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Disciplina	620.1
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Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Multiscale Aspects in the Multiphasic Modelling of Human Brain Tissue -- Simulation of Steatosis Zonation in Liver Lobule - a Continuummechanical Biscale, Tri-phasic, Multi-component Approach -- Nano-mechanical Tensile Behavior of the SPTA1 Gene in the Presence of Hereditary hemolytic anemia-related Point Mutations -- The Choice of a Performance Indicator of Release in Transdermal Drug Delivery Systems -- Multiscale Multiphysic Approaches in Vascular Hemodynamics -- Heart Valve Flow Computation with the Space-Time Slip Interface Topology Change (ST-SI-TC) Method and Isogeometric Analysis (IGA) -- Estimation of Element-based Zero-stress State in Arterial FSI Computations with Isogeometric Wall Discretization --

Fluid-Structure Interaction Modeling in 3D Cerebral Arteries and Aneurysms -- Large-eddy Simulation of Turbulence in Cardiovascular Flows -- Computational Comparison between Newtonian and non-Newtonian Blood Rheologies in Stenotic Vessels -- Artificial Textile Reinforced Tubular Aortic Heart Valves - Multi-scale Modelling and Experimental Validation -- Preliminary Monolithic Fluid Structure Interaction Model for Ventricle Contraction -- The Biomechanical Rupture Risk Assessment of Abdominal Aortic Aneurysms - Method and Clinical Relevance -- A deeper Insight of a Multi-dimensional Continuous Biofilm Growth Model: Experimental Observation and Parameter Studies -- Multiscale Experimental and Computational Investigation of Nature's Design Principle of Hierarchies in Dental Enamel -- Challenges in Total Hip Arthroplasty -- Personalized Orthopaedic Trauma Surgery by Applied Clinical Mechanics -- Measurement of Intracochlear Pressure Differences in Human Temporal Bones using an off-the-shelf Pressure Sensor -- Development of a Parametric Model of the Electrically Stimulated Auditory Nerve.

Sommario/riassunto

This book provides an overview of new mathematical models, computational simulations and experimental tests in the field of biomedical technology, and covers a wide range of current research and challenges. The first part focuses on the virtual environment used to study biological systems at different scales and under multiphysics conditions. In turn, the second part is devoted to modeling and computational approaches in the field of cardiovascular medicine, e.g. simulation of turbulence in cardiovascular flow, modeling of artificial textile-reinforced heart valves, and new strategies for reducing the computational cost in the fluid-structure interaction modeling of hemodynamics. The book’s last three parts address experimental observations, numerical tests, computational simulations, and multiscale modeling approaches to dentistry, orthopedics and otology. Written by leading experts, the book reflects the remarkable advances that have been made in the field of medicine, the life sciences, engineering and computational mechanics over the past decade, and summarizes essential tools and methods (such as virtual prototyping of medical devices, advances in medical imaging, high-performance computing and new experimental test devices) to enhance medical decision-making processes and refine implant design. The contents build upon the International Conference on Biomedical Technology 2015 (ICTB 2015), the second ECCOMAS thematic conference on Biomedical Engineering, held in Hannover, Germany in October 2015.