Conceptual Modelling in Computational Immunology

Martina Husakova
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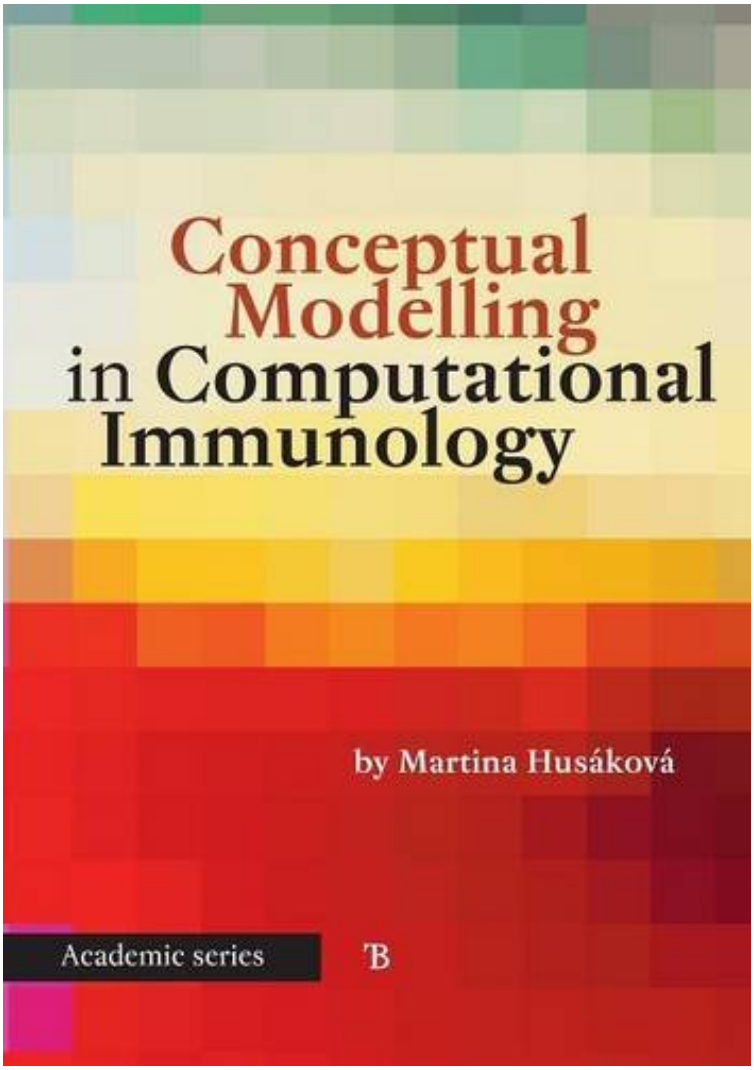

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Martina Husakova : Conceptual Modelling in Computational Immunology before purchasing it in order to gage whether or not it would be worth my time, and all praised Conceptual Modelling in Computational Immunology:

The natural immune system is an amazing complex system aiming at the homeostasis maintenance of a living organism. The non-linear, dynamic and complex nature of this system renders the behaviour far from predictable. This fact complicates exploration of immune processes and their understanding with traditional in vivo or in vitro strategies. Techniques of computer science are a promising alternative for the investigation of the natural immune system. Computational immunology investigates an inner life of the natural immune system with the assistance of

various approaches of computer science (artificial or computational intelligence), mathematics, physics or statistics. It offers in silico strategies helping with the understanding of phenomena that are difficult to explore through traditional techniques. The monograph introduces the historical context of this research area and the first computer science-based applications. It concentrates mainly on conceptual modelling of various biological processes with the usage of particular conceptual languages and approaches (concept maps, entity-relationship diagrams, ontologies, topic maps, SBML, CellML, SBGN, statecharts and UML) differing in the degree of formality and use. Conceptual models are crucial, because they highlight the most important "players" of immune processes and relations between them. Conceptualisation is inevitable especially if we study really complex system. The primary goal of the monograph is to investigate the usefulness of the Agent Modelling Language for conceptualisation of particular immune processes. The Agent Modelling Language (AML) extends the UML for conceptualisation of multi-agent systems. The natural immune system is perceived as the multi-agent system in the monograph. Selected types of AML-based diagrams represent properties and processes occurring in a secondary lymphoid organ - a lymph node where interactions between T-cells and dendritic cells are mainly taken into account.