

# Arithmetic and geometry of algebraic surfaces: the place of elliptic fibrations and K3 surfaces

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## Abstract

In this talk I will go over recent progress on the arithmetic of algebraic surfaces, review some contributions of the study of elliptic fibrations to it and present open problems summarising the state of the art. K3 surfaces have a special place in the classification of algebraic surfaces: they lie in an intermediate spot, being not too simple (as rational surfaces) nor too complicated (as surfaces of general type). They are ubiquitous in mathematics, having been studied by differential and algebraic geometers, dynamicists, arithmeticians, analysts and also by physicists. A special feature of K3 surfaces is that they are the only class of surfaces that might admit more than one elliptic fibration, with section, that is not of product type. The classification of such different fibrations has been the object of several papers since the 90's. I plan to outline a new approach to this problem and, if time allows, discuss arithmetic and geometric applications of the method.