BRIN MATHEMATICS RESEARCH CENTER

Brin MRC Distinguished Lecture

Random Lattices and Their Applications in Number Theory, Geometry and Statistical Mechanics

Jens Marklof, University of Bristol

Date: March 1st, 2024

Time: 3:15 PM

Location: 3206 Kirwan Hall

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DEPARTMENT OF MATHEMATICS

Abstract

Lattices are fundamental objects in physics, mathematics and computer science. Starting from a cubic lattice, say, we can perturb the structure by linear transformations (shearing, stretching, rotating) to obtain a whole family of lattices.
Dr. Marklof will discuss the resulting "space of lattices", the dynamics of group actions on this space, natural probability measures, as well as some fascinating applications to long-standing problems in various areas of mathematics and mathematical physics. He will tell us about kinetic transport in crystals and quasicrystals (the Lorentz gas), pseudo-random properties of simple arithmetic sequences, knapsack problems, diameters of random Cayley graphs and subtle lattice point counting problems in hyperbolic geometry.

About the Speaker

Jens Marklof is Professor of Mathematical Physics at the University of Bristol, specializing in dynamical systems and ergodic theory, quantum chaos, and the theory of automorphic forms.
Marklof received his PhD in 1997 from the University of Ulm, and held research fellowships at Princeton University, Hewlett-Packard, the Isaac Newton Institute in Cambridge, the Institute des Hautes Etudes Scientifique and the Laboratoire de Physique Theorique et Modeles Statistiques near Paris. Major awards include a 2010 LMS Whitehead Prize and a five-year ERC Advanced Grant. From November 2023 he will serve a two-year term as President of the London Mathematical Society.