

津田塾大学数学・計算機科学研究所

## 数学科 70 周年 記念談話会のお知らせ

講演者： Noriko Yui (Queen's University)

講演題目：Modularity of Calabi-Yau Varieties

日時：2019 年 7 月 26 日 (金) 16:30–17:30 (16:00 から Tea)

場所：津田塾大学小平キャンパス新館 3 階 320 (談話会室)

### 概要：

Let  $X$  be a Calabi–Yau variety of dimension  $d$ . We will confine ourselves to Calabi–Yau varieties of small dimensions, e.g.,  $d \leq 3$ . Dimension one Calabi–Yaus are elliptic curves, those of dimension two are K3 surfaces, and dimension three ones are Calabi–Yau threefolds. Geometry and physics are both very much in evidence on Calabi–Yau varieties over the field of complex numbers.

Today I will focus on Calabi–Yau varieties defined over the field  $\mathbb{Q}$  of rational numbers (or number fields), and will discuss the modularity/automorphy of Calabi–Yau varieties in the framework of the Langlands Philosophy.

In the last twenty-five years, we have witnessed tremendous advances on the modularity question for Calabi–Yau varieties. All these results rest on the modularity of the two-dimensional Galois representations associated to them. In this lecture, I will present these fascinating results. Time permitting, I will discuss the modularity of higher dimensional ( $> 2$ ) Galois representations arising from K3 surfaces and Calabi–Yau threefolds over  $\mathbb{Q}$ .

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