Contents

Preface	ix		
Acknowledgments			xi
Introduc	tion	xiii	

1 What Engineers Know about De	sign	1
--------------------------------	------	---

- 2 Why an Animal Needs a Brain 11
- 3 Why a Bigger Brain? 41
- 4 How Bigger Brains Are Organized 57
- 5 Information Processing: From Molecules to Molecular Circuits 105
- 6 Information Processing in Protein Circuits 125
- 7 Design of Neurons 155
- 8 How Photoreceptors Optimize the Capture of Visual Information 195
- 9 The Fly Lamina: An Efficient Interface for High-Speed Vision 235
- 10 Design of Neural Circuits: Recoding Analogue Signals to Pulsatile 265
- 11 Principles of Retinal Design 277
- 12 Beyond the Retina: Pathways to Perception and Action 323
- 13 Principles of Efficient Wiring 363
- 14 Learning as Design/Design of Learning 399
- 15 Summary and Conclusions 433

Principles of Neural Design 445 Notes 447 References 465 Index 519