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Nota di contenuto	Preface -- 1. Cell mechanics: The role of simulation Stem Cell-Based Tissue Engineering for Bone Repair: Influence of cell communication and 3-D cell-matrix environment, by Swathi Damaraju and Neil A. Duncan -- 2. In silico biology of bone regeneration inside calcium phosphate scaffolds, by Aurélie Carlier, Hans Van Oosterwyck and Liesbet Geris.- 3. Constitutive Effects of Hydrolytic Degradation in Electro-spun Polyester-urethane Scaffolds for Soft Tissue Regeneration, by Hugo Krynauw, Lucie Bruchmüller, Deon Bezuidenhout, Peter Zilla, Thomas Franz -- 4. 4D numerical analysis of scaffolds: a new approach, by A. C. Vieira, A. T. Marques, R. M. Guedes, V. Tita -- 5. Microrheology of Biopolymers at non-thermal regimes, by Rommel G. Bacabac, Heev Ayade, Lara Gay M. Villaruz, Raymund Sarmiento, Roland Otadoy -- 6. Optimization approaches for the design of additively manufactured scaffolds, by Sara M. Giannitelli, Alberto Rainer, Dino Accoto, Stefano De Porcellinis, Elena De-Juan-Pardo, Eugenio Guglielmelli, Marcella Trombetta -- 7. Rational Design of Artificial Cellular Niches for Tissue Engineering, by Ana Sancho-Erkizia, Javier Aldazabal, Alberto Rainer, Elena M. De-Juan-Pardo -- 8. Photocrosslinkable materials for the fabrication of tissue-engineered constructs by stereolithography, by Rúben F. Pereira, Paulo J. Bártolo.

Sommario/riassunto

This book describes the state of the art on computational modeling and fabrication in Tissue Engineering. It is inspired by the ECCOMAS thematic conference, the European Committee on Computational Methods in Applied Sciences, on Tissue Engineering, held in Lisbon, Portugal, June 2-4, 2011. Tissue Engineering is a multidisciplinary field involving scientists from different fields. The development of mathematical methods is quite relevant to understand cell biology and human tissues as well to model, design and fabricate optimized and smart scaffolds. Emphasis is put on mathematical and computational modeling for scaffold design and fabrication. This particular area of tissue engineering, whose goal is to obtain substitutes for hard tissues such as bone and cartilage, is growing in importance.