

Editorial

**FOREWORD TO THE THEMATIC ISSUE:
TRIBOLOGY AND CONTACT MECHANICS
IN BIOLOGICAL AND MEDICAL APPLICATIONS**

Tribology, contact mechanics and biomechanics belong to the group of extremely complex engineering disciplines and, not surprisingly, they have been a subject of interest for a long time now. The interest has particularly grown in the recent decades and the research in the field intensified dramatically. This may be partly attributed to the development of modern hardware tools which made computations and analyses that engineers dreamt of decades ago not only possible, but literally at their fingertips. Equally important is the recognition that the research in those fields can only be successful if it involves a multidisciplinary approach. Hence, it is of utmost importance that researchers should work together across those disciplines to tackle major challenges. This aspect was the major impetus for Valentin L. Popov (Technische Universität Berlin) and Sergey G. Psakhie (Russian Academy of Sciences) to bring the researchers together by organizing an International Workshop entitled *Tribology and Contact Mechanics in Biological and Medical Applications* at the Technische Universität Berlin.

The present thematic issue contains a selection of papers which reflects the spectrum of topics addressed at the Workshop. The subject of the Workshop is the intersection of contact mechanics, tribology and medicine/biology. This area has been experiencing rapid development in recent years. Current research objectives include the development of high-performance and low-wear materials in order to significantly increase the lifetime of medical prostheses such as artificial hips or knee joints and implants. Tribological characteristics play a very important role here, so that their influence on the functional properties of biological joints and medical devices is of great interest. For example, ultrasound oscillations are used to produce or improve the function of biomedical instruments. The wear behavior, temperature development and damping properties can be controlled by a targeted use of gradient materials. Another major area of research is the optimal adaptation and compatibility between artificial material and human tissue. A very important issue is the adhesive behavior of biological tissues. A further focus is on elastomers whose capabilities are tested for transferability to human tissue.

Due to the extreme interdisciplinary character of the field of bio-tribology, many, even fundamental, questions have not been answered yet. It is important in this area to look for complementary expertise and combine it. This is the main focus of the Workshop.

Dragan Marinković
Editor-in-Chief