

Models of the Visual System

Edited by

George K. Hung

*Rutgers University
Piscataway, New Jersey*

and

Kenneth J. Ciuffreda

*State University of New York
New York, New York*

Kluwer Academic/Plenum Publishers
New York, Boston, Dordrecht, London, Moscow

CONTENTS

| | | |
|---|--|------------|
| I. OPTICAL SYSTEM MODELS | | 1 |
| 1. Physiological System Models of the Cornea | | 3 |
| Jeffrey W. Ruberti and Stephen D. Klyce | | |
| 2. Models of the Lens and Aging Effects | | 57 |
| Jane Koretz | | |
| II. NEUROSENSORY SYSTEM MODELS | | 107 |
| Retina | | |
| 3. Anatomy and Physiology of the Retina | | 109 |
| Richard A. Normann and K. Shane Guillory | | |
| 4. Intraocular Retinal Prostheses and Related Signal Processing | | 147 |
| Dean Scribner, Eyal Margalit, Kah-Guan Au Eong, James Weiland, E. de Juan, Jr., and Mark S. Humayun | | |
| 5. Push-Pull Model of Dopamine's Action in the Retina | | 191 |
| Iván Bódis-Wollner and Areti Tzelepi | | |
| Visual Cortex | | |
| 6. Laminar Organization of the Visual Cortex: A Unified View of Development, Learning, Attention, and Grouping | | 215 |
| Stephen Grossberg | | |
| 7. Beyond Classical Retinotopy: Striate Cortical Mechanisms Associated with Voluntary Saccades and Attention | | 245 |
| Iván Bódis-Wollner | | |

| | |
|---|------------|
| III. OCULOMOTOR SYSTEM MODELS | 285 |
| Accommodation | |
| 8. Models of Accommodation | 287 |
| George K. Hung, Kenneth J. Ciuffreda, Madjid Khosroyani, and Bai-chuan Jiang | |
| Vergence and Accommodation | |
| 9. Models of Vergence and Accommodation-Vergence Interactions | 341 |
| Bai-chuan Jiang, George K. Hung, and Kenneth J. Ciuffreda | |
| Eye Tracking | |
| 10. Models of the Saccadic and Smooth Pursuit Systems | 385 |
| Jordan Pola | |
| 11. Models of Saccade-Vergence Interactions | 431 |
| George K. Hung and Kenneth J. Ciuffreda | |
| IV. PERCEPTUAL SYSTEM MODELS | 463 |
| Texture | |
| 12. Psychophysics and Modeling of Texture Segregation | 465 |
| Ramanujan Kashi, Thomas V. Papathomas, and Bela Julesz | |
| Motion | |
| 13. Neural Models of Motion Perception | 487 |
| Thomas V. Papathomas, Amy S. Rosenthal, and Bela Julesz | |
| Visual Attention | |
| 14. Computational Models of Visual Attention | 521 |
| Scott B. Steinman and Barbara A. Steinman | |

Cognitive Processing

- 15. Cognitive Processing and Models of Reading** 565
 Erik D. Reichle and Keith Rayner

Perceptual Space

- 16. Models of Visual Perceptual Space** 605
 Vasudevan Lakshminarayanan

V. CLINICAL SYSTEM MODELS 623

Vergence Model Parameters and Clinical Vergence Tests

- 17. Model-Based Understanding of Clinical Vergence Testing** 625
 Kenneth J. Ciuffreda and George K. Hung

Refractive Error Development

- 18. Models of Refractive Error Development** 643
 George K. Hung and Kenneth J. Ciuffreda

Reading Disability

- 19. Models of Reading Disability and Their Implications** 679
 Harold A. Solan

Dysfunction

- 20. Nystagmus Basics: Normal Models that Simulate Dysfunction** 711
 Louis F. Dell'Osso

- 21. Multisensory Feedback Therapy for Oculomotor Dysfunction** 741
 Kenneth J. Ciuffreda, Barry Tannen, and Daniella Rutner

- Subject Index** 771