

## **Abstract**

Oberwolfach Workshop:

### **Explicit Methods in Number Theory**

Dates:

**1 Sep - 6 Sep 2024** (Code: 2436)

Organizers:

**Karim Belabas, Talence**

**Bjorn Poonen, Cambridge MA**

**Fernando Rodriguez-Villegas, Trieste**

The aim of this Oberwolfach meeting on 'Explicit methods in number theory' is to bring together people attacking key problems in number theory via techniques involving concrete or computable descriptions. Here, number theory is interpreted broadly, including algebraic and analytic number theory, Galois theory and inverse Galois problems, arithmetic of curves and higher-dimensional varieties, zeta and L-functions and their special values, and modular forms and functions. Considerable attention is paid to computational issues, but the emphasis is on aspects that are of interest to the pure mathematician.

The workshop will feature a minicourse on the recent developments on cohomology of higher-dimensional arithmetic groups. This topic has deep connections to number theory, arithmetic geometry, and representation theory. Classically it ties in with the arithmetic theory of modular forms and modular curves, and the higher-dimensional analogues again relate to automorphic forms and representations. In the past, this was mainly a theoretical endeavor, with connections to subjects such as algebraic K-theory, but recently Euclidean lattices and their reduction theory have provided tools for getting a handle on these abstract objects. The cohomology of arithmetic groups in higher rank has many new features, such as abundance of torsion classes. It has been the source of recent theoretical developments in the Langlands program, which in turn suggest new lines of experimental investigation. They provide a new domain in which to explore arithmetic statistics, and we hope also to involve experts in this direction.