

Editorial

DOI: 10.1007/s11424-010-0003-8

15 October 2010

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Systems Biology has been greatly boomed recently and attracted many leading scientists in Biology, Physics, Mathematics, Computer Science, Optimization, and Statistics. This special issue aims at presenting the state-of-the-art research in this field and further the cross-disciplinary studies to help people to understand the complex biological systems. This special issue is an out-growth of the 3rd International Symposium on Optimization and Systems Biology (OSB2009), which was organized by Chinese Academy of Sciences (CAS), Shanghai University and University of Tokyo, and held in Zhangjiajie, China, from September 20 to 22, 2009. The OSB series symposiums provide a forum for the scientists, researchers, educators, and practitioners interested in systems biology study to exchange ideas and approaches. Fourteen papers in this special issue are selected from fifty nine papers in the OSB2009 proceedings. These papers cover a wide range of optimization and systems biology. Specifically, three papers use dynamic model to study complex behaviors such as synchronization in circadian rhythm, coupled feedback on noise filtering in signal transduction networks, and the stochastic effects in molecular network. Three papers utilize machine learning methodology to predict protein function, protein-protein interactions, and biological pathways. Two papers use optimization model and self-organizing map to detect community structures in complex networks. Two papers develop computational method to identify sequence repeats in disease genes and analyze the gene networks. One paper reviews the recent results on edge coloring problem in graph theory. The other three papers address some important optimization applications and matrix computation problems. Together, these articles show that Systems Biology is an important and promising research area, and we encourage more and more researchers, specifically young people to join in this field.

Finally, we would like to thank all the referees for their dedicated help and the authors for their kind contributions for the OSB2009 and this special issue.

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