

A9: Programmable Biology: DNA Computing and Biocircuits Engineering

Modern technological advances are allowing us to handle with increasing precision matter at the molecular and even atomic levels. These technological advances can realise these two new models of computation. In the twentieth century, an attempt was made to model and simulate the computational processes occurring in nature. In the twenty first century, efforts will be directed to use nature itself to perform computations: biomolecular computers to analyse and interact with living organisms and quantum computers in order to simulate quantum physical systems. These studies will also allow us to decipher the laws of information processing in nature; a unique theory of information that includes physics, computer science and biology.