

Preface

Significant progress has been made in the development of neural prostheses to restore human functions and improve the quality of human life. Biomedical engineers and neuroscientists around the world are working to improve design and performance of existing devices and to develop novel devices for artificial vision, artificial limbs, and brain–machine interfaces.

This book, *Implantable Neural Prostheses 1: Devices and Applications*, is part one of a two-book series and describes state-of-the-art advances in techniques associated with implantable neural prosthetic devices and their applications. Devices covered include sensory prosthetic devices, such as visual implants, cochlear implants, auditory midbrain implants, and spinal cord stimulators. Motor prosthetic devices, such as deep brain stimulators, Bion microstimulators, the brain control and sensing interface, and cardiac electro-stimulation devices are also included. Progress in magnetic stimulation that may offer a non-invasive approach to prosthetic devices is introduced. Regulatory approval of implantable medical devices in the United States and Europe is also discussed.

Advances in biomedical engineering, micro-fabrication technology, and neuroscience have led to many improved medical device designs and novel functions. However, many challenges remain. This book focuses on the device designs and technical challenges of medical implants from an engineering perspective. We are grateful to leading researchers from academic institutes as well as design engineers and professionals from the medical device industry who have contributed to the book. Part two of this series will cover techniques, engineering approaches, and R&D advances in developing implantable neural prosthetic devices. We hope a better understanding of design issues and challenges may encourage innovation and interdisciplinary efforts to push forward the frontiers of R&D of implantable neural prostheses.

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Devices and Applications

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