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PLENARY LECTURE I

Translational tilings of Euclidean space

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Translational tilings of Euclidean space are a partition of Euclidean space (up to null sets) by translates of one or more tiles. For instance, the famous Penrose tilings are a translational tiling by a finite number of triangles which can only tile the plane non-periodically. One of the outstanding problems in this field is the "periodic tiling conjecture" - if a tile can tile space by translations, must there exist a way to tile space periodically with this tile? Recently, Rachel Greenfeld and I were able to disprove this conjecture in high dimensions, by encoding a certain "Sudoku puzzle" as a tiling problem. We survey this result and other recent progress in this talk.

Short Biography

Terence Tao was born in Adelaide, Australia in 1975. He has been a professor of mathematics at UCLA since 1999, having completed his PhD under Elias Stein at Princeton in 1996. Tao's areas of research include harmonic analysis, PDE, combinatorics, and number theory. He has received a number of awards, including the Salem Prize in 2000, the Bochner Prize in 2002, the Fields Medal in 2006, the MacArthur Fellowship in 2007, the Waterman Award in 2008, the Nemmers Prize in 2010, the Crafoord prize in 2012, and the Breakthrough Prize in Mathematics in 2015. Terence Tao also currently holds the James and Carol Collins chair in mathematics at UCLA, and is a Fellow of the Royal Society, the Australian Academy of Sciences (Corresponding Member), the National Academy of Sciences (Foreign member), and the American Academy of Arts and Sciences.

