The geometric disposition of Diophantine equations

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Which integers can be expressed as a sum of three cubes? Is there a box such that the distance between any two of its corners is a rational number? Is there a 3 x 3 magic square of squares? These and many other questions can be phrased mathematically as diophantine problems. The properties of the geometric avatars corresponding to these diophantine problems help understand why these problems are so difficult, and why there almost certainly isn't an elementary way to answer the original questions. In this talk I will survey the idea that geometric classification theorems provide a good lens for use in the study of diophantine equations.