

# 1999 AMS-MAA-SIAM Morgan Prize

Today undergraduate students are working on problems of current research interest, proving theorems, writing up results for publication, and giving talks on their work. There is undergraduate research at the highest level of professional excellence.

The AMS-MAA-SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student recognizes and encourages high-caliber mathematical research by undergraduate students. Sponsored by the AMS, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics, the prize was endowed by Mrs. Frank Morgan and carries the name of her late husband.

The 1999 Morgan Prize has been awarded to SEAN THOMAS McLAUGHLIN. SAMIT DASGUPTA received an Honorable Mention.

The prize selection committee consisted of George E. Andrews (chair), Kelly J. Black, Catherine A. Roberts, Robert O. Robson, Martha J. Siegel, and Trevor Wooley.

The following text contains the committee's citation, a brief biographical sketch of Sean McLaughlin, and his response upon receiving the award. The same information is presented for Samit Dasgupta.

## **Citation: Sean McLaughlin**

The 1999 winner of the Morgan Prize for Outstanding Research by an Undergraduate is Sean Thomas McLaughlin, whose undergraduate studies are being conducted at the University of Michigan. His submission for the prize is based on his proof of the "Dodecahedral Conjecture", a major problem in discrete geometry related to, but dis-

tinct from, Kepler's sphere-packing problem and a conjecture that has resisted the efforts of the strongest workers in this area for nearly sixty years.

The committee formed the opinion that the solution of this old, difficult conjecture constituted a singular achievement of such stature that this work alone was deserving of the highest recognition. Letters written in support of his nomination convincingly detailed the fundamental contributions made by McLaughlin to the resolution of the Dodecahedral Conjecture and also the excitement on the international scene accompanying the latter's proof.

The strength of his research, together with the emphatically enthusiastic letters detailing his achievements, offer convincing evidence that he is an outstanding candidate, and the committee is proud to give the 1999 Frank and Brennie Morgan prize to Sean McLaughlin.

## **Biographical Sketch**

Sean Thomas McLaughlin is a double major in mathematics and clarinet performance at the University of Michigan. In his free time he enjoys soccer and hiking.

## **Response**

I couldn't have done any of this work without many hours of discussion with Tom Hales and Sam Ferguson. It was really a group effort all around. I'd also like to recognize the REU



**Sean McLaughlin**

[Research Experiences for Undergraduates] and UROP [Undergraduate Research Opportunity Program] programs, which partially funded this research for the better part of two years. Finally, thank you to Gabor Fejes Tóth for inviting me to present the proof at the mathematics institute in Budapest.

### **Honorable Mention: Samit Dasgupta**

#### **Citation**

The work of Samit Dasgupta is amazingly sophisticated and diverse. His papers address problems from number theory, social choice theory, group theory, and combinatorics. The research on Stark's Conjectures, presented as his honors thesis at Harvard, is particularly impressive. Dasgupta has shown deep understanding of this area in modern number theory, exhibiting a solid background in complex analysis and class field theory. He has extended the computational work to a setting that had never been considered. He and Daniel Biss (Morgan Prize, 1998) showed their extensive understanding of algebra in "A presentation for the unipotent group over rings with identity" (submitted for publication). His paper "On the size of minimum super arrovian domains" (*SIAM Journal of Discrete Mathematics*) significantly extends results of Fishburn and Kelly on a generalization of Arrow's "impossibility theorem". Samit Dasgupta is an extraordinarily versatile mathematician, and the committee is pleased to grant him Honorable Mention for the 1999 Morgan Prize.

#### **Biographical Sketch**

Samit Dasgupta grew up in Silver Spring, Maryland. He was introduced to mathematics, in particular number theory, at the Ross Young Scholars Program at Ohio State University during the summer of 1992 and conducted his first original research at the Research Science Institute at the Massachusetts Institute of Technology in the summer of 1994. There he wrote a number theory paper for which he won fourth place in the Westinghouse Science Talent Search. He was also a winner of the 1995 USA Mathematical Olympiad and placed on the *USA Today* All-Academic Team.

In 1999 Dasgupta graduated *summa cum laude* from Harvard University with an A.B. degree in mathematics. His primary interest in college was number theory, though he enjoyed conducting research in combinatorics and group theory at Joseph Gallian's Research Experience for Undergraduates Program in Duluth, Minnesota. During college he was a course assistant for freshman honors calculus and also for abstract algebra. Dasgupta received Certificates for Distinction in Teaching for both classes. He also received a Barry Goldwater Scholarship and was awarded the David Mumford Prize by the Harvard Mathematics Department.

Dasgupta is currently a research assistant for Martin Feldstein and John Campbell at the National Bureau of Economic Research in Cambridge, Massachusetts. He plans to attend graduate school in mathematics in the fall of 2000.

#### **Response**

I am very honored to receive the Honorable Mention award for the 1999 Frank and Brennie Morgan Prize. I would like to thank all those who assisted me in my research by providing guidance, suggestions, and encouragement. In particular, I would like to recognize Professor Brian Conrad (Harvard University), Professor Joseph Gallian (University of Minnesota-Duluth), and Daniel Biss (MIT).