

| | |
|-------------------------|--|
| 1. Record Nr. | UNINA9910792054603321 |
| Autore | Wong Kelvin K. L. |
| Titolo | Methods in research and development of biomedical devices / / Kelvin K. L. Wong, School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University, Australia, Jiyuan Tu, School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University, Australia, Zhonghua Sun, Department of Imaging and Applied Physics, Curtin University, Australia, Don W. Dissanayake, School of Electrical and Electronic Engineering, University of Adelaide, Australia |
| Pubbl/distr/stampa | Singapore ; ; Hackensack, NJ, : World Scientific, c2013 New Jersey : , : World Scientific, , [2013] 2013 |
| ISBN | 1-299-28136-2 981-4436-10-0 |
| Descrizione fisica | 1 online resource (xvi, 177 pages) : illustrations |
| Collana | Gale eBooks |
| Disciplina | 610.28 |
| Soggetti | Medical instruments and apparatus Biomedical engineering |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Description based upon print version of record. |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Contents; Foreword; Preface; Acknowledgments; 1 Introduction; 1.1 Overview of Research and Development Processes; 1.2 Questions; 2 Overview of Biomedical Technologies; 2.1 Classification of Biomedical Devices; 2.2 Description of Biomedical Devices; 2.2.1 Aneurysmal Stents; 2.2.2 Endovascular Stents; 2.2.3 Biomedical MEMS Micropump; 2.2.4 Drug Delivery Devices; 2.3 Summary; 2.4 Questions; 3 Conceptualisation and Medical Image-Based Modelling; 3.1 CAD Modelling and Design Realisation; 3.1.1 Prosthetic Heart Valve; 3.1.2 Endovascular Stent Grafts; 3.1.3 Biomedical MEMS Micropump; 3.2 Medical Imaging and Reconstruction3.2.1 Computed Tomography; 3.2.2 Virtual Intravascular Endoscopy; 3.2.3 CT Reconstruction of the Nasal Cavity, Pharynx and Larynx; 3.2.4 Magnetic Resonance Imaging; 3.3 Mechanical Prototyping; 3.3.1 Rapid Prototyping by Stereolithography; 3.3.2 Technical Limitations; 3.4 Summary; 3.5 |

Questions; 4 Medical Imaging and Visualisation; 4.1 Computed Tomography; 4.2 Virtual Intravascular Endoscopy; 4.2.1 Generation and Presentation of VIE; 4.2.2 Generation of VIE Images; 4.2.3 Threshold Range Along the Abdominal Aorta; 4.2.4 Optimal Threshold Selection 4.2.5 Generation of VIE Images with Aortic Stent and Artery Lumen Together 4.2.6 Aortic Stent Wire Thickness on VIE Images; 4.2.7 Image Display and Interpretation; 4.3 Optimal CT Scanning Protocols for VIE Visualisation; 4.4 Summary; 4.5 Questions; 5 Treatment of Aneurysms; 5.1 Introduction; 5.2 Open Surgery; 5.3 Minimally Invasive Techniques; 5.4 Medical Image Visualisation; 5.5 Technical Limitations; 5.6 Medical Imaging and Geometrical Reconstruction; 5.7 Conformance with Preliminary Concept; 5.8 Summary; 5.9 Questions; 6 Endovascular Stent Grafts; 6.1 Review of Device 6.1.1 What Is a Stent Graft? 6.1.2 Why Endovascular Repair?; 6.2 Technical Developments; 6.2.1 Suprarenal Stent Grafts; 6.2.2 Fenestrated Stent Grafts; 6.3 Technical Success; 6.4 Long-term Outcomes; 6.5 Computational Modelling; 6.5.1 CFD of Suprarenal Stent Grafts; 6.5.1.1 Configuration of Stent Wires Crossing the Renal Artery Ostium; 6.5.1.2 Segmentation of CT Volume Data; 6.5.1.3 Generation of Aorta Mesh Models; 6.5.1.4 Simulation of Suprarenal Stent Wires Crossing the Renal Artery Ostium; 6.5.1.5 Computational Two-Way Fluid Solid Dynamics; 6.5.1.6 CFD Analysis 6.5.2 CFD of Fenestrated Stent Grafts 6.5.2.1 Simulation of Fenestrated Renal Stents; 6.5.2.2 Numerical Verification; 6.5.2.3 Computational Two-Way Fluid Solid Dynamics and Analysis; 6.6 Summary; 6.7 Questions; 7 Nasal Drug Delivery; 7.1 Review of Device; 7.2 Computational Modelling; 7.2.1 Geometrical Meshing; 7.2.2 Physiological Boundary Conditions; 7.2.3 Simulating Flow in the Nasal Cavity; 7.3 Assessment of Modelling and Optimisation; 7.3.1 Insertion Angle; 7.3.2 Full Spray Cone Angle; 7.3.3 Implications for Nasal Drug Delivery; 7.4 Summary; 7.5 Questions; 8 Biomedical MEMS Micropump 8.1 Review of Device

Sommario/riassunto

This book presents a road map for applying the stages in conceptualization, evaluation, and testing of biomedical devices in a systematic order of approach, leading to solutions for medical problems within a well-deserved safety limit. The issues discussed will pave the way for understanding the preliminary concepts used in modern biomedical device engineering, which include medical imaging, computational fluid dynamics, finite element analysis, particle image velocimetry, and rapid prototyping. This book would undoubtedly be of use to biomedical engineers, medical doctors, radiologists, and any other professionals related to the research and development of devices for health care.