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# QUANTITATIVE MEDICAL DATA ANALYSIS USING MATHEMATICAL TOOLS AND STATISTICAL TECHNIQUES



edited by **Don Hong** (*Middle Tennessee State University & Vanderbilt University, USA*) & **Yu Shyr** (*Vanderbilt University School of Medicine, USA*)

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Quantitative biomedical data analysis is a fast-growing interdisciplinary area of applied and computational mathematics, statistics, computer science, and biomedical science, leading to new fields such as bioinformatics, biomathematics, and biostatistics. In addition to traditional statistical techniques and mathematical models using differential equations, new developments with a very broad spectrum of applications, such as wavelets, spline functions, curve and surface subdivisions, sampling, and learning theory, have found their mathematical home in biomedical data analysis.

This book gives a new and integrated introduction to quantitative medical data analysis from the viewpoint of biomathematicians, biostatisticians, and bioinformaticians. It offers a definitive resource to bridge the disciplines of mathematics, statistics, and biomedical sciences. Topics include mathematical models for cancer invasion and clinical sciences, data mining techniques and subset selection in data analysis, survival data analysis and survival models for cancer patients, statistical analysis and neural network techniques for genomic and proteomic data analysis, wavelet and spline applications for mass spectrometry data preprocessing and statistical computing.

**Contents:**

- Statistical Methodology and Stochastic Modeling
- Proteomics and Genomics
- Survival Modeling and Analysis
- Mathematical Models for Diseases
- Computing and Visualization

**Readership:** Mathematicians, statisticians, and computer scientists working in biomedical data mining and analysis, disease modeling, and related applications; graduate students in biomathematics and biostatistics and related fields; biological and medical researchers.

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