

BEN GREEN TO RECEIVE 2007 SASTRA RAMANUJAN PRIZE

The 2007 SASTRA Ramanujan Prize will be awarded to Ben Green, who is Hershel Smith Professor of Mathematics at Cambridge University, England. This annual prize, which was established in 2005, is for outstanding contributions to areas of mathematics influenced by the genius Srinivasa Ramanujan. The age limit for the prize has been set at 32 because Ramanujan achieved so much in his brief life of 32 years. The \$10,000 prize will be awarded at the International Conference on Number Theory, Mathematical Physics, and Special Functions, Dec 20-22, at SASTRA University in Kumbakonam, India, Ramanujan's hometown.

Professor Green has made phenomenal contributions to several important problems in combinatorial additive number theory, by himself and in collaboration with Fields Medalist Terence Tao of UCLA, who won the 2006 SASTRA Prize. This stunning progress has been achieved by ingenious new methods involving an interplay of combinatorial ideas, number theoretic methods and analytic techniques. Green's PhD thesis of 2002, written under the direction of Fields Medalist Tim Gowers of Cambridge University, is a collection of several outstanding papers. In one of them that appeared in the Bulletin of the London Mathematical Society in 2004, he solved the Cameron-Erdos conjecture which is a bound for the number of sum free subsets among the positive integers up to a given number N . Over the years several top mathematicians had worked on this problem which was finally solved by Green.

Green's most spectacular contribution is to the study of long arithmetic progressions of primes, starting with his seminal paper of 2005 in the Annals of Mathematics. This paper contained very fundamental ideas which he and Terence Tao could greatly develop and build on to settle the long standing conjecture that the primes contain arbitrarily long arithmetic progressions. A fundamental result in Combinatorial Additive Number Theory is a 1953 theorem of K. F. Roth which asserts that any set of positive integers with positive density contains arithmetic progressions of length 3. This paved the way for the Hungarian mathematician Szemerédi to obtain a substantially deeper and stronger result, namely, that any set of positive integers which has positive density contains arbitrarily long arithmetic progressions. Tim Gowers, who revolutionized Combinatorial Additive Number Theory with the powerful new idea called higher uniformity, provided among other things an entirely new proof of Szemerédi's theorem. Szemerédi's theorem does not apply to the primes, which have density zero. Nevertheless, it had long been conjectured that the primes do contain arbitrarily long arithmetic progressions. The first significant advance in this direction was provided by Green in his Annals of Mathematics paper of 2005 where he established a Roth type theorem for the primes, namely that any set of primes with relative positive density contains arithmetic progressions of length 3. Green's combinatorial proof of this result makes significant improvements on the techniques of Gowers and contained the basic ideas that led to far reaching extensions. Green's work attracted Tao, whose expertise complemented that of Green. Together they first extended Green's result to arithmetic progressions of length 4 within sets of primes of relative positive density, and soon thereafter proved that there are arbitrarily long arithmetic progressions among sets of primes with relative positive density. In this process, Green and Tao have significantly extended the Circle Method by linking it with Gowers' ideas as well as with ergodic theory. The Circle Method, originally due to Hardy and Ramanujan for estimating the number of partitions of an integer, was later developed by Hardy and Littlewood into a versatile tool in Additive Number Theory. This work of Green and Tao which is soon to appear in the Annals of Mathematics, is having an impact on analytic number theory, of a magnitude that has not been witnessed in a very long time.

Green was born in Bristol, England in 1977. He went to Cambridge University to do his BA (1995-98) and continued there to do his PhD (1999-2002) during which time he was awarded the Smith Prize (2001). He held post-doctoral positions at the Alfred Renyi Institute in Budapest (2003-04) and the Pacific Institute of Mathematics in Vancouver (2005-06), before being quickly elevated to appointment as Professor at the University of Bristol in 2005. His spectacular contributions have had so much impact in such a short span of time that in the last two years recognitions have come to him in a flood. He received the prestigious Fellowship at the Clay Institute in 2005 and was appointed Hershel Smith Professor at Cambridge University in 2006 at the young age of 29. He was also delivered one of the invited lectures at the International Congress of Mathematicians at Madrid in 2006. Green is Fellow of Trinity College, Cambridge, following a great tradition at that College where Hardy, Littlewood and Ramanujan were Fellows.

Green emerged as the top choice from a pool of brilliant young mathematicians from around the world. The international panel of experts who formed the 2007 SASTRA Ramanujan Prize Committee are: Chair - Krishnaswami Alladi (University of Florida), George Andrews (The Pennsylvania State University), Manjul Bhargava (Princeton University), James Lepowsky (Rutgers University), Tom Koorwinder (University of Amsterdam), Kannan Soundararajan (Stanford University), and Michel Waldschmidt (University of Paris).

Previous winners of the [SASTRA Ramanujan Prize](#) are [Manjul Bhargava and Kannan Soundararajan in 2005](#) (two prizes), and [Terence Tao in 2006](#). Thus the SASTRA Prize is awarded to the best of the best, and this lofty international standard is continued with the award of the 2007 Prize to Ben Green, who belongs to the hallowed tradition in number theory at Cambridge begun by Hardy, Littlewood, and Ramanujan.

Krishnaswami Alladi
Chair, 2007 SASTRA Ramanujan Prize Committee

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