

2001 Morgan Prize



Ciprian Manolescu

The Frank and Brennie Morgan Prize recognizes and encourages outstanding mathematical research by undergraduate students. It was endowed by Mrs. Frank Morgan of Allentown, Pennsylvania, and carries the name of her late husband. Mrs. Morgan is the mother of Frank Morgan of Williams College. A joint committee of the AMS, the Mathematical Association of America (MAA), and the Society for Industrial and Applied Mathematics chooses the winner. The first Morgan Prize was awarded at the 1996 Joint Mathematics Meetings.

At the MAA Mathfest in Burlington, Vermont, in August 2002, the 2001 Morgan Prize was awarded to CIPRIAN MANOLESCU. Named as Honorable Mention is MICHAEL A. LEVIN. Below are the citations and biographical sketches for the awardees.

Ciprian Manolescu

Floer homology has been at the center of major advances in geometry over the past fifteen years. The traditional definition of Floer homology has been described as cumbersome and technically difficult. Manolescu's research makes a fundamental advance in the field by giving an elegant construction of Floer homology. In his construction, he associates a spectrum (in the sense of algebraic topology) with a 3-manifold. The Floer homology of the 3-manifold is determined as the homology of this spectrum. This approach to Floer homology bypasses the traditional technical difficulties, and experts predict that this construction will become the standard approach in this rapidly developing area of mathematics. The committee was impressed

by the depth and quality of Manolescu's research and by his command of a large body of geometry, topology, and analysis required for his work. The quality of his research papers, the enthusiastic letters from his mentors, and the response to his work at seminars and professional meetings all confirm the outstanding nature of his research. The committee is proud to award the 2001 Frank and Brennie Morgan Prize to Ciprian Manolescu.

Biographical Sketch

Ciprian Manolescu was born in Alexandria, Romania, in 1978. Soon after that his family moved to Pitesti, Romania, where he lived until coming to the U.S. for college in 1997. During high school he participated in several mathematics contests, winning three gold medals at the International Mathematical Olympiad. As an undergraduate at Harvard University, he also took part in the Putnam Competition, winning the first prize in 1997, 1998, and 2000. Since his sophomore year he has been working as a course assistant for several mathematics classes at Harvard, obtaining certificates for distinction in teaching. In the spring of 1999 he took a reading course in differential geometry with Peter Kronheimer. This sparked Manolescu's interest in the subject, and he continued working under Kronheimer's guidance for the next few years. During the summers Manolescu benefited from grants from the Harvard College Research Program. He graduated summa cum laude in 2001 and received the Hoopes prize for his senior thesis, "Finite dimensional approximation in Seiberg-Witten theory". Currently, Manolescu is a graduate student in the mathematics department at Harvard University. His research interests include topology, differential geometry, and mathematical physics.

Michael A. Levin

The Morgan Prize Committee is pleased to award honorable mention for the 2001 Morgan Prize for Undergraduate Research to Michael Levin for his work on quadratic inequalities for the descent statistic of permutations. His prize is based on work that was done at Cornell's REU (Research Experiences for Undergraduates) program and that will appear in the *Journal of Combinatorial Theory, Series A*. The general area of Levin's work concerns statistics on the number of permutations π of the first n positive integers for which a fixed set of indices are exactly those for which $\pi(i+1) < \pi(i)$. These are difficult combinatorial problems with a long history going back to Euler. Levin developed original and surprising methods, which involve passing to a continuous limit and which experts say will open up new avenues of research related to quadratic inequalities satisfied by combinatorially defined numbers. The committee was impressed with the originality and depth of Levin's research. Letters from his teachers and collaborators all attest to his impressive problem-solving abilities and to the excellent and original nature of his work. The committee is proud to award honorable mention for the 2001 Frank and Brennie Morgan Prize to Michael Levin.

Biographical Sketch

Michael Levin grew up on the south side of Chicago. He became interested in mathematics at an early age, and in sixth grade he began attending mathematics programs during the summer. In high school he took a number of mathematics courses at the University of Chicago. He attended Harvard University, where he majored in mathematics. Levin spent the summer after his sophomore year at the Williams College REU where he worked on knot theory research. The next summer he worked on combinatorics research at the Cornell University REU. While in college, he developed an interest in theoretical physics. He is currently a first year graduate student in the physics department of the Massachusetts Institute of Technology. He has not yet chosen a research group, but he is potentially interested in both theoretical condensed matter physics and string theory.

—From an MAA Announcement