INTRODUCTION

Cell Signaling networks (CSNs) are bio-chemical systems of interacting molecules in cells. Typically, these systems take as inputs chemical signals generated within the cell or communicated from outside. These trigger a cascade of chemical reactions that result in changes of the state of the cell and (or) generate some chemical output, such as prokaryotic chemotaxis or coordination of cellular division. The diagram below depicts the make-up of a simple signaling network:

MODELING BIOCHEMICAL NETWORKS

The purpose of modeling these networks is manifold. From a theoretical point of view it allows the exploration of network structures and dynamics, to find emergent properties or to explain the organization and evolution of networks. From a practical point of view, in silico experiments can be performed that would be very expensive or impossible to achieve in the laboratory, such as hypothesis-testing with knock-out experiments or overexpression, or checking the validity of a proposed molecular mechanism.

BRIDGES BETWEEN APPROACHES

The aforementioned approaches for representation of CSNs unify different aspects of the view to biological systems. Each approach is of particular interest to answer specific questions. Bridging tools and heterogeneous approaches allow one to combine some of those modeling techniques and thus to take advantages of their differing features. The diagram below presents a map of some of the available bridges and heterogeneous approaches: