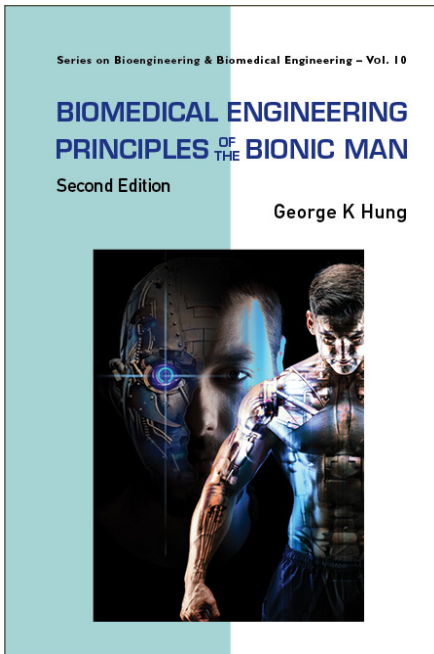


# Biomedical Engineering Principles of the Bionic Man

## 2nd Edition



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### ABOUT THE BOOK

This comprehensive compendium provides an up-to-date scientific source of biomedical engineering principles of “replacement parts and assist devices” for the bionic man. It covers biomechanics, biochemistry, rehabilitation, tissue engineering, and sports science, as well as applications in cardiovascular, visual, auditory, and neurological systems.

The useful reference text benefits students, scientists, and laymen keen in understanding the fundamental underlying principles of biomedical devices and procedures, along with recent advances in transplant methodology, gene therapy, stem cell research, and sports science.

This unique volume provides numerous test questions in selected chapters with answers in the Appendix. Numerous color figures provide additional emphasis and vivacity to the written content.

### READERSHIP

Researchers, professionals, academics, and graduate students in biomedical engineering, orthopaedics/ biomechanics and stem cells research.

### CONTENTS

- **Brain and Rehabilitation:**
  - Technologies for Restoring Limb Function (*William Craelius*)
- **Eye:**
  - Vision Correction Surgery: Refractive Surgery and Intraocular Lens Implants (*Daniel J Hu and Peter A Rapoza*)
  - Applications of Advanced Technologies to Retinal Prosthesis (*Dean Scribner and Lee Johnson*)
  - Models of Myopia Development (*Andrew J Fiedler, Jimo Liu, George K Hung, and Kenneth J Ciuffreda*)

- **Ear:**
  - Advances in the Design of Hearing Aids (*Ian Bruce*)
  - Restoration of Hearing by Electrical Stimulation of the Human Cochlea, Brainstem, and Midbrain (*Robert V Shannon*)
- **Heart:**
  - The Bionic Pacemaker (*Gary M Drzewiecki*)
  - Bionic Age Hemodynamic Monitoring: Invasive, Non-invasive, Wearable, and Wireless Applications (*John K-J Li*)
- **Tissue Engineering and Gene Therapy:**
  - Tissue Engineering of the Heart (*Michael O Zembala, Ricardo A Bello, and Robert E Michler*)
  - Gene Therapy for the Heart (*Christian Spies and Gary L Schaefer*)
  - Stem Cell Transplantation Therapy for Heart Disease (*Wangde Dai and Robert A Kloner*)
- **Joints:**
  - Total Knee Replacement (*W Thomas Gutowski*)
- **Bionic Athletes:**
  - Medical Advances in Treating the Masters Athletes (*Anthony Luke and Marc R Safran*)
  - Baseball Pitching Kinematics and Postural Metrics: Introduction and Methodology (*Courtney Semkewyc and William Craelius*)
  - Baseball Pitching Kinematics and Postural Metrics: Velocity (*Courtney Semkewyc and William Craelius*)
  - Baseball Pitching Kinematics and Postural Metrics: Torque (*Courtney Semkewyc and William Craelius*)
  - Baseball Pitching Kinematics and Postural Metrics: Optimal Attributes of High Velocity and Low Torque in Pitching (*Courtney Semkewyc and William Craelius*)

## ABOUT THE AUTHOR

**Prof. George K Hung** received a BS in Mechanical Engineering, MS in Bioengineering, and PhD in Physiological Optics, all from UC Berkeley. He is currently a professor of Biomedical Engineering at Rutgers University. He has published extensively in the areas eye movement control, nearsightedness development, and sports science. His books include: *Models of Oculomotor Control*, World Scientific (2001); *Models of the Visual System* (2002) and *Biomedical Engineering Principles in Sports* (2004), Kluwer Academic/Plenum Publishers; *Biomedical Engineering Principles of the Bionic Man*, World Scientific (2010), and *Biomechanical Principles and Applications in Sports*, Springer (2019).

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