



Sixty years in service to international biomedical engineering community

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The first issue of the IFMBE journal *Medical and Biological Engineering and Computing* (MBEC) was published sixty years ago, in 1963, under the title *Medical Electronics and Biological Engineering*. It was one of the first scientific journals combining research in fields of medicine and biology with research and development in engineering and technical sciences, today recognized as biomedical engineering. The policy of the founders of the *International Federation for Medical and Biological Engineering* (IFMBE) was from the very beginning of the creation of MBEC to establish a truly international journal in the then new interdisciplinary field [7, 26]. Since then, the journal has gone through many changes and grown significantly, remaining open to the publication of papers from a very wide field of science that arrive for review and publication from all over the world. Let's recall some significant moments from the past of MBEC and IFMBE and try to depict its present and future as best as possible.

The Federation was founded during the second International Conference on Medical Electronics held in Paris in 1959 by a group of inspired and far-sighted scientists from both, medical and engineering fields [12]. The first name of organization got at its formative meeting was *International Federation for Medical Electronics*, and it was an association of individuals. A few years later, in 1965, the Federation has changed its organizational structure and became an association of national biomedical engineering societies. At that time, the Federation got its current name, *International Federation for Medical and Biological Engineering*, <https://ifmbe.org/>. The Journal was renamed and from its Volume 4 carried the name *Medical and Biological Engineering*. Since

the number of received papers was steadily increasing, from 1965, the occurrence of the journal increased from quarterly to bi-monthly publication [6].

Following the intention of the founders to build a journal aimed for the wide international community, the first volumes of the journal were accepting submissions for publication of full papers in any of the four languages: English, French, German, or Russian, while abstracts were published in all four languages. The four-language format was discontinued in 1973 and English was accepted as the official language of the journal. In the early years of publications, in addition to the original papers, contributions were accepted in the format of Surveys, Technical Notes, and Letters to the Editor.

The seventies were turbulent years for the journal. Biomedical engineering grew, new specializations appeared within the field, and the number of publications grew significantly. In order to facilitate the work of the editor and editorial board, the Federation established the Federation Journal Committee and the Publication Committee in 1971. To further improve the journal and the working conditions of the editors and the board, negotiations with publishing houses followed and resulted in the 1974 transfer from Pergamon Press to Peter Peregrinus Ltd. In 1977, the name of the journal was changed to accommodate new technologies that significantly influenced biomedical engineering, and the new name *Medical and Biological Engineering and Computing* was adopted [11], which the journal still carries today. With the growing of the field of biomedical engineering and consequently the number of publications, the periodicity of publication was increased to bi-monthly in 1975.

The next major change in the way journals are published was caused by the transition of scientific publishing from the previously predominantly printed to online publishing. The MBEC publisher was changed and from 2006 Springer took over the journal publication both, in print and online form [21, 31] and digitized all previously published volumes which are now available on <https://link.springer.com/journ>

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al/11517. In the same year, MBEC became a monthly publication [30].

Apart from the author, the editors contributed the most to the permanent growth of the importance and reputation of the journal. Therefore, I think that on the occasion of this MBEC's jubilee, it is mandatory to mention their names again as a sign of gratitude for their dedicated work. The first editor was Dr. Alfred Nightingale, who laid the foundations for MBEC to be published, but unfortunately died before the first issue of the journal was published in 1963. The position of the Editor in Chief was followed by P. E. K. Donaldson (1963–1967), J. W. Pearce (1968–1969), D. W. Hill and J. A. Bushman (1970–77), D. W. Hill (1978–1985), V. C. Roberts (1986–1991), P. Rolfe (1991–1996), A. Murray (1996–2005), J. A. E. Spaan (2006–12), Nitish Thakor (2012–2022), and the current Editor in Chief, Shanbao Tong from 2022.

Professor Tong has put together a highly distinguished editorial board comprising of leading experts in the field of biomedical engineering. These experts have gained widespread recognition for their significant contributions to the field, and their expertise covers a wide range of areas within biomedical engineering. The board members come from diverse backgrounds and are drawn from various biomedical engineering societies around the world. This diversity underscores the journal's global presence and strong influence in the field of biomedical engineering.

In today's world of scientific publishing, including the field of biomedical engineering, there is a significant competition, and the number and availability of published papers is constantly growing. It is difficult in such an environment (especially for younger members of the BME community) to find papers that best suit their educational and research needs, even considering the capabilities of today's bibliographic searchers and open-source resources available online. If we want to get a better insight into the profile of papers published recently in MBEC, we can do it in three ways: by reviewing the field of interest of articles published in this special issue dedicated to the 60th anniversary of MBEC, by reviewing the Editor's Choice papers recommended by the editorial board for each published volume, and by reviewing the key terms of the most cited papers.

The latest frontiers and trends in *Medical and Biological Engineering and Computing* are well highlighted in this special issue. The aim of biomedical research is to solve clinical problems, and this issue features two articles on postural syncope [25] and smoke/alcohol/drug use [13] as well as one that explores the biomechanical effects of playing Tai-chi [17]. Artificial intelligence has emerged as a powerful tool for solving biomedical problems, such as data, image processing, and medical diagnosis. Machine learning, transfer learning, and deep learning are widely used in medical engineering and computing. MBEC receives more

than 80% of submissions related to AI, showing its increasing importance. The topics in this special issue reflect this trend, with AI techniques employed for biomedical image processing [8, 35, 36, 18] and image classification [4, 9]. MBEC is committed to exploring the frontiers of medical engineering, and this special issue includes two articles on brain stimulation, investigating high-frequency rTMS [10] and generating the taptic sensation by non-invasive proximal nerve stimulation [23].

In November 2022, the MBEC Editor-in-Chief introduced a new category for published papers, the Editor's Choice papers. The Editor's Choice presents new and innovative original research articles which caught the eye of MBEC Editor and the Editorial Board, and which they found of interest of the wide readership. These articles are freely accessible for two months after being published online. In the latest 12 months, several articles from the Editor's choice were describing research on machine learning methodology and applications in biomedical engineering [5, 15, 20, 22, 32, 37, 38]. Many authors of the chosen papers found their interest in improvement of diagnostics and therapy of heart diseases [14, 19, 20, 27, 29, 33].

Among the most cited articles from MBEC, issues of motion analysis based on signals from inertial measurement units (IMUs) were tackled to validate the proposed biomechanical model [28] and to investigate possibilities to reduce the risk of falls in elderly [2, 3]. Two papers were investigating characteristics of some aspects of the heart rate signal, in order to find new methods for prompt clinical examination of the cardiovascular system [16] and to detect drowsiness through monitoring of the heart rate variability [34]. A review paper on implantable microelectrodes and nanoelectrodes [24] was well noticed as well as the research paper on algorithms for quantifying the complexity of biomedical time series [1].

After this short analysis of the main topics of published articles in MBEC in recent years, one can observe a shift of interest in researching towards computer science methodologies applied on biological and medical data and signals, primary machine learning, and artificial intelligence. The possibility of simultaneously collecting large amounts of data from different sources provides unprecedented opportunities for the development of medicine and health care and prevention through continuous monitoring and promotion of wellness. Such trends in publications can be observed in other wide biomedical interest journals which do not compete with highly specialized journals. Our wish is that MBEC stays a journal open to authors from all over the world to share their research and ideas for innovation and improving health and wellbeing. MBEC should remain a platform for showing differences in health issues in developed on the one hand, and low- and middle-income countries on

the other. Being a general biomedical engineering journal, MBEC gives the authors also a chance to publish research which would hardly find its place in highly specialized journals. We are looking forward to seeing where the following decade will direct medical and health technologies. MBEC and the International Federation for Medical and Biological Engineering will stay in service to the biomedical engineering community as it was in the past six decades.

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