TOUGH COMPUTATIONAL CHALLENGES IN MOLECULAR BIOLOGY

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Abstract. Molecular biology is experiencing a revolution that is transforming the way life science and medical research is done. High throughput techniques allow the interrogation of biological systems at a breadth and depth that were impossible until a few years ago. For example, complete genome sequences of organisms are generated, the expression of many thousands of genes and proteins are measured by automated and fast methods, and protein interactions can be measured on a large scale. To sift, analyze and understand these data in an integrated fashion is a major challenge. Many fascinating computational problems arise, most of which are only very partially answered. In this talk I will review what we know and what we would like to know about several such problem areas. Topics will include genome rearrangements, gene expression analysis, DNA assembly and genetic networks. The talk will assume no prior knowledge in biology.

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