

Systems and Synthetic Biology

To handle the enormity and complexity of biological data, mathematical equations, computational algorithms and bioinformatics tools are needed. Experimental genomics and bioinformatics have generated a huge parts-inventory for biologists. To connect these parts and assign each interaction a specific behaviour (qualitative and quantitative, deterministic vs. stochastic, well mixed vs. gradients), the field of systems biology field was born. Due to availability of data, computational resources and mathematical equations, modeling in biology became popular. Concepts of probability, stochasticity, ordinary differential equations, parameter estimation and parameter optimization were introduced in biology. New data capturing, data analysis and data display tools were invented. In my talk I shall describe developments in bioinformatics, systems and synthetic biology and show the application of computer science, mathematics and engineering in modern biological research.