Preface to the Second Edition

It has been eight years since the first edition of *Combinatorics of Permutations* was published. All parts of the subject went through significant progress during those years. Therefore, we had to make some painful choices as to what to include in the new edition of the book.

First, there is a new chapter in this edition, Chapter 9, which is devoted to sorting algorithms whose original motivation comes from molecular biology. This very young part of combinatorics is known for its easily stated and extremely difficult problems, which sometimes can be solved using deep techniques from remote-looking parts of mathematics. We decided to discuss three sorting algorithms in detail.

Second, half of the existing chapters, namely Chapters 1, 3, 4, and 6, have been significantly changed or extended. Chapter 1 has a new section on alternating permutations, while Chapter 3 has new material on multivariate applications of the exponential formula. In Chapter 4, which discusses pattern avoidance, several important results have been improved. Some of these are discussed in the text, some are discussed in the exercises. Chapter 6, discussing some probabilistic aspects of permutations, now covers the concept of asymptotically normal distributions.

Third, all chapters have extended Exercises sections and extended Problems Plus sections. The latter often contain results from the last eight years. Exercises marked with a (+) sign are thought to be more difficult than average, while exercises marked with a (–) sign are thought to be easier.

The book does not assume previous knowledge of combinatorics above the level of an introductory undergraduate course. We believe that the second edition contains more than enough material for a one-semester course, so the instructor has some liberty to decide which 70–85 percent of the text to cover. We hope that both the instructor and the student will finish the course with the thought that combinatorics of permutations is not only very useful, but also thoroughly enjoyable.