Riemann and Klein Surfaces, Automorphisms, Symmetries and Moduli Spaces
To our master and colleague Prof. Bujalance
and specially to our great friend Emilio who united us all in mathematics
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Preface

Group actions on Riemann surfaces, Klein surfaces, and related structures such as hyperbolic manifolds, complex surfaces, and Teichmüller spaces constitute an important nexus for group theory, combinatorics, geometry, topology, Galois theory and complex analysis. Compact Riemann surfaces are complex projective curves and have been studied for well over one hundred years. These surfaces have spawned a rich, interconnected theory in algebraic geometry, complex analysis, hyperbolic geometry, topology, and combinatorial/geometric group theory using tools such as uniformizing Fuchsian groups, Jacobian varieties, and moduli spaces. The use of combinatorial/geometric group theory for studying Riemann surfaces goes all the way back to Klein, Hurwitz and others; has continued through topological methods such as mapping class groups, Teichmüller and moduli spaces; and is a key part of the more recent developments in cryptographic applications, the Grothendieck theory of dessins d’enfants, and the use of powerful computer algebra systems such as Magma and GAP.

This volume is based on the conference, Riemann and Klein Surfaces, Symmetries, and Moduli Spaces, that took place at Linköping University 24–28 June 2013, in honor of Professor Emilio Bujalance. The conference and this volume are devoted to the mathematics that Professor Bujalance and his many colleagues have worked on, with special focus on Riemann and Klein surfaces, i.e., complex curves, automorphisms of surfaces (real and complex), group actions on surfaces, Grothendieck theory of dessins d’enfants, topological properties of moduli spaces of complex curves, and Abelian varieties. The conference had a computational/combinatorial flavour; the presence of a group action—geometric, combinatorial, or topological—was felt in almost every paper presented.

There is considerable current activity in these fields. As noted, these topics range from classical problems of classifying Riemann and Klein surfaces and their automorphism groups to the discovery of the topological structure of moduli spaces and the Grothendieck theory of dessins d’enfants. This volume should be a very useful source for anyone working in the area since the conference covered such a wide spectrum of topics. To guide mathematicians new to the area, several articles of an expository nature have been included. The volume will also serve as a tool in communicating the interplay among the different areas.

S. Allen Broughton, Antonio F. Costa, Milagros Izquierdo and Rubí E. Rodríguez
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This volume contains the proceedings of the conference on Riemann and Klein Surfaces, Symmetries and Moduli Spaces, in honor of Emilio Bujalance, held from June 24–28, 2013, at Linköping University.

The conference and this volume are devoted to the mathematics that Emilio Bujalance has worked with in the following areas, all with a computational flavor: Riemann and Klein surfaces, automorphisms of real and complex surfaces, group actions on surfaces and topological properties of moduli spaces of complex curves and Abelian varieties.