KONUK EDİTÖR ÖNSÖZÜ

Biyomekaniğin önde gelen isimlerinden biri olan Prof.Dr. Nuri Akkaş, Bilim ve Teknik Dergisinde yer alan "***Canlıların Mühendisliği Biyomekanik: Biyomekaniğin Tanımı, Dünü, Bugünü ve Geleceği***" başlıklı yazısında, biyomekaniğin tanımlarından örnekler vermekte, tüm tanımlarda yer alan ortak iki kelimenin "mekanik" ve "canlı" (veya onun eşdeğeri) kelimeler olduğunu söylemektedir. Prof.Dr. Akkaş'a gore, insanoğlunun birinci amacı, yaşamın sırrını (yani canlılığın ne olduğunu ve canlıların işlevlerini nasıl yerine getirdiklerini) ortaya çıkarmaktır. Bu yönüyle, biyomekaniğin, yaşamın sırrının araştırılmasında, klasik mekanikçilerin insanoğluna armağanı olduğunu; ama bu arada günlük yaşamamızda hepimizi etkileyen pratik bulguların da elde edildiğini ifade etmektedir.

Biyomekanik, yüzyıllar öncesine uzanan bir bilim dalıdır ve çok geniş bir alanı kapsar. Aristo, Bergamalı Galen, Leonardo da Vinci, Galileo Galilei, William Harvey, Rene Descartes, Giovanni Alfonso Borelli, Robert Hooke, Stephen Hales, Leonhard Euler, Thomas Young, Jean Poiseuille, Hermann von Helmholtz, Horace Lamb ve Otto Frank, biyomekanik çalışan tarihi şahsiyetlerden sadece bir kısmıdır. Bu isimler ve burada zikredilmeyen birçok isim, biyomekanik bilim dalının yüzyıllardır canlı ve etkin olduğunu göstermektedir. Yeni bir bilim dalı olmadığı anlaşılan biyomekanik alanındaki çalışmalar, elde edilen başarılara yenileri de eklenerek, devam edecektir.

Yeni çalışmaları teşvik etmek, yapılan çalışmaların paylaşılmasını ve işbirlikleri oluşturulmasını sağlamak adına ülkemizde her iki yılda bir farklı bir üniversitenin ev sahipliğinde **Uluslarası Katılımlı Ulusal Biyomekanik Kongresi** düzenlenmektedir. Bu Kongrenin yedincisi Süleyman Demirel Üniversitesi Biyomekanik Çalışma Grubu öncülüğünde **16-18 Ekim 2014 tarihleri arasında Isparta'da** düzenlenmiş, yurtdışından ve yurtiçinden birçok araştırmacı üniversitemizde bir araya gelmiş, çoğunluğu ülkemizden olmak üzere 42 farklı üniversiteden ve farklı alanlardan 58 bildiri Kongrede sunulmuştur. Sunulan bildirilerin ait oldukları alanlar şunlardır: Ortopedik Biyomekanik, Dental Biyomekanik, Biyomalzemeler, Spor Biyomekaniği, Doğada Biyomekanik, Doku Mühendisliği, Sayısal Biyomekanik, Medikal Cihazlar ve Biomedikal Robotlar, Yürüme ve Hareket Biyomekaniği. Kongrede, sunulan birbirinden değerli bildirilerin yanında, Prof. Ozan Akkuş ve Prof. Dwight Davy (Case Western Reserve University, ABD), Prof. Samuel Kassagne (San Diego State University, ABD), Prof. David Taylor (University of Dublin, İrlanda), Prof.Dr. Feza Korkusuz (Hacettepe Üniversitesi) ve Prof.Dr. Hasan Havıtçıoğlu (Dokuz Eylül Üniversitesi) konferanslar vermişler ve çalışmalarını katılımcılarla paylaşmışlardır.

Kongreye gönderilen ve büyük çoğunluğu sunulan bildiriler arasından olmak üzere toplam 20 bildiri, her biri alanında uzman en az iki hakem tarafından değerlendirilerek, üniversitemiz Fen Bilimleri Enstitüsü Dergisi Biyomekanik Özel Sayısında araştırma makalesi olarak yayınlanmak üzere seçilmiştir. Seçilmiş bildirilerin yayınlanmasında katkı veren Ebru Yılmaz İnce'ye, Yrd.Doç.Dr. Kenan Tüfekci'ye, SDÜ Fen Bilimleri Enstitüsü Müdür Yardımcısı Doç.Dr. Cengiz Özel'e, SDÜ Fen Bilimleri Enstitüsü Müdürü Prof.Dr. Ahmet Şahiner'e ve SDÜ Fen Bilimleri Dergisi ekibine teşekkür ediyorum.

Doç.Dr. Ramazan Kayacan

Süleyman Demirel Üniversitesi
Kongre Düzenleme Kurulu Eş Başkanı

GUEST EDITOR'S PREFACE

Prof. Nuri Akkaş, one of the leading names of Turkey in Biomechanics, gives examples of definitions of Biomechanics in his article entitled "***Engineering of Living Things, Biomechanics: Definition, Past, Present and Future of Biomechanics***" in TUBITAK's "Bilim ve Teknik" Science Magazine, and points to two common words in all definitions which are "mechanics" and "alive" (or its equivalent). According to Prof. Akkaş, the first purpose of human beings is to discover the secrets of life such as what is being alive? how we are alive? How beings carry out their tasks? With this respect, Prof. Akkaş states that Biomechanics is a gift of classical mechanicians to human beings primarily to investigate the secrets of life, but it also helps us to get practical results affecting our daily lives.

Biomechanics is a science discipline dates back centuries in human history and covers wide range of sub disciplines. Aristotle, Galen of Bergamon, Leonardo da Vinci, Galileo Galilei, William Harvey, Rene Descartes, Giovanni Alfonso Borelli, Robert Hooke, Stephen Hales, Leonhard Euler, Thomas Young, Jean Poiseuille, Hermann von Helmholtz, Horace Lamb and Otto Frank are some of the important names in history of biomechanics. These names and the many names that are not mentioned here indicate that biomechanics science has been alive and effective for centuries. New studies will continue in the field of Biomechanics, which has turned out not to be new science discipline, by adding new successes to it.

To motivate us for new studies, to increase and share our knowledge on the field of biomechanics, and to form the basis of new collaborations we come together in the Internationally Participated National Biomechanics Congress organized every two years by a different university of Turkey. This, the 7th National Biomechanics Congress, was held on 16th -18th October 2014, in Isparta under the leadership of Süleyman Demirel University Biomechanics Research Group, and once again brought together engineers, scientists from various disciplines including medicine, dentistry, basic sciences and various engineering specialties. Fifty-eight papers from forty-two different universities, mostly in Turkey, and in seven different fields of biomechanics, were orally presented through two days of the Congress. These fields of biomechanics are as follows: Orthopaedic Biomechanics, Dental Biomechanics, Biomaterials, Sport Biomechanics, Biomechanics in Nature, Tissue Engineering, Numerical Biomechanics, Medical Instruments and Biomedical Robots, Gait and Motion Biomechanics. In addition to the valuable presentations in the Congress, we had guest speakers from different countries, who are well-known internationally for their research in different fields of biomechanics. These speakers were Prof. Ozan Akkuş and Prof. Dwight Davy from Case Western Reserve University of USA, Prof. Samuel Kassagne from San Diego State University of USA, Prof. David Taylor from University of Dublin of Ireland, Prof. Feza Korkusuz from Hacettepe University of Turkey and Prof. Hasan Havıtçıoğlu from Dokuz Eylül University of Turkey.

To be published in the Biomechanics special issue of SDU Journal of Natural and Applied Sciences, 20 articles were selected after the peer-review of each submitted article by two experts in the field and among which the most were presented during the Congress. I would like to thank to Ebru Yılmaz İnce, Asst. Prof. Kenan Tüfekci, Assoc. Prof. Cengiz Özel, Prof. Ahmet Şahiner and the editorial team of the Journal for their efforts in this special issue.

Assoc.Prof. Ramazan Kayacan

Süleyman Demirel University
Co-Chair, Congress Organizing Committee

PROF. OZAN AKKUS' PREFACE

As one of the organizers, it is my distinct honor to introduce a selection of papers which were sent to the Internationally Participated 7th National Biomechanics Congress that was held in Isparta's Süleyman Demirel University. This special issue of SDU Journal of Natural and Applied Sciences on Biomechanics presents 20 selected Biomechanical Studies in article format. These articles were all peer-reviewed by experts in the field and mostly judged during the conference.

Having received the foundations of my training in biomechanics in Turkey as a graduate student a while ago, the conference reunited me with friends and mentors I have worked with during the culmination of my research career. Therefore, besides being a superb opportunity for scientific exchange, it was a touching and deeply personal experience for me. More importantly, I was able to see the depth and breadth of the research on biomechanics which has steadily improved since I have left Turkey. The interdisciplinary nature of biomechanics was reflected by the make-up of the attendees which included engineers, physicians, dentists and biologists. Therefore, many of the presentations did not only entail good technical depth but also they were translational and had clinical relevancy which were interjected by clinical collaborators. The body of literature reflected a balanced combination of computational models and experimental characterization in a broad set of problems in orthopaedics, dentistry, tissue engineering, biomaterials, robotics and gynecology.

The conference was a great success in cultivating information exchange. Despite being a national conference, the program was designed to foster participations of international attendees. In that perspective, a significant level of cultural exchange took place during the social program. It was delightful to see attendees from different cultures and backgrounds to blend in the common denominator of biomechanics! I am leaving this conference with the satisfaction of seeing the enthusiasm and dedication of the next generation of young biomechanicians. I invite the readers to peruse these articles to see Turkey's ongoing strength in biomechanics for themselves.

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PROF. DAVID TAYLOR'S PREFACE

It is a pleasure and an honour for me to say a few words to introduce this publication of selected papers from the 7th National Biomechanics Congress, which was held in Süleyman Demirel University on October 16th and 17th, 2014.

A national congress such as this one fulfils a number of important objectives. In addition to being a forum for the dissemination of recent research, it provides an opportunity for students and young academics to present their work for the first time to a receptive audience. It is also an important networking event in which researchers can meet, make new contacts and renew old friendships, and discuss matters of common interest. I found that this congress achieved all of these aims very well. There was also an international flavour to the meeting, in the form of a number of talks from invited guests, describing work being done in some of the leading research centres worldwide.

Biomechanics is a relatively new subject and one which present special challenges, being an interdisciplinary subject combining elements of engineering mechanics, materials science, biology and medicine. To make progress in this field one needs to be an expert in some branch of engineering or physical science but one also needs to be able to appreciate aspects of medicine and biology and to collaborate with experts in these areas.

It was a great pleasure for me to discover that Turkish researchers are making important progress in many of the key areas of biomechanics, contributing not only at a national but also an international level. In this selection of papers from the congress, the reader will find many of the topics which characterise modern biomechanics research. Orthopaedic and dental biomechanics has been a mature field for quite a long time, but here we see how the latest methods of analysis and simulation can be used to develop improved designs for devices such as artificial hip joints and dental implants. Tissue engineering is a very exciting area which is just beginning to yield important products for clinical use, but in which further fundamental research is essential. Robotics is a field in which complex mechanics and control engineering interact with human factors. Each of these topics was well represented in the conference. We also saw researchers working on fundamental scientific problems such as how to measure the mechanical properties of human body tissues and the development of new materials with future potential to replace or augment these tissues.

I was fortunate to be able to attend this conference, which for me was my first opportunity to visit Turkey. I came home with many fond memories, not only of the scientific sessions but also of the casual conversations which I had with delegates and students. I gained a very favourable impression of Turkish people as friendly, hospitable and inquisitive, interested in science and in their place in the wider world.I am glad to report, from my personal experience, that biomechanics is a thriving field in Turkey, with a significant number of researchers working in different universities around the country, well served by a strong national congress.

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