
Preface

This book arose from a meeting centered on higher algebraic structures that are now ubiquitous in various areas of mathematics (algebra, algebraic topology, differential geometry, algebraic geometry, mathematical physics) and theoretical physics (quantum field theory, string theory). These structures provide a common language essential for the study of deformation quantization, theory of algebroids and groupoids, symplectic field theory, and much more.

These higher algebraic structures first appeared in 1963, in Murray Gerstenhaber's¹ *The cohomology structure of an associative ring* and in Jim Stasheff's *Homotopy associativity of H -spaces. I, II.*² In these fundamental publications, one finds the introduction of the notions that were to be called a Gerstenhaber algebra (developed in part to understand algebraic deformation theory) and an A_∞ algebra (developed in part to understand higher homotopies). While the relation between these notions was not immediately recognized, the ideas of higher homotopies and algebraic deformation would merge decades later and they are now permanently intertwined. The ideas of Gerstenhaber and Stasheff are present in every contribution of this volume.

¹ Ann. Math. **78**, 267–288 (1963).

² Trans. Am. Math. Soc. **108**, 275–292 (1963).

Higher Structures in Geometry and Physics

In Honor of Murray Gerstenhaber and Jim Stasheff

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