



Berlin
Mathematical
School

BMS Friday Colloquium

Friday 8 July 2016 at 14:15

Tea & Cookies starting at 13:00

Harnack-Haus, Goethe-Saal, Ihnestr. 16-20, 14195 Berlin



Henry Cohn

(Microsoft Research New England/MIT)

Mysteries of sphere packing in high dimensions

The sphere packing problem asks for the densest packing of spheres in Euclidean space. In other words, how can we arrange non-overlapping, congruent balls so as to cover as much of space as possible? This problem plays an important role not only in geometry and material science, but also in information theory, where sphere packings are error-correcting codes for a continuous communication channel.

What makes this subject remarkable is how rich and varied the best known sphere packings are. Low dimensions give a misleading impression, namely that it's easy to guess the answer, while in fact high dimensions turn out to be full of beautiful mysteries. Each dimension is a little different, and nobody understands what happens in the limit as the dimension tends to infinity.

In his talk, Cohn will survey some of those mysteries without assuming any special background, and he'll take stock of where things stand now, after Maryna Viazovska's recent solution of the eight-dimensional sphere packing problem.

Henry Cohn is a principal researcher at Microsoft Research New England and an adjunct professor in the MIT department of mathematics. He received his PhD from Harvard in 2000, after which he joined Microsoft Research as a postdoc. He then became a researcher in the theory group at Microsoft Research Redmond and, eventually, head of the cryptography group, before becoming one of three founding members of Microsoft Research New England in 2008. Cohn's research is primarily in discrete mathematics, and he enjoys any problem where concrete and abstract mathematics interact.