

Preface

This collection of research papers provides an overview over some of the progress that has been made in major areas in Differential Geometry in the past few years. It is centred around the scientific activities within the Priority Programme “Global Differential Geometry” supported by the German Research Foundation – Deutsche Forschungsgemeinschaft (DFG) – from 2003 until 2009. This Priority Programme, and hence the present volume, covers the following areas as well as their mutual connections:

- Global Riemannian Geometry
- Geometric Analysis
- Symplectic Geometry

In particular this volume offers the following topics:

The contributions to Global Riemannian Geometry include existence and obstruction results for metrics with particular properties, such as metrics under particular curvature and/or holonomy constraints, or metrics of low-dimensional geometries. Interesting aspects of geometric limits are also included. Some papers discuss asymptotic geometries, Euclidean buildings or singular spaces.

One of the topics in Geometric Analysis is the spectral geometry of elliptic operators on Riemannian manifolds, including their applications in differential topology. Another one is the geometry and analysis of Lorentzian manifolds, as well as classical and quantum fields on Lorentzian manifolds. Progress on mean curvature flow and scalar curvature constraints are also discussed.

Finally, the Symplectic Geometry section considers new aspects of Floer Homology and Contact Structures on odd-dimensional manifolds.

We hope this panoramic collection of papers will be helpful and inspiring.

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