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MAGIC LAUNCH LECTURE 2023

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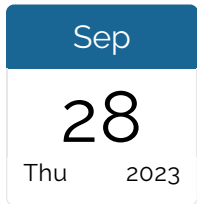
16:00 - 17:00
Organised by Sam Blackburn.
Hosted by University of Nottingham.

Title - Exploring the landscape of Fano varieties: geometry, computation, and machine learning

Speaker - Alexander Kasprzyk, Associate Professor in Geometry (University of Nottingham)

Algebraic geometry is one of the gems of pure mathematics. Essentially concerned with the study of shapes described by systems of polynomial equations, it builds a fundamental bridge between algebra and geometry, and informs many areas of modern mathematics and theoretical physics.

One of the fundamental open problems in algebraic geometry is the classification of Fano varieties: shapes with positive curvature which form the "atomic pieces" of geometry. Although known to be finite in each dimension (thanks in part to work by UK Fields Medalist Caucher Birkar), even the classification in dimension three is largely mysterious.

Recent ideas taken from mirror symmetry help translate this classification problem into a combinatorial question which can be tackled by computers. Many centuries of runtime on High Performance Computing clusters is providing the first conjectural glimpse of the landscape of Fano varieties. This has transported an abstract theoretical challenge into the world of Big Data. Much still remains to be understood, however tools from data science -- including machine learning -- are finally allowing us to begin making sense of the rich mathematical structure hidden within this classification.

The lecture will be delivered via Zoom. All staff and PhD students are invited. To attend, you must be registered as a user of the MAGIC website - contact your MAGIC node representative for help.