

PREFACE

In a world where atom-, step-, redox-, and pot-economy have become some of the most important challenges in synthetic organic chemistry, the development of innovative and synthetically useful tools has more than not transfigured the way chemists devise their syntheses of complex biologically active molecules. Thus, the idea behind this book was to emphasize the impact of modern synthetic tools on the synthesis of complex biologically active compounds, and show how they have provided new and elegant solutions to many synthetic puzzles. In this context, we decided to dedicate the first part of this book to modern catalysis with a special emphasis given to various key transformations such as C–H functionalizations (Chapter 1, *S. Rousseaux, B. Liégault, and K. Fagnou*), cross-couplings (Chapter 2, *E. Colacino, J. Martinez, and F. Lamaty* and Chapter 3, *R. Marcia de Figueiredo, J.-M. Campagne, and D. Prim*), gold-catalyzed reactions (Chapter 4, *F. Gagosz*), metathesis-based syntheses (Chapter 5, *J.-A. Richard, S. Y. Ng, and D. Y.-K. Chen*), and asymmetric organocatalysis (Chapter 6, *M. Shoji and Y. Hayashi* and Chapter 7, *S. Shirakawa, S. A. Moteki, and K. Maruoka*). The second part of the book provides a broad coverage of some of the most elegant and eco-compatible transformations developed so far, such as rearrangements (Chapter 8, *J. Marco-Contelles and E. Soriano*) and domino reactions (Chapter 9, *L. F. Tietze, S. G. Stewart, and A. Düfert*). The third part of the book is dedicated to the development of specific tools for the synthesis of carbohydrates (Chapter 12, *X. Guinchard, S. Picard, and D. Crich*) and alkaloids (Chapter 13, *S. Bur and A. Padwa*), while the fourth part unveils some of the most recent techniques, such as the use of fluororous tags (Chapter 10, *W. Zhang*), flow chemistry (Chapter 11, *R. M. Myers, K. A. Roper, I. R. Baxendale, and S. V. Ley*) and engineered biosynthesis (Chapter 14, *C. J. B. Harvey and C. Khosla*). Finally, the last two chapters of this book are dedicated to two prospective methods, namely, target- and diversity-oriented organic synthesis (Chapter 15, *R. Rodriguez*) and the use of DNA-based asymmetric catalysis (Chapter 16, *M. Smietana, J.-J. Vasseur, J. Cossy, and S. Arseniyadis*) that are particularly promising tools for the synthesis of complex bioactive molecules.

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Finally, we hope you will enjoy reading this book as much as we have enjoyed preparing it. We believe it will be a valuable source of information for both academic and industrial researchers, as well as to undergraduate and graduate students all over the world.

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