Zeta Functions
in Algebra and Geometry
## Contents

Preface ix  
List of participants xiii  

**Part I: L-functions of varieties over finite fields and Artin L-functions**

Computational aspects of Artin L-functions  
**by Pilar Bayer** 3  

Zeta functions for families of Calabi-Yau \( p \)-folds with singularities  
**by Anne Frühbis-Krüger and Shabnam Kadir** 21  

Estimates for exponential sums with a large automorphism group  
**by Antonio Rojas-León** 43  

**Part II: Height zeta functions and arithmetic**

Height zeta functions on generalized projective toric varieties  
**by Driss Essouabri** 65  

Combinatorial cubic surfaces and reconstruction theorems  
**by Yuri Manin** 99  

Height zeta functions of equivariant compactifications of semi-direct products of algebraic groups  
**by Sho Tanimoto and Yuri Tschinkel** 119  

**Part III: Motivic zeta functions, Poincaré series, complex monodromy and knots**

Singularity invariants related to Milnor numbers: Survey  
**by Nero Budur** 161  

Finite families of plane valuations: Value semigroup, graded algebra and Poincaré series  
**by Carlos Galindo and Francisco Monserrat** 189  

\( q, t \)-Catalan numbers and knot homology  
**by Evgeny Gorsky** 213  

Motivic zeta functions for degenerations of abelian varieties and Calabi-Yau varieties  
**by Lars Halvard Halle and Johannes Nicaise** 233
The lattice cohomology of $S^2_d(K)$
by András Némethi and Fernando Román 261

Part IV: Zeta functions for groups and representations

Representation zeta functions of some compact $p$-adic analytic groups
by Nir Avni, Benjamin Klopsch, Uri Onn and Christopher Voll 295

Applications of some zeta functions in group theory
by Aner Shalev 331