

Preface

The use of biomolecular systems for processing information, performing logic operations, computational operations, and even automata performance is a rapidly developing research area. The entire field was named with the general buzzwords, "biomolecular computing" or "biocomputing." Exciting advances in the area include the use of various biomolecular systems including proteins/enzymes, DNA, RNA, DNAzymes, antigens/antibodies, and even whole biological (usually microbial) cells operating as "hardware" for unconventional computing. The most important feature of the biocomputing systems is their operation in biochemical and even biological environment. Many different applications of these systems, in addition to unconventional computation, are feasible; while their biosensor/biomedical use is obviously one of the most important applications. Interfacing of biological systems with "smart" biosensors, signal responsive materials, and bioelectronic devices is of highest importance for future developments in the area of biomolecular computing. The various topics covered highlight key aspects and the future perspectives of biomolecular computing. The book discusses experimental work done by biochemists and biologists and theoretical approaches developed by physicists and computer scientists. The different topics addressed in this book will be of high interest to the interdisciplinary community active in the area of unconventional biocomputing. It is hoped that the collection of the different chapters will be important and beneficial for researchers and students working in various areas related to biochemical computing, including biochemistry, materials science, computer science, and so on. Furthermore, the book is aimed to attract young scientists and introduce them to the field while providing newcomers with an enormous collection of literature references. I, indeed, hope that the book will spark the imagination of scientists to further develop the topic.

Finally, the Editor (E. Katz) and Publisher (Wiley-VCH) express their thanks to all authors of the chapters, whose dedication and hard work made this book possible, hoping that the book will be interesting and beneficial for researchers and students working in various areas related to unconventional biocomputing. It should be noted that the field of biocomputing extends to the fascinating area of chemical molecular and supra-molecular synthetic systems which consideration was outside the scope of the present book. This complementary area of molecular computing (based on synthetic rather than natural biological molecules) is covered in another

new book of Wiley-VCH: **Molecular and Supramolecular Information Processing: from Molecular Switches to Logic Systems** – E. Katz, Editor. Both the books are must for the shelves of specialists interested in various aspects of molecular and biomolecular information processing.

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