Foreword

Twenty-years ago, Professors Y. C. (Bert) Fung and John A. Brighton organized the First ASME Biomechanics Symposium held at Georgia Institute of Technology, June 20–22, 1973. At that time, these two pioneers in biomechanics research felt that: 1) there was a lack of forums devoted principally to the mechanics aspects of bioengineering; 2) some unifying and coordinating activities were required among different divisions of ASME pursuing biomechanics, bio-heat transfer, bioenergetics, biomaterial, and biocontrol research; and 3) it was hoped that such coordination can be extended to various sister societies in engineering, biology, and medicine. The two organizers expressed the hope that "some day there will be no difficulty for us to select a meeting to attend, and to know where we can meet our friends and colleagues of common interest."

Prior to 1973, there were limited activities in biomechanics. Some of the notable events include: 1) the Symposium on Biorheology organized by Professor Alfred L. Copley and held at Brown University in August of 1964; 2) the Symposium on Biomechanics and Related Bio-engineering Topics organized by Professor Robert M. Kenedi and held at the University of Strathclyde, Scotland, in September of 1964; 3) the Applied Mechanics Division Symposium on Biomechanics organized by Professor Fung and held at the ASME Winter Annual Meeting at New York City in November of 1966; and 4) the Symposium on Synovial Joint Mechanics organized by the Tribology Group of the Institute of Mechanical Engineers and the British Orthopaedic Association, London, U.K., in April 1967; 5) the founding of the Journal of Biomechanics in 1968 edited by Verne Roberts and F. Gaynor Evans and published by Pergamon Press; and 6) the Symposium on Biomechanics: Its Foundations and Objectives, again organized by Bert Fung, and held in 1970 at the University of California at San Diego. These were significant events; each having made an impact on the subsequent development of biomechanics and bioengineering. Students of biomechanics may well find the reading of the proceedings from these symposia very worthwhile.

In the succeeding twenty years, the development of biomechanics and bioengineering gained significant momentum. While biomechanists in many countries were actively engaged in biomechanics research (it would be impossible to list all their activities here), selected activities, principally in the U.S., Europe and Japan, are listed below.

1975—the Human Factors Committee of ASME was re-organized as the Bioengineering Division (BED) of ASME.
1977—the American Society of Biomechanics, the *Journal of Biomechanical Engineering* and the BED H.R. Lissner Award were established.
1979—the equally important European Society of Biomechanics was established. ESB has been a major unifying force for biomechanics activities on the Continent.
1980—the Gordon Conference on Bioengineering and Orthopaedic Science was established.
1982—after three years of organizational work, the United States National Committee on Biomechanics was formed.
1983—the first U.S.-Japan-China Conference on Biomechanics was held in Wuhan, China; the second during 1987 in Osaka, Japan; and the third during 1991 in Atlanta, Georgia, U.S.A.
1985—As a tribute to all of Y. C. Fung's contributions toward fostering biomechanics research throughout the world, the Bioengineering Division of ASME established the Y. C. Fung Young Investigator Award.
1987—the H.R. Lissner Award was converted into an ASME honor.
1987—the Division of Bioengineering was founded within Japan Society of Mechanical Engineers. This division has been a major unifying force for bioengineering activities in Japan.
1990—the successful First World Congress on Biomechanics held at the University of California at San Diego in August; perhaps the most ambitious of all the projects in biomechanics to date. Plans for the Second World Congress on Biomechanics are well underway. This meeting will be held in Amsterdam, Holland, in July of 1994.
1992—the formation of Japan National Committee of Biomechanics.
1992—the establishment of the American Institute of Medical and Biological Engineers. AIMBE's objectives are two-fold: 1) to serve as the organization for coordinating all biomechanics and bioengineering activities; and 2) to honor select individuals who have contributed significantly to bioengineering in general, and to biomechanics in particular.

The 20th Anniversary ASME Symposium was organized for a very simple objective; i.e., to summarize the progress made in various aspects of biomechanics since the first Biomechanics Symposium held at Georgia Tech. The rules for organizing this anniversary program were equally simple: 1) invite all individuals (assuming they are still active in the field) who were at the Georgia Tech. meeting; and 2) invite individuals who are currently recognized experts in their area(s) of specialty and whose fields were not represented 20 years ago. Occasionally, some individuals changed fields, and these individuals were encouraged to write in their current areas of interest. This special volume of the Journal of Biomechanical Engineering contains many contributions from authors who have distinguished themselves in our field. They provide for us a clarity of history in their areas of study only they could have written, and they provide for us some words of advice for future directions which no doubt will be important. Some authors decided to take this opportunity to present some of their newest views.

As we reflect on what has happened since 1973, we see that each of the stated needs by Bert Fung and John Brighton has been fulfilled. First, there is now no lack of forums for biomechanics. The ASME Summer and Winter Annual Meetings have become familiar and important sites to meet and discuss problems of similar interest. There are now established channels wherein one can organize inter-divisional and inter-societal meetings.

Finally, it is the hope that coordination will continue to be fostered with various sister societies in engineering, biology, and medicine through the USNCB and AIMBE.

In 1993, the ASME Biomechanics Symposium became the ASME Bioengineering Conference. This is an important evolutionary step in that this meeting was co-sponsored by the Bioengineering Division and Bioprocessing Engineering Subdivision of ASME, as well as the Pharmaceutical and Bioengineering Division of the AIChE, the Engineering Division of ASCE, the Biomedical Engineering Society, the United States National Committee of Biomechanics, and the American Institute of Medical and Biological Engineers. Each of these co-sponsoring organizations also developed sessions which contributed greatly to the success of the 1993 Bioengineering Conference. In addition, the location of Breckenridge, Colorado for this 1993 meeting was spectacular. The atmosphere was relaxed and everyone, especially the attendees' family members, enjoyed the Rocky Mountains.

As with the 1973 Biomechanics Symposium, we hope the 1993 Bioengineering Conference will be even more successful in fostering communication and exchange of scientific information. It is our hope that these types of meetings will provide the fertile ground from which synergistic activities will sprout for developing new knowledge, new insights and creative new avenues of bioengineering research. We look forward to the 2013 meeting!

We have enjoyed working with all the contributors of this volume. It has been a most rewarding experience. We hope the readers will enjoy reading the articles contained in this special volume of the JOURNAL as much as we have.

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