

Preface

From September 29 to October 3, 1997, the Neuronal Coding '97 workshop was held at the Versailles Research Centre of the Institut National de la Recherche Agronomique (INRA), France. It focused on how the nervous system codes and processes information. This special issue collects original contributions from scientists who attended the workshop.

In recent years the prospects and challenges of understanding the neural coding and processing mechanisms have attracted an increasing number of scientists from different disciplines. The 34 articles contained in this issue illustrate how a representative cross-section of these researchers, from biology, physics, computer science and mathematics, approaches this intriguing subject. Researchers in each of these disciplines have made significant contributions to our understanding of neural coding mechanisms. Modern analytical treatment of the subject requires, however, that each researcher is aware of developments in even sometimes remote fields of endeavor. We hope that this collection will provide a timely survey of various approaches within the area and will prove useful not only to those already working on neural coding, but also to those newly embarking on studies in the field.

The workshop was intended to bring together people sharing a common interest in modelling approaches for studying the nervous system. Participants were expected to consider neuronal coding in both single neurons and neural networks, and to try to link theory and experiments

by focusing on models useful for interpreting experimental data or for motivating experimental work. We now feel that this diversity of points of view has been achieved, both at the workshop and in the following articles, ruling out any risk of monotony! In this issue, problems in neural coding are considered in the sensory, motor and central nervous systems, and at all levels of organization (subcellular, cellular, network). Often neural coding is studied in connection with oscillations, synchronization and noise, which are basic for understanding how the nervous system works. However, behind this diversity, there is a thread that links these articles together: this is the implicit assumption shared by all authors that if a model of a system cannot be built then it is not really understood! This is a very demanding criterion that places new challenges in the description of neural phenomena.

The workshop was also an occasion to honour Professor José Pedro Segundo (University of California, Los Angeles, and Universidad de la Republica, Montevideo, Uruguay), whose 70th birthday almost coincided exactly with the workshop. In the course of his career, Professor Segundo has made significant contributions to the understanding of neural functions, and we are pleased to dedicate this special issue to him.

The financial support of several French and European institutions made this meeting possible. These include the Institut National de la Recherche Agronomique, the Réseau Cogniseine, the Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche, and the

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their contribution to the success of the workshop.

Jean-Pierre Rospars
Guest Editor