Appendix A3

Preface to the proceedings of the **"First Workshop on biological physics 2000"**
held at Chulalongkorn University, Bangkok, 18-22 September 2000.

A workshop on biological physics was helf in Bankok, Thailand, on 18-22 September 2000. Biological Physics, once a small part of physics in which a few devoted and possibly far-sighted physicists tried to build a new direction, has become a rapidly growing field. The workshop in Bangkok was planned to survey the field.

Biological Physics covers an enormous number of interesting subfields. A living cell, for instance, is a chemically open system in which many essential biological functions are non-equilibrium nonlinear collective phenomena, driven by chemical reactants such as ATP, GTP, different ligands and receptors. The living cell and many of its subsystems such as proteins, membranes, cytoskeleton with microtubules, and the nucleus with the DNA double helix and the centrosome, are hence lyotropic systems depending on various reactant concentrations.

One central problem is what molecules can do collectively in living matter that they cannot do in inanimate matter. In other words, what is the phenomenon of life expressed in terms of the collective behavior of the constituent molecules. Without correlations between biomolecules, for instance receptors engaged by their ligands, there would be no life. Both nonlocal and local correlations are prerequisites for instance for signal transduction and DNA replication. A description of biological phenomena, experimentally studied at a molecular level, thus requires an extensive physical modeling with the full arsenal of tools and knowledge of many-body physics derived from studies of inanimate matter. However, biological systems are far more complex than the systems encountered in ordinary condensed matter physics. A central problem of biological physics thus is to start from what is known and then to study experimentally, theoretically, and computationally the new phenomena encountered in biosystems in order to create novel nonequilibrium models. This approach may lead to an understanding of the nature of biological functions. Thus one of the aims of the conference was to bridge the gap between experiment and theory and to bring together researchers from different fields.

The order of contents of this book follows that in which the talks were given at the meeting. One of the contributions, the one by Wokyung Sung, was published previously and is therefore included here in the form of an extended abstract. The meeting was economically supported by National Research Council of Thailand (NRCT), Thailand Research Fund (TRF), Asia Pacific Center for Theoretical Physics (APCTP), Third World Academy of Sciences (TWAS), and Chulalongkorn University, which are here gratefully acknowledged. We also thank Forum for Theoretical Science (FTS), Chulalongkorn University, for all the arrangements before and during the conference. Many cordial thanks are also directed to Associate Professor Chaiyute Thunpithayakul, Associate Professor Wichit Sritrakool, Mr. Chanin Churrahmun, Mr. Piyapol Anubuddhangkura, and students of the FTS whose help made the Workshop a fruitful event.

On behalf of all visiting participators, two of us, Hans Frauenfelder and Leif Matsson, particularly want to thank the hosts, Virulh Sa-yakanit and all others in the FTS, for all the care extended to us. It created a warm atmosphere, which contributed to the quality of the meeting, and which we carried home with us as an unforgettable memory.

Finally we sincerely thank Mr Piyapol Anubuddhangkora for his valuable assistance in preparing and editing the manuscripts for the proceedings.

Virulh Sa-yakanit Leif Matsson Hans Frauenfelder