

Preface

Color vision is considered to be a visual sensation that is intimately related to emotions. If the world is “colorful,” then it is positively full of wonder and surprises. When it is “bleak” or “gray,” then the prospects are sad and pessimistic. Red is warm but can mean danger. Blue is cold. Yellow is a color of warning.

Color vision is a marvelous subdiscipline in vision research, embraced by those who study it and sometimes carefully avoided by those for whom it is only of indirect interest.

In the recent years, our understanding of human color vision has been tremendously advanced by many new developments, ideas, and achievements. It has been and still is an exciting time for color vision scientists. We therefore think that it is timely that these new developments are brought together in a book, particularly if it is one in a series on Vision Research. In this book, many new developments have been assembled, covering many different levels from genetics to perception, and studied with state-of-the-art methods such as genetics, morphology, imaging techniques, electrophysiology, psychophysics, and computational neuroscience. The genetics of cone photopigments is discussed in Chap. 1. Further new exiting developments have been obtained in the study of cone mosaics (Chap. 3), in the physiology of color vision in retinal (Chaps. 2 and 4) and cortical circuitries (Chap. 7), and in color psychophysics and perception (Chaps. 5, 6 and 8). Going beyond the questions about the processes leading to visual perception within an individual, the book also considers the latest computational models (Chap. 9), clinical implications and the question how retinal disorders can compromise color vision (Chap. 10), and finally the evolution of color vision (Chap. 11). We hope that the reader will find the chapters inspiring and helpful in defining scientific topics that will be of interest in the future. We think that there will be many interesting challenges. To name but a few, the following topics may emerge: the molecular basis of color vision; the study of single cells and pathways and their visual responses in the living retina; the responses of cells in their intact circuitries; the mathematical description of color processing; the improved use of color vision in diagnosing and monitoring inherited and acquired disorders of the retina; a better understanding of the many perceptual aspects of color vision.

We were supported by world experts who contributed to the book and wrote chapters on the new developments in their field of interest. We encouraged them to seek contact and collaborate with other experts. The result often was an interesting discussion amongst the authors and with the editors. We are extremely glad and proud that all authors have put so much effort in writing their chapters. We asked the authors to keep the text as simple and understandable as they could (without compromising on the scientific content), so that it also would entice and interest nonexpert scientists and students. The result is a book of which we think highly of and we are confident that it brings the latest developments in color vision research for a broader scientific audience. We hope you, as a reader, will agree.

We would like to thank the authors for their brilliant efforts. We appreciate it enormously. The collaboration between the series editors and with Springer was also extremely positive and inspiring.

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