

## Preface

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This special issue collects 33 papers presented at the Neuronal Coding workshop held at Osaka University, Osaka, Japan, on 11–15 October 1999. This was the third of a series of workshops on this subject, the two previous ones having been held in Prague (1995) and Versailles (1997).

Understanding how the central nervous system codes and processes messages from the environment is one of the most challenging subjects in the neurosciences. The articles contained in this issue illustrate how scientists with different backgrounds approach this vast subject. Blending theoretical and experimental studies, bridging the function of single neurons to that of neural networks and linking membrane phenomena to animal or human behaviours, these contributions are testimony to the variety of concurrent mechanisms that subserve information processing in the peripheral and central nervous systems. Equally remarkable is the diversity of disciplines engaged in these investigations: mathematicians, physicists, computer scientists, biologists, all have original tools and ideas by which to try to elucidate the performances.

Besides the common subject of inquiry another unifying theme appears, namely the necessity of modelling and comparing models to experimental data. This common preoccupation brings a special flavour to this issue. In this aspect, at least, it is faithful to the seminal workshop on ‘Neural Coding’ organized in 1968 by Donald H. Perkel and Theodore H. Bullock, when they challenged the research community to reveal the essence of neural coding.

Since then much effort has been expended on this

enquiry although there is no indication that the end of the road is in sight. Remarkable results have been obtained in the study of sensory systems, traditionally led by investigations of the visual and auditory systems, and more recently by a renewed interest in the chemical senses triggered by the development of molecular biology. With new discoveries still being made in the primary stages of information processing it is no surprise that the higher stages in the brain present so many terrae incognitae. Since understanding the neural correlates of consciousness is now openly recognized as the ultimate challenge in the domain, there is no doubt that many more Neural Coding workshops will have to be organized in the future to keep track of all the advances being made in this demanding area.

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