

#### Terry Tao wins Fields Medal

*"for his contributions to partial differential equations, combinatorics, harmonic analysis and additive number theory".*

*Terence Tao is a supreme problem-solver whose spectacular work has had an impact across several mathematical areas. He combines sheer technical power, an other-worldly ingenuity for hitting upon new ideas, and a startlingly natural point of view that leaves other mathematicians wondering, "Why didn't anyone see that before?". His interests range over a wide swath of mathematics, including harmonic analysis, nonlinear partial differential equations, and combinatorics.*

Professor Terry Tao, of the University of California at Los Angeles, was awarded the Fields Medal, often called the "Nobel Prize of Mathematics", at the International Congress of Mathematicians in Madrid today (22 August 2006). Terry grew up in Adelaide, and holds Bachelor and Master degrees in Mathematics from the Flinders University of South Australia. His work spans a broad range of pure mathematics, and is breathtaking in both scope and depth. Terry is the first Australian to win this award, the most prestigious in the world for mathematics, and this is one of the most significant achievements of Australian Science.

#### Terry Tao

Terry was a child prodigy who was born in Adelaide on July 17, 1975, and grew up there. He won medals three times at the International Mathematical Olympiads, a competition for high school aged students, but Terry was over five years younger than most of the other competitors. He began his studies for his Bachelor of Science degree at Flinders University in his early teens, and completed this degree with First Class Honours in Mathematics, followed by a Master of Science degree in Mathematics, under the direction of Professor Garth Gaudry, while still a teenager. He continued with a Doctor of Philosophy from Princeton University before his twenty-first birthday, and since then has been mainly based at the University of California at Los Angeles, where he was the youngest full professor in living memory. In the last decade, he has come back to Australia on many occasions, including two six-month visits to the University of New South Wales (Sydney) and two six-month visits to the Australian National University (Canberra), where he is an Honorary Professor. He has won many awards, including the Medal of the Australian Mathematical Society in 2005, and he is a Corresponding Member of the Australian Academy of Science. For more details, see his website [www.math.ucla.edu/~tao/](http://www.math.ucla.edu/~tao/).

#### Terry Tao's work and its significance

Terry has worked in a number of different mathematical areas, and he has been remarkably prolific---the rate at which he writes high quality papers sets him apart from most leading mathematicians in the world.

His early work was in harmonic analysis. This part of mathematics seeks to understand complex phenomena such as electrical signals by breaking them down as a sum of simple phenomena, and underpins modern signal processing (for radio and television, for instance) and image compression (for jpeg image and mp3 music files). From this he moved into the study of nonlinear partial differential equations, which explain hard-to-understand physical phenomena such as the transmission of light in fibre optics. He has also worked in algebra, explaining symmetries of complex systems, and in number theory, making one of the biggest leaps in understanding the distribution of prime numbers in the last hundred years. The study of prime numbers used to be considered one of the most esoteric fields of mathematics, and G. H. Hardy, a Cambridge professor of the early 1900s, famously used to boast that his work in this area would never be applied, but these days prime numbers are used to safely encode data, such as the details of ATM and EFTPOS transactions, for sending along telephone lines and other insecure transmission channels, and Hardy's work underpins millions of safe transactions every day. His work in combinatorics was another of the contributions recognised in the Fields Medal Citation.

#### The Fields Medal

There are amusing stories about why there are no Nobel Prizes in Mathematics (see [www.cs.uwaterloo.ca/~alopez-o/math-faq/node50.html](http://www.cs.uwaterloo.ca/~alopez-o/math-faq/node50.html)), based on a presumed antipathy or rivalry for the affections of a woman between Alfred Nobel and the Swedish mathematician Gosta Mittag-Leffler. The Fields Medal was set up as a result of the efforts of the Canadian mathematician John Charles Fields (see [www-history.mcs.st-andrews.ac.uk/Biographies/Fields.html](http://www-history.mcs.st-andrews.ac.uk/Biographies/Fields.html) and links from this page); the first Medal was awarded in 1936, and following a break for the Second World War, Fields medals have been awarded every four years since 1950. A total of forty-three medals have been awarded between 1936 and 2002. Other relevant information is at [www.mathunion.org/General/Awards.html](http://www.mathunion.org/General/Awards.html)

#### Other Fields Medal winners

There were three other winners, Andrei Okounkov, Grigori Perelman and Wendelin Werner. In the words of Sir John Ball, IMU President, who announced the Medallists and read short citations, Perelman "declined to accept the Medal". This refusal has become the subject of press interest: there are several newspaper articles offering differing explanations for this. One story suggests that he fought with his colleagues in St Petersburg over (possibly imagined) slights; rumours are circulating that he refused \$1,000,000 from the Clay Foundation for different reasons; certainly he was not present at the ceremony today.

#### Other Prizes and Medals

King Juan Carlos of Spain also presented the Nevanlinna Prize, for theoretical computer science, to Jon Kleinberg, and the Gauss Medal, for applied mathematics which has had impact outside mathematics, to the daughter of Kiyoshi Ito, who was unable to attend for health reasons, he is over 90 years old. Australia's Ian Sloan was on the committee which chose the Gauss Prize winner.

Terry will visit Australia in late September, for the AustMS Annual Conference at Macquarie University.



Terry with the Fields Medal (photo taken by Michael Cowling at noon on Wed 23 Aug 2006, two hours after his plenary lecture at ICM in Madrid (with thanks to Neville Smythe for further editing))

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