At the time we write this book there are several excellent references available which discuss various aspects of modular invariant theory from various points of view: Benson [6]; Derksen and Kemper [26]; Neusel [85]; Neusel and Smith [86]; and Smith [103]. In this book, we concentrate our attention on the modular invariant theory of finite groups. We have included various techniques for determining the structure of and generators for modular rings of invariants, while attempting to avoid too much overlap with the existing literature. An important goal has been to illustrate many topics with detailed examples. We have contrasted the differences between the modular and non-modular cases, and provided instances of our guiding philosophies and analogies. We have included a quick survey of the elements of algebraic geometry and commutative algebra as they apply to invariant theory. Readers who are familiar with these topics may safely skip this chapter.

We wish to thank our principal collaborators over the years with whom we have had so much pleasure exploring this fascinating subject: Ian Hughes, Gregor Kemper, R. James Shank, John Harris as well as our students and friends, Jianjun Chuai, Greg Smith, Mike Roth, Brandon Fodden, Emilie Dufresne, Asia Matthews and Chester Weatherby. In particular we thank John Harris, R. James Shank, Jianjun Chuai, Mike Roth, Emilie Dufresne, Asia Matthews, Chester Weatherby and Tristram Bogart for reading draft chapters and pointing out errors and suggesting improvements. We also thank Marie-José Bertin for clarifying the history of her own work to us.

Finally, our thanks go to the anonymous referees for many helpful and constructive remarks.

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August 2010

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Modular Invariant Theory
Campbell, H.E.A.E.; Wehlau, D.
2011, XIV, 234 p., Hardcover
ISBN: 978-3-642-17403-2