

Preface

The area of biological systems and materials is a growing research field of immense importance. The possibility to predict or even to influence the ‘lifetime’ of parts of the human body or to offer adequate replacements in the case of failure directly influences our entire well-being. In many cases, this becomes more and more important at higher age when joints or other parts must be replaced in order to guarantee an adequate mobility and function of our body. To adopt the mechanical performance of structural parts of our body or to offer alternatives if they do no more function properly in order to meet the general biological life expectancy is a great challenge which requires joint efforts of many academic disciplines. On the other hand, our environment affects biological systems in the short or long-time range and avoiding negative influence and impact on any living system is a topic of many challenging investigations. Furthermore, many materials and structures seen in living organisms, i.e. human body, animals, and plants, are optimized to an extent which is still difficult to achieve for artificial materials and structures. Thus, learning from nature is nowadays a new direction to overcome limitations of classical engineering materials.

The 5th International Conference on Advanced Computational Engineering and Experimenting, ACE-X 2011, was held in Algarve, Portugal, from 3 to 6 July, 2011 with a strong focus on bio related topics. This conference served as an excellent platform for the engineering community to meet with each other and to exchange the latest ideas. This volume contains 18 revised and extended research articles written by experienced researchers participating in the conference. The book will offer the state-of-the-art of tremendous advances in developments of materials for drug delivery, dental implants and filling materials, biocompatible membranes, bioactive surface coatings, and bio-compatible and eco-sustainable building materials. Furthermore, biosystems such as microorganisms, the human eye, the musculoskeletal system and human body parts and respective replacements are subjects of the contributions.

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