

Anne Bennett Prize: citation for Henna Koivusalo

Short citation:

Dr Henna Koivusalo of the University of Bristol is awarded the Anne Bennett Prize for her work on cut-and-project sets, dynamical systems and fractals and her dedication to the advancement of women in mathematics.

Long citation:

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Working at the interface of several mathematical areas including fractal geometry, cut and project sets, Diophantine approximation and dynamical systems, Henna Koivusalo's work has been fundamental to these areas.

Cut and project sets provide a natural framework for constructing so-called aperiodic structures or patterns. These appear naturally not only in mathematics, e.g. the famous Penrose tiling, but also in physics in the form of quasi-crystals. Dr Koivusalo has made major advances in this area, most of all by delivering a comprehensive classification of cut-and-project sets and considering various applications. Her work proves fundamental results on linear repetitive structures in terms of their 'complexity' and Diophantine properties of lattices associated with cut and project schemes.

Koivusalo's work on quantitative aspects of recurrence and shrinking target problems in dynamical systems defines the state-of-the-art in the area for a large class of systems. Her recent work develops the theory for overlapping iterated function systems, which are notorious for a non-uniqueness phenomenon, giving rise to a different, and difficult to understand, type of behaviour. Koivusalo's work provides a comprehensive understanding (using Lebesgue and Hausdorff measures) of typical behaviour of orbits in such systems.

In the area of mass transference, Koivusalo delivers novel powerful frameworks with applications to previously intractable problems in Diophantine approximation. Notably, these frameworks include mass transference 'from balls to arbitrary shapes' and her recent breakthrough on mass transference for limsup sets of annuli. The latter led to her resolving a two decades old problem in Diophantine approximation on Ψ -badly approximable points.

In addition to her research accomplishments, Dr Koivusalo has been a tireless promoter of women in mathematics, not least by being a role model for every mathematician and particularly for women in mathematics. She has provided advice and support for other women in mathematics and run numerous outreach events inspiring new generations to enter mathematics and other STEM subjects, particularly female students.