

Preface

Recent developments in genomics and molecular biology finally carry the promise of understanding the functions of complex biological systems on a whole genome level. These developments have led to enormous amounts of data generated in highthroughput technologies, most prominently in gene expression microarrays. Within the Bioconductor project, an increasing number of researchers are trying to establish solutions for the analysis of such data, combining knowledge from such diverse disciplines as statistics, computer science, bioinformatics, and molecular biology.

With microarrays becoming a standard technology in many molecular biology labs, there is increased demand for comprehensive yet easy to follow instructions to the complex data analysis process. After many years of teaching introductory Bioconductor courses we can identify the main topics of interest, the common misunderstandings and pitfalls, and have learned to better understand key problems with which beginners to the analysis tasks are often challenged. In this book, we try to guide the readers through each step of the data analysis process, beginning from import and data processing to the generation of lists of differentially expressed genes and finally the modeling and interpretation of these lists in downstream analyses. Every chapter focuses on real data use cases that illustrate the problem, and we present both executable code and detailed background information for each step. A companion Webpage to this book can be found at <http://www.bioconductor.org/pub/docs/BioconductorCaseStudies>

Acknowledgments

We would like to thank Stefano Iacus for organizing the annual Bioconductor courses in Bressanone, Italy, which are the basis for this book and May Alipao, who has helped to organize the Bioconductor courses at the Hutchinson Center. We also thank the many students who attended these and other courses and whose countless questions, helpful remarks, and enthusiasm provided a valuable source of inspiration during the genesis of this book, immensely shaping the outcome you hold in your hands right now. We thank all the co-authors of the individual chapters. Their

expert knowledge was highly appreciated and helped to clarify the key concepts and to point out critical steps. We would also like to thank the following individuals who contributed in one or another way to this book: James W. MacDonald, Marc Carlson, Nolwenn LeMeur, Brig Mecham, Joern Toedling, Steffen Durinck, Anna Freni Sterrantino, Deepayan Sarkar, Rafael Irizarry, Jean (Zhijin) Wu, and Li Long.

RG expresses his thanks and appreciation to Tanja and Sophie, for their encouragement and understanding during the long hours spent working on this and other projects.

Florian Hahne
Wolfgang Huber
Robert Gentleman
Seth Falcon

Bioconductor Case Studies

Hahne, F.; Huber, W.; Gentleman, R.; Falcon, S.

2008, XII, 284 p., Softcover

ISBN: 978-0-387-77239-4