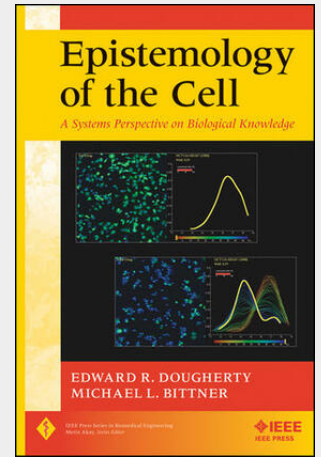


Epistemology of the Cell: A Systems Perspective on Biological Knowledge

This text examines the place of biological knowledge within the framework of science as a whole and addresses issues focused on the specific nature of biology, how biology is studied, and how biological knowledge is translated into applications, in particular, with regard to medicine. The book opens with a general discussion of the development of human understanding of scientific knowledge and method. The book gets specific focusing on knowledge of the cell, the basic unit of life. The salient point is the analogy between a systems-based analysis of factory regulation and the regulation of the cell. The book also includes information on translational science.

An examination of how the cell should be described in order to effectively process biological data "The fruitful pursuit of biological knowledge requires one to take Einstein's admonition [on science without epistemology] as a practical demand for scientific research, to recognize Waddington's characterization of the subject matter of biology, and to embrace Wiener's conception of the form of biological knowledge in response to its subject matter. It is from this vantage point that we consider the epistemology of the cell." --from the Preface In the era of high biological data throughput, biomedical engineers need a more systematic knowledge of the cell in order to perform more effective data handling. Epistemology of the Cell is the first authored book to break down this knowledge. This text examines the place of biological knowledge within the framework of science as a whole and addresses issues focused on the specific nature of biology, how biology is studied, and how biological knowledge is translated into applications, in particular with regard to medicine. The book opens with a general discussion of the historical development of human understanding of scientific knowledge, the scientific method, and the manner in which scientific knowledge is represented in mathematics. The narrative then gets specific for biology, focusing on knowledge of the cell, the basic unit of life. The salient point is the analogy between a systems-based analysis of factory regulation and the regulation of the cell. Each chapter represents a key topic of current interest, including: * Causality and randomness * Translational science * Stochastic validation: classification * Stochastic validation: networks * Model-based experimentation in biology Epistemology of the Cell is written for biomedical researchers whose interests include bioinformatics, biological modeling, biostatistics, and biological signal processing.



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