Preface

This text is based upon a recent course at Bar Ilan University, as well as upon numerous collaborative efforts (see the Acknowledgments Chapter following this Preface). After dealing with classical geometric preliminaries, including the theorema egregium of Gauss, we present new geometric inequalities of systolic type on Riemann surfaces, as well as their higher dimensional generalisations. Thus, the text can be viewed as an expanded version of a part of the survey by C. Croke and the present author [CrK03], which itself dealt with a small part of the material in M. Gromov’s seminal text Filling Riemannian manifolds [Gro83]. Most of the results presented here have been obtained over the past four years, a reflection of the rapid progress in the field since the publication of the monograph [Gro99] seven years ago. M. Berger’s recent monograph [Berg03] provides a fascinating historical perspective unburdened by proofs, cf. Section 2.1.