## CONTENTS


Reviews v
Preface vii
Book Summary xiii

**Section I. Cardiac Perfusion**

**Chapter 1. Physiomics of Coronary Perfusion and Cardiac Pumping** **1**
Fumihiko Kajiya, Masahito Kajiya, Taro Morimoto, Tatsuo Iwasaki, Yousuke Inai, Masanori Hirota, Takahiko Kiyooka, Yuki Morizane, Takehiro Miyasaka, Satoshi Mohri and Juichiro Shimizu

**Chapter 2. Left Ventricular Inhomogeneity and the Heart's Functional Reserve** **17**
Felix Blyakhman

**Chapter 3. Quantification of Cardiac Perfusion and Function Using Nuclear Cardiac Imaging** **57**
Ru-San Tan, Liang Zhong, Terrance Chua and Dhanjoo N. Ghista

**Chapter 4. Regional Mechanics of the Beating Heart** **83**
Martyn P. Nash and Peter J. Hunter

**Chapter 5. Left Ventricular (LV) Pumping–Perfusion Analysis: Myocardial Properties, Intra-LV Velocity and Pressure, Detection of Myocardial Ischemic and Infarcted Segments, Perfusion Depiction by SPECT Imaging, Computation of Blood Flow Pressure and Velocity Patterns Within Myocardial Regions** **129**
Eddie Y. K. Ng, Dhanjoo N. Ghista, Jian Jun Shu, Reginald C. Jegathese and Meena Sankaranarayanan




CARDIAC PERFUSION AND PUMPING ENGINEERING
© World Scientific Publishing Co. Pte. Ltd.
http://www.worldscibooks.com/engineering/6460.html

**Section II. Cardiac Pumping Characteristics**

**Chapter 6. Left Ventricular (LV) Pressure Increase Mechanism During Isovolumic Contraction, and Determination of the Equivalent LV Myocardial Fibers Orientation** **165**
Dhanjoo N. Ghista, Li Liu, Liang Zhong, Si Yong Yeo, Leok Poh Chua, Ru-San Tan, and Yong Seng Tan

**Chapter 7. Left Ventricular Filling Performance Characteristics** **191**
Dhanjoo N. Ghista, Liang Zhong, Ru-San Tan and Eddie Y. K. Ng

**Chapter 8. New Clinically Relevant Left Ventricular Contractility Index (Based on Normalized Wall Stress)** **203**
Dhanjoo N. Ghista, Liang Zhong, Ru-San Tan, Eddie Y. K. Ng and Leok Poh Chua

**Chapter 9. Characterization of Cardiac Dysfunction During Systolic Ejection** **215**
Dhanjoo N. Ghista, Liang Zhong, Eddie Y. K. Ng and Ru-San Tan

**Chapter 10. Strain Analysis and Visualization of LV Deformation During a Cardiac Cycle, As an Index of Contractility** **229**
Jinah Park and Sang I. L. Park

**Section III. Assisted Perfusion and Pumping, and Myocardial Repair**

**Chapter 11. Augmented Myocardial Perfusion by Coronary Bypass Surgical Procedure: Emphasizing Flow and Shear Stress Analysis at Proximal and Distal Anastomotic Sites Providing the Basis of Better Graft Patency Rates** **255**

CARDIAC PERFUSION AND PUMPING ENGINEERING
© World Scientific Publishing Co. Pte. Ltd.
http://www.worldscibooks.com/engineering/6460.html

Dhanjoo N. Ghista, Meena Sankaranarayanan, Leok Poh Chua, Yong Seng Tan and Eddie Y. K. Ng

**Chapter 12. Numerical Simulation and PIV Measurement of Two Proximal Anastomosis Models** **313**
Leok Poh Chua, Jun-Mei Zhang and Dhanjoo N. Ghista

**Chapter 13. Mechanical Circulatory Support Systems** **351**
Mustafa Akdis and Helmut Reul

**Chapter 14. Development of an Axial Blood Pump** **383**
Weng Kong Chan and Yew Wah wong

**Chapter 15. Mathematical Modeling of Ventricular-Assist Devices** **419**
S. Vandenberghe, P. Segers and P. Verdonck

**Chapter 16. Tissue Engineering for the Infarcted Heart: Cell Transplantation Therapy** **477**
Genevieve M. Y. Tan, Lei Ye, Winston S. N. Shim, Husnain Kh. Haider, Alexis B. C. Heng, Terrance Chua, Tian Hai Koh and Eugene K. W. Sim

**Chapter 17. Tissue Engineering of Artificial Heart Tissue** **541**
Genevieve M. Y. Tan, Lay Poh Tan, N. N. Quang, Winston S. N. Shim, Alfred Chia, Subbu V. Venkatramen and Philip E. H. Wong

**Index** **579**

CARDIAC PERFUSION AND PUMPING ENGINEERING
© World Scientific Publishing Co. Pte. Ltd.
http://www.worldscibooks.com/engineering/6460.html