

# FOREWORD

The inspiration for this book is my father, Mort Reinhart, who also happens to be the golf partner of Dr. George Hung, this book's editor. At 76, my father is still able to pursue an active lifestyle as an avid golfer with multiple replaced, repaired and rejuvenated body parts. He has ocular implants, a knee replacement and has undergone cardiac bypass surgery; George kiddingly refers to him as "the bionic man".

To me as an orthopaedic surgeon, my father seems to be a fairly typical patient who has benefited greatly from the wonderful biomedical devices and techniques widely utilized in many areas of medicine. This textbook describes some of these devices and conveys sense of excitement about the opportunity for further advances as new technologies emerge in Biomedical Engineering.

Golfers like my father and Dr. Hung often look to innovations in equipment design, and materials to improve their performance. The same process works in medicine where physicians, patients, and researchers hope for improved personal "performance" through advances in technology. However, whereas in golf the idea is to improve the external equipment, in medicine the idea is to improve the internal attributes of the player.

New technology alone is not sufficient to drive innovation in medicine. The other factor which continues to push innovation is the increasingly high demands and expectations of patients. Many individuals with a variety of medical conditions expect that their problems can be addressed so that they can continue to pursue all of their activities at a high level and over increasingly extended periods of time. More and more the focus in helping patient is not simply in relieving symptoms, but in truly restoring near normal function.

This book presents a fabulous and fascinating array of technologies which are already well developed, or are currently under development. Advances in materials, design, electronics and biologic techniques all

have the potential to enable patients to sense the world around them and move through their daily activities with greater enjoyment and ease.

In my specialty of Orthopaedics, the traditional focus has been on repairing or replacing broken parts with various mechanical devices. However, in Orthopaedics as well as in many other medical specialties as described in this book, the focus is broadening from simple mechanical solutions to biological solutions as well. Various biomedical techniques are described that augment or assist normal structures, that monitor and correct abnormal conditions on an instantaneous basis, and that can stimulate or substitute for impaired bodily symptoms. The new frontiers in biology, including tissue engineering and gene therapy, offer opportunities to regenerate or recreate healthier systems as well.

The concept of a “bionic man” may on the surface seem to imply a mechanical or robotic condition. However, with these new techniques a bionic man is actually a combination of enhanced natural functions as well as substitute or artificial parts. This new bionic man is actually more human in that he has greater ability to enjoy life not only in his required day to day activities but also in the desired activities which bring him pleasure.

This book presents students with basic scientific principles and hopefully also provides the inspiration to pursue new and creative ideas, and visionary thinking about how to continue to improve this bionic man.

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