DNA

Microarray Technology and Data Analysis in Cancer Research

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Preface

DNA microarray technology has become a useful technique in gene expression analysis for the development of new diagnostic tools, and for the identification of disease genes and therapeutic targets for human cancers. Appropriate control for DNA microarray experiment and reliable analysis of the array data are the key to performing the assay and utilizing the data correctly. The most difficult challenge has been the lack of a powerful method to analyze the data for all genes (more than 30000) simultaneously and to use the microarray data in a decision-making process.

In this book, we attempt to describe DNA microarray technology and data analysis by pointing out current advantages and disadvantages of the technique and available analytical methods. An important part of the book is that we will include some new ideas and analytical methods based on our own experience in DNA microarray study and analysis. We believe that our new way of interpreting and analyzing the microarray data will bring us closer to success in decision making using the information obtained through DNA microarray technology.

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Dr. Dongguang Li is currently an Associate Professor in the School of Computer and Information Science at Edith Cowan University, Australia, and is a member of the Institute of Electrical and Electronics Engineers (IEEE) and the Optical Society of America (OSA). He obtained an M.Eng. degree in optical engineering from the University of Shanghai for Science and Technology, China, in 1984; and a Ph.D. in physics from the University of New South Wales, Australia, in 1994.

He has had a productive research career spanning more than two decades. During this time, he has made important and significant contributions to a variety of scientific fields, in particular the broad fields of optical engineering, global optimization, and information technology.

His research interests have been in global optimization algorithms and their applications in intelligent ballistics image processing and optical thin film design. He invented a unique and innovative true global optimization algorithm for optical thin film design. He is the author of the optical thin film design software, OpteFilm, and its upgraded version, OnlyFilm. He has also established a database system based on ballistics image processing for firearm identification, for which he was awarded the 2006 Australian B-HERT (Business–Higher Education Round Table) Award for best research and development collaboration. Recently, he has expanded his research interests to the field of microarray data mining.

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