CAROLINE SERIES, University of Warwick
Boundaries of discreteness and hyperbolic 3-manifolds

Suppose given a finite collection of Moebius maps which depend holomorphically on some complex parameters. For which parameter values is the group they generate discrete? Inspired by Mandelbrot's work on iteration of quadratic polynomials, this question was investigated by David Mumford and David Wright in the 1980s. Their remarkable computer experiments suggested that the region of discreteness in parameter space has a complicated fractal-like boundary. I will explain how three dimensional hyperbolic geometry has shed light on this problem, making use of wonderful new concepts stemming from Thurston's revolutionary work on hyperbolic three manifolds. The talk will be illustrated with beautiful computer graphics which have played a crucial role in the discoveries.