



Name in English: Terence Chi-Shen Tao
Name in Chinese: 陶哲轩 [陶哲軒]
Name in Pinyin: Táo Zhéxuān
Gender: Male
Birth Year: 1975
Birth Place: Adelaide, Australia
Current location: Los Angeles , California

Profession: Professor of Mathematics

Education: Bachelor of Science (Honors), Mathematics, Flinders University [Australia], 1991; Master of Science, Mathematics, Flinders University, 1992; Ph.D., Mathematics, University of California, Los Angeles, 1996

Awards: 2012, Crafoord Prize (Mathematics), Royal Swedish Academy of Sciences; 2010, Nemmers Prize, Northeastern University; 2010, King Faisal International Prize (Mathematics), King Faisal Foundation; 2010, George Pólya Prize, Society for Industrial and Applied Mathematics; 2008, Onsager medal, Lars Onsager Lecture; 2008, Alan T. Waterman Award, National Science Foundation; 2005, Ostrowski Prize, Ostrowski Foundation; 2007, MacArthur Fellowship, MacArthur Foundation; 2007, SASTRA Ramanujan Prize, Shanmugha Arts, Science, Technology & Research Academy; 2006, Fields Medal, International Mathematical Union; 2005, Australian Mathematical Society Medal, Australian Mathematical Society; 2002, Bôcher Memorial Prize, American Mathematical Society, 2000, Salem Prize, Salem Prize Committee; 1992, Fulbright Postgraduate Scholar, Australian-American Fulbright Commission; 1988, Gold Medal, International Mathematical Olympiad; 1987 Silver Medal, International Mathematical Olympiad; 1986, Bronze Medal, International Mathematical Olympiad

Contribution: Dr. Terence Tao's family are all very bright, especially in mathematics. His father, Dr. Billy Tao, was a pediatrician who immigrated to Australia from Hong Kong in 1972. His mother earned a mathematics and physics degree from Hong Kong University and taught mathematics in a Hong Kong secondary school before coming to Australia. Both of his brothers, Nigel and Trevor, have earned degrees in mathematics.

Terence Tao was marked as a child math prodigy in Australia very early in his life. When he was 2 his parents sat him in front of the television to watch "Sesame Street." As his father admitted, "We basically used 'Sesame Street' as a babysitter." Terence started to use spelling blocks that his parents had bought for him to spell out words and to demonstrate simple math problems. But his father said the blocks had been bought as toys, not for education, "You expect them to throw them around."

Terence was enrolled in a private school at just 3 1/2 years old but was withdrawn just six weeks later. He was not ready to spend so much time in school and the teacher wasn't ready to teach a child prodigy.

When Terence was finally enrolled in public school when he was 5 he was allowed to progress at his own pace in a special program developed for him between administrators, teachers, and his parents. He was "given the freedom to enjoy life" including playing bridge and experiments in music dubbing. Terence quickly advanced beyond his peers by several grades in science and mathematics but stayed even with them in courses such as English. "When I was a child in Adelaide, Australia, I loved games with clear, unambiguous rules; puzzles that were tough but fair; and the clean, abstract, simplicity of numbers and symbols. So it is perhaps not surprising that I have been drawn to mathematics for as long as I can remember." Essays though particular discomforted him, "I never really got the hang of that. These very vague, undefined questions. I always liked situations where there were very clear rules of what to do."

By 7 1/2 he was studying math at a local high school and by age 8 he had scored a 760 out of a possible 800 on the Scholastic Aptitude Test (SAT) math section and was starting to study calculus. For awhile there were discussions about accelerating Terence's education to graduate from a university as quickly as possible. His parents talked with experts in the education of gifted children and examined the often sad history of many past child prodigies (high academic achievements and acclaim by their mid-teens, asocial recluses and dropouts by twenty.) They decided to keep their son in regular schools and have college professors mentor him instead of sending him to a university. His father said, "To get a degree at a young age, to be a record-breaker, means nothing. I had a pyramid model of knowledge, that is, a very broad base and then the pyramid can go higher. If you just very quickly move up like a column, then you're more likely to wobble at the top and then collapse."

In 1986, at the age of just 10, Terence Tao became the youngest medal winner in the history of the International Mathematical Olympiad when he took a bronze medal. The following year he won the silver medal. In 1988, he became the youngest ever to win a gold medal at the age of 13. In 1989, at the age of 14, he finally left high school and enrolled full time at Flinders University in his native Adelaide. In December 1991 he earned his Bachelor of Science degree in Mathematics with Honors and his Masters of Science in Mathematics just six months later in June 1992. In that same year, at just 16, he was awarded a Fulbright Scholarship to continue his postgraduate studies in the United States at Princeton University from which he earned his Ph.D. at the age of 20 in 1996.

He immediately became an assistant professor at the University of California, Los Angeles (UCLA) and was a full professor by 24, the youngest full professor in the history of the university.

Dr. Terence Tao has explored many different fields of mathematics and been consulted about numerous scientific and mathematical problems by his peers. One field that especially interested him in number theory were prime numbers, numbers greater than 1 that have no positive divisors other than 1 and itself. A simple mathematical concept but at the root of such complicated fields as cybersecurity, cryptanalysis, and codebreaking. When you transmit your credit card number or other sensitive information electronically a prime number key is always involved to keep that

information safe. The Green-Tao theorem of 2004 looked at prime number progression and proved that it is always possible to find in the infinity of integers, a progression of any length of equally spaced prime numbers. This had been a problem tormenting mathematicians for over 2,300 years since the Greek mathematician, Euclid, pondered the problem in 300 BC.

In 2004, Professor Emmanuel Candes, then an applied mathematician at the California Institute of Technology, presented Dr. Tao with the problem of reconstructing images with the least possible information. Today's digital cameras record several million pixels then use a compression algorithm to reduce the amount of data in the picture for efficient storage and transmission. Why couldn't a camera start with the compressed data first and make the process faster and more efficient?

Dr. Tao responded the next day with a new and complex algorithm that allowed an accurate picture to be created from just a small sample of data. The field of compressive sampling was born. Work is already being done to develop a new MRI for medical and scientific purposes using the new algorithm. The US Department of Defense is also very interested in the research. Their idea is to drop many small and very stupid one-pixel cameras each transmitting their tiny bit of data to a computer which can then assemble a very complete picture of any area. Possible national security applications could also include faster digital recognition at airports and other checkpoints. Another field could be more compressed and faster data storage and retrieval with obvious commercial and military applications worth billions of dollars.

In 2009, Dr. Terence Tao, became a dual American-Australian citizen. On his UCLA website though he says, "I consider myself primarily an Australian. This doesn't mean that I wrestle crocodiles in the outback, but I do like Vegemite and meat pies (though not simultaneously), Aussie rules and cricket, Pom-bashing and Kiwi-rivalry, and above all Australia's easy-going, honest, and relaxed culture."

Publications:

From 1996 to 2013, Terence Tao has published, submitted, or co-authored over 250 articles in mathematics. He is also the author of eight books on mathematics.

External Links:

<http://www.math.ucla.edu/~tao/>

<http://www.math.ucla.edu/~tao/preprints/cv.html>

<http://terrytao.wordpress.com/>

<http://www.cnn.com/2010/OPINION/04/23/tao.who.am.i/index.html>

http://www.nytimes.com/2007/03/13/science/13prof.html?_r=0&pagewanted=all

<http://www.smithsonianmag.com/science-nature/tao.html>

<http://www.youtube.com/watch?v=e2V5U8Gwebc>