduate is Jacob Fox. Jacob Fox is now in his fourth year of undergraduate studies at MIT [Massachusetts Institute of Technology]. The award is based on a most astounding collection of research papers by any undergraduate mathematician. Jacob Fox's research is in three areas: Ramsey-type problems, rainbow patterns in colorings of the integers or Z/mZ , and other problems in graph theory (namely on discrepancy, clique number, embedding, and diameter). Jacob Fox is an excellent problem solver, passionately interested in these subjects, driven by his love of mathematics, his talents, and his originality. He communicates easily and frequently collaborates with a variety of distinguished researchers. He also frequently publishes alone. Jacob Fox's research exhibits a formidable ability to get to the heart of the issues in the problems at hand, and the ability to develop extremely ingenious and novel techniques. In addition to being able to solve problems posed by others, Fox has also excelled at finding topics all by himself, formulating novel conjectures and approaches to solutions. His accomplishments are shaping his areas of research and are of extraordinary promise for the future.



Jacob Fox

Biographical Sketch

Jacob Fox (previously Jacob Licht) is a senior majoring in theoretical mathematics at the Massachusetts Institute of Technology. He first studied advanced mathematics as an “epsilon” at the Ross Program at Ohio State University. His love for mathematics was further developed through the Research Science Institute, which laid the foundation for work that earned him his first publication, second place in the Intel Science Talent Search, and fourth place in the Siemens Westinghouse Competition. In college Jacob’s interest in combinatorics research was strengthened through undergraduate research supervised by Daniel J. Kleitman, Lucent summer internships at Bell Labs, and, most recently, Joe Gallian’s summer Research Experiences for Undergraduates program at the University of Minnesota, Duluth. In a paper in the *Journal of Combinatorial Theory Series A*, Fox and Kleitman proved the first nontrivial case of Richard Rado’s 1933 Boundedness Conjecture. Extending earlier work of Erdős, Kakutani, Komjáth, and Rado, Jacob proved an infinite color analogue of Rado’s theorem on partition regularity of systems of linear equations. At the Duluth program, he proved a bipartite analogue of Dilworth’s theorem on partially ordered sets, which will appear in the journal *Order*. His research interests are in Hungarian-style combinatorics, particularly Ramsey theory, extremal graph theory, combinatorial number theory, and probabilistic methods in combinatorics.

Response

I am honored to be the recipient of this prize. I would like to thank Mrs. Frank Morgan for endowing the prize and the AMS, MAA, and SIAM for sponsoring it. Daniel J. Kleitman and Radoš Radoičić deserve special thanks for the many years they have mentored my research. I would also like to thank Yuliy Baryshnikov, Joe Gallian, Mohammad Mahdian, Janos Pach, Igor Pak, and numerous others for helping my development as a research mathematician. I thank my family for their love and support.