



Neuroprosthetics: Principles and Applications (Rehabilitation Science in Practice Series)

Justin C. Sanchez

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Master the tools of design thinking using **Neuroprosthetics: Principles and Applications**. Developed from successfully tested material used in an undergraduate and graduate level course taught to biomedical engineering and neuroscience students, this book focuses on the use of direct neural sensing and stimulation as a therapeutic intervention for complex disorders of the brain. It covers the theory and applications behind neuroprosthetics and explores how neuroprosthetic design thinking can enhance value for users of a direct neural interface.

The book explains the fundamentals of design thinking, introduces essential concepts from neuroscience and engineering illustrating the major components of neuroprosthetics, and presents practical applications. In addition to describing the approach of design thinking (based on facts about the user's needs, desires, habits, attitudes, and experiences with neuroprosthetics), it also examines how effectively "human centered" neuroprosthetics can address people's needs and interactions in their daily lives.

Identifying concepts and features of devices that work well with users of a direct neural interface, this book:

- Outlines the signal sensing capabilities and trade-offs for common electrode designs, and determines the most appropriate electrode for any neuroprosthetic application
- Specifies neurosurgical techniques and how electronics should be tailored to capture neural signals
- Provides an understanding of the mechanisms of neural-electrode performance and information contained in neural signals
- Provides understanding of neural decoding in neuroprosthetic applications
- Describes the strategies that can be used to promote long-term therapeutic interventions for humans through the use of neuroprosthetics

The first true primary text for undergraduate and graduate students in departments of neuroscience and bioengineering that covers the theory and applications behind this science, **Neuroprosthetics: Principles and Applications** provides the fundamental knowledge needed to understand how electrodes translate neural activity into signals that are useable by machines and enables readers to master the tools of design thinking and apply them to any neuroprosthetic application.

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