

A HISTORY OF THE INTERNATIONAL ORGANIZATION FOR MEDICAL PHYSICS – 50 YEARS ANNIVERSARY – PART II

Azam Niroomand-Rad¹, Colin Orton², Peter Smith³, and Slavik Tabakov⁴

¹Georgetown University, Washington D.C., USA,

²Wayne State University, Detroit, MI, USA,

³Aberdeen, UK,

⁴Kings College, London, UK

Abstract— In celebration of 50 years Golden Anniversary of the founding of the International Organization for Medical Physics (IOMP), Part I of this article [1] described early discussions and developments that led to the formation of the International Organization for Medical Physics in 1963, followed by the early years of expansion of the Organization. This article covers the subsequent development of the Organization and reviews its major activities and links to other international organizations and how they were originated.

Keywords— IOMP, IUPESM, IFMBE, ICSU, IUPAP, ILO, ISCO, Medical Physics

I. INTRODUCTION

This article is written by past and present members of the IOMP History Subcommittee in recognition of the Golden Anniversary of the founding of the Organization in 1963. In part I [1] formation of the Organization with just four National Members Organizations, representing a few hundred medical physicists, was reviewed and development of its membership was outlined.

This article highlights the major activities and accomplishments of the IOMP and recognizes the enormous time and effort donated by many of its voluntary members to promote the purposes and objectives of the Organization as outlined here:

1. Early IOMP Conferences and Initial Collaboration with Biomedical Engineers
2. Formation of the International Union of Physical and Engineering Sciences in Medicine
3. World Congresses and International Conferences on Medical Physics
4. Membership in the International Council of Scientific Unions (ICSU)
5. Formation of the Regional Federations of Medical Physics
6. Collaboration with United Nations Organizations
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 - 6.2 World Health Organization
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7. Affiliation with International Unions
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10.6.4 Fellowship of IOMP

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10.8. Rules Committee

10.9. International Advisory Council

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10.11 History Subcommittee

11. IOMP Important Documents and Policy Statements

11.1 Review and Way Forward Document

11.2 IOMP Policy Statements

II. EARLY IOMP CONFERENCES AND INITIAL COLLABORATION WITH BIOMEDICAL ENGINEERS

Two years after its formation, in September 1965, IOMP held its first conference in Harrogate, UK. It was organized by the UK Hospital Physicists' Association (HPA) and over 500 people from 24 countries attended. There were 117 proffered papers in three parallel sessions and eight review papers and these review papers, together with the Presidential Address of Prof Val Mayneord, were published as a supplement to *Physics in Medicine and Biology* [2]. Thus began the sequence of the IOMP's International Conferences on Medical Physics (ICMPs).

At Harrogate, Council decided that the next conference should be held in Boston, USA, in August 1969. The third conference was held in Goteborg, Sweden and the fourth in July 1976 in Ottawa, Canada – thereby each of the founding quartet hosted one of the first four ICMPs.

Biomedical Engineers had formed the International Federation for Medical Electronics and Biological Engineering, later renamed the International Federation for Medical and Biological Engineering (IFMBE), four years prior to the formation of the IOMP [3]. At the International Conference of Medical and Biological Engineering held in Melbourne in 1971, R Magnusson, IOMP Vice-President, made a plea for closer association between the two organizations. It was agreed to hold further discussions to explore areas of collaboration. Subsequently in 1972 IFMBE Secretary-General attended IOMP 3rd ICMP in Gothenburg, Sweden where Council endorsed exploring closer collaboration. In 1973 the Presidents and Secretaries-General of the two organisations met when both organizations were planning conferences to be held in Ottawa, Canada (4th ICMP and 11th ICMBE). It was agreed that these meetings should be

back-to-back at the same venue, with sessions of mutual interest held in the middle.

In 1976 at the Ottawa Conference it was agreed that the next joint meeting should be held in 1979 in Jerusalem, Israel. This goal was achieved in August 1979, which marks the first integrated conference (5th ICMP and 12th ICMBE) by the two Organizations. John Mallard's memories of these historical events were published in an article, which is available at the History Section of Published Articles at IOMP Website (www.iomp.org).

III. FORMATION OF THE INTERNATIONAL UNION OF PHYSICS AND ENGINEERING SCIENCES IN MEDICINE

In the period 1974–1979 there were a number of meetings between officers of the IOMP and IFMBE, including the formation in 1975 of a formal committee (Prof. R. L. Clarke, representing IOMP, and Dr. J A Hopps, representing IFMBE), to prepare a paper on collaboration for discussion by both organizations at the joint meeting in 1976. Subsequently a proposal by Clarke and Hobbs for the creation of an international union tentatively designated as '*the International Union for Physics and Engineering in Medicine*' was put forward to a joint IOMP/IFMBE meeting at Ottawa. Both organizations authorized the continuation of the ad-hoc committee and requested a draft document, including draft Statutes, to be prepared for consideration by the Councils at their meetings at Jerusalem in 1979. A tentative plan was circulated for comment in early 1978 and the comments were reviewed by May of that year. Subsequently a resume was prepared for national societies because of the possible impact of a scientific union on their operation. Record of this resume is available at IOMP Archives, IOMP Headquarter, York, UK. The resume put forward the following main reasons for the formation of a union:

- Conferences. The 1976 Ottawa and the 1979 Jerusalem conferences had demonstrated a considerable overlap in the topics presented by the two organizations but more effective integration at future conferences would require closer coordination between the two organizations.
- Scientific Affiliation. Neither society had a satisfactory scientific affiliation. IOMP was an Associated Commission of the International Union for Pure and Applied Biophysics (IUPAB) but this had not provided the hoped for benefits and there were few common interests with other members. The IFMBE had withdrawn from the Council of International Organizations

for Medical Science for similar reasons. If a union could be formed which met the requirements for membership of the International Council of Scientific Unions (ICSU) then two organizations would have the desired scientific affiliation and advantages accruing from membership of the world's foremost scientific body.

- Integration of programs and development of mutual interests
- Enhancement and recognition of IOMP and IFMBE in international circles.

It was thought that it was necessary to have national organizations, as well as IOMP and IFMBE, as members of the proposed union to meet requirements for membership of the ICSU. There were considerable concerns around the role of national members and this dominated discussion in 1977 and 1978. However in 1979 a simpler organizational structure was devised which did not involve national organizations. Thus a further position paper was circulated for consideration in August 1979. The word "Sciences" was added to the name of the Union in order to enhance our chances of being approved for membership of ICSU. [4]. Statutes of the new Union were approved by Councils of both organizations at their meetings in Jerusalem in 1979 and the International Union of Physical and Engineering Sciences in Medicine (IUPESM) came into existence in January 1980.

IV. WORLD CONGRESSES AND INTERNATIONAL CONFERENCES ON MEDICAL PHYSICS

The formation of IUPESM allowed IOMP and IFMBE to embark on a programme of triennial World Congresses (WCs). The WCs on Medical Physics and Biomedical Engineering were, and are, managed by IUPESM and normally jointly hosted by the medical physics and biomedical engineering national member organisations of the country where the Congress is held. Although managed by IUPESM, both IOMP and IFMBE are signatories to the contract and the WCs incorporate an ICMP of IOMP and an International Conference (IC) of IFMBE. **Table 1** is a listing of all ICMPs, WCs, years, and locations of the meetings.

In addition to the triennial World Congresses on Medical Physics and Biomedical Engineering, IOMP Officers have discussed various possibilities for further ties with the Regional Organizations. In 2003 at the WC in Sydney, Australia, Azam Niroomand-Rad, IOMP President, presented additional series of ICMPs, separate from the WCs but interleaved with them. This proposal was discussed at the Council meeting in Sydney.

Additionally proposal by German Society for Medical Physics (DGMP) to organize the IOMP 14th ICMP in Nuremberg, Germany was approved. In 2004, a full discussion paper that was circulated to Council followed proposal for additional ICMPs. Council approved this proposal at a virtual meeting in October 2004 [5] but stipulated that the term WC should not be used for these additional series of ICMPs.

The two main objectives for introducing additional triennial ICMPs between the WCs were:

- Medical physicists worldwide, especially those from developing countries, needed more opportunities to interact with each other and be exposed to emerging technologies. Smaller and more frequent scientific meetings of high quality, would help to improve the development of medical physics, to strengthen links among regional medical physicists, and to promote the medical physics profession in countries / regions where a large WC was not an option.
- To meet the challenges of the IOMP financial resources needed to grow accordingly. It was hoped that the additional conferences would increase the income of IOMP

The conferences were to reflect the priorities and needs of the region in which they were based. A balance between various scientific, educational, training and professional elements reflecting the needs of the region along with substantial exhibition were always encouraged.

V. MEMBERSHIP IN THE INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

The desire to secure membership in the International Council of Scientific Unions (ICSU) had been a key issue since the inception of IOMP, was a primary reason for the establishment of IUPESM and a key factor in determining its constitution. After the formation of IUPESM enormous efforts were made by the IUPESM Officers to secure its membership with ICSU. In summer of 1980, ICSU turned down the IUPESM application and suggested an application should first be made for Associate Membership. In 1982 this application was submitted and was accepted by ICSU.

IUPESM remained an Associate Member of ICSU for the next fifteen years but gained little from its Associate status. In 1997 ICSU reviewed the relationship between IUPESM and ICSU as part of wider review of its activities. A report was presented by IUPESM to an ICSU review panel and the opportunity was taken to push for full membership but the outcome was a continuation of associate membership. In 1999, after further

discussions with ICSU, Keith Boddy, IUPESM President and IOMP Past-President, with the approval and endorsement of Council, submitted a substantive fresh application to ICSU for full membership. In September 1999 the IUPESM was unanimously admitted to ICSU as a full member [6,7]

In the years following full membership of ICSU, the IUPESM Officers have made considerable efforts to reap benefits from full membership but results have been limited. Funding was obtained to produce a brochure '*Physical and Engineering Sciences in Healthcare*' and IUPESM was active in collaboration with other unions on the project '*Science for Health and Well-Being*'. This eventually emerged as the current ICSU project "*Health and wellbeing in the changing urban environment: a system analysis approach*". IUPESM has recently been involved with a cluster of Bio Unions that have lately established new programs of international symposia and advanced summer schools.

VI. FORMATION OF THE REGIONAL FEDERATIONS OF MEDICAL PHYSICS

To help develop medical physics in various regions, IOMP has supported formation of its Regional Organizations of Medical Physics in Europe, Latin America, Asia-Oceania, South-East Asia, Middle East and Africa. These Federations have developed their own Statutes and Bylaws that are consistent with IOMP Mission and Objectives. Many officers of these Regional Organizations (Federations) take part in various IOMP Committees, thus assuring the synchronized global development of the profession. The IOMP Council has representatives of both – national organizations and the respective Regional Federations. The current Regional Federations of IOMP includes:

- European Federation of Organizations for Medical Physics (EFOMP) with 35 national members - formed in 1980
- Latin American Medical Physics Association (ALFIM) with 11 national members - formed in 1984
- Asian-Oceania Federation of Organizations for Medical Physics (AFOMP) with 16 national members - formed in 2000
- Southeast Asian Federation for Medical Physics (SEAFOMP) with 6 national members - formed in 2006
- Middle East Federation of Organizations for Medical Physics (MEFOMP) with 12 national members - formed in 2008
- Federation of African Medical Physics Organizations (FAMPO) with 15 national members - formed in 2009

VII. COLLABORATION WITH UNITED NATIONS ORGANIZATIONS

7.1 *International Atomic Energy Agency (IAEA)*

In the early years of formation of IOMP, several IOMP members were collaborating with IAEA – for example, in 1962 Dr. Monty Cohen from UK was a member of the Steering Group but at that time worked for the IAEA. He suggested that IOMP should apply for consultative status with IAEA. Informal contacts and communications were maintained during the early years and in 1967 IOMP Council agreed to consider affiliation with IAEA. Mr. E H Belcher, the IAEA representative at the meeting, suggested that IOMP write the Director-General requesting that the IAEA formally designate a point of contact with IOMP. However it appears little formal action was taken over the next few years but in 1976 Dr. Horst Eisenlohr was appointed liaison person to IOMP by IAEA.

In 1982 it was reported to Council that IAEA in collaboration with the World Health Organization (WHO) was planning to set up a network of Secondary Standard Dosimetry Laboratories (SSDL). IOMP was formally recognized, and continues to be recognized, as a collaborating organization associated with the IAEA/WHO Network of SSDLs. The IOMP Secretary-General, Colin Orton (1991-1994) negotiated a formal agreement for cooperation between the IAEA and the IOMP and President Udipi Madhvanath signed a Memorandum of Understanding in Vienna in June 1992. Subsequently, a list of medical physics experts willing to travel to developing countries to work with the IAEA was developed to help IAEA identify experts willing to support their programs. In 1996 IOMP signed a further Memorandum of Understanding with IAEA to help transport donated used equipment to recipients in developing countries. Collaboration has continued and IOMP contributes successfully to a number of IAEA programs and projects led by each its two relevant Divisions working in the fields of medical physics and radiation safety. Even though IOMP has never been recognized by IAEA as having formal consultative status, it is normally invited to send an observer to the Agency's annual General Conference.

7.2 *World Health Organization (WHO)*

In the early years IOMP collaboration with WHO was less strong than with IAEA. However at the 1972 Council meeting, Dr. Berndt Waldeskrog of WHO proposed affiliation of IOMP to WHO and Council agreed. But it appears little action was taken in the 1970s. In 1982 Alexander Kaul, IOMP President, met with Dr. Raconeanu, Chief Medical Officer at WHO to discuss formal collaboration but again it appears to have led to little action. Although the IOMP had no formal

agreement with WHO there were collaborations between these two organizations and IOMP was represented in a several WHO projects and initiatives, such as the WHO's 'Global Initiative on Radiation Safety in Healthcare Settings'.

In 2009 IOMP appointed a designated Liaison to WHO – Peter Smith (2009-2012) and Habib Zaidi (2013-Present). In the meanwhile a concerted effort was initiated to establish formal links with WHO and number of meetings were held at Geneva and at the World Congress in Munich. This finally resulted in the signing of a memorandum of understanding in 2010 and agreement on an 'IOMP/WHO Collaboration Plan for 2010-2012'. IOMP was involved in planning and actively participated in WHO's 'First Global Forum on Medical Devices' held in Bangkok in September 2010 and the second Forum held in Geneva in November 2013. Currently IOMP is applying for Non Government Organization (NGO) status to WHO.

7.3 International Labour Organization (ILO)

By 1995 with 55 National Members, IOMP had recognized difficulties stemming from lack of recognition of medical physicists, especially in developing countries. It was extremely important to our colleagues to be recognized par with other professionals and, therefore, be eligible for many of the benefits that were accorded to them such as status, appropriate responsibilities, decision-making, and salary negotiation. In 1995 IOMP President, Keith Boddy, initiated the first communication with the Bureau of Statistics that manages, organizes and publishes the International Standard Classification of Occupations (ISCO) of the ILO in Geneva, Switzerland. The listing of professionals in ISCO is updated infrequently. The first publication was in 1958 (ISCO-58), followed by ISCO-68, ISCO-88 and most recently in 2008 (ISCO-08).

Keith Boddy and other IOMP Presidents in particular Azam Niroomand-Rad and Colin Orton requested that Medical Physicists should be included in the listing of Health Professionals for the update of ISCO-88. However, they soon recognized that this path was long and arduous. It took them over 12 years to overcome these obstacles and have Medical Physicists be listed in ISCO-2008.

To pursue recognition of medical physicists in the revision of ISCO-88, we had to adhere to ISCO procedures. This included (but was not limited to) providing documents from governmental agencies as to the definition, task performed, and listing of medical physicists by governmental agencies. IOMP had to submit and re-submit its request along with supporting documents including list of tasks performed by medical

physicists several times when Directors and/or Staffs of the Bureau of Statistics were being replaced. Two web-based consultations for update of ISCO-88 were prepared and distributed - first in 2004 [8] and second in 2006 [9].

After the first consultation ILO concluded that medical physicists were not sufficiently numerous to justify a separate unit group. The second consultation focused on where medical physics should be included in the classification and responses were equally divided between including medical physicists under "Physicists and Astronomers" or under "Health" Professionals. IOMP, and others, proposed that medical physicists should be classified under Health Professionals, because in the classification system of a number of countries medical physicists were classified under 'Health Professionals'. However, Directors of Bureau of Statistics at ILO recognized that ISCO-88 needs to be updated due to varieties of reasons including emergence of new occupations and decline of some occupations and the need for categories at the sub-major and minor groups to be more even in size than those in ISCO-88 which had 10 Major Groups, 28 Sub-Groups, 116 Minor Groups, and 390 Unit Groups. Thus ISCO-08 came to have 10 Major Groups, 36 Sub-Major Groups, 126 Minor Groups, and 446 Unit Groups.

The ILO finally decided in favor of classification under 'Physicists and Astronomers' for the following two main reasons:

- Since the basis of knowledge required for medical physics is physics, it is consistent with the ISCO conceptual model to include them in the same Unit group as other physicists.
- The view that medical physicists should be classified as health professionals because they work in the health system was not accepted as ISCO is not a classification of industrial activities.

With this conclusion it was decided to include Medical Physicists in Major Group 2 (Professionals), Sub-Major Group 21 (Science and Engineering Professionals), Minor Group 211 (Physical and Earth Science Professional), and Unit Group 2111 (Physicists and Astronomers) in ISCO-08 [10].

Following further discussions initiated by Fridtjof Nusslin, IOMP President and Peter Smith, IOMP Past Secretary-General, in 2010 two notes were added to ISCO-08 clarifying the position of medical physicists in relation with other health professions. The one at the end of unit group 2111 'Physicists and Astronomers' states that "... medical physicists are considered to be an integral part of the health work force alongside those occupations classified in Sub-Major Group 22, Health

Professionals and others classified in a number of other unit groups in Major Group 2, Professionals.” A similar note was added under Sub-Major Group 22. The list of tasks performed by medical physicists under “Physicists and Astronomers” was also extended and modified as indicated in ISCO-08 [11].

In recognition of this very important professional achievement, in 2013 IOMP launched an International Day of Medical Physics (IDMP), which will be celebrated annually on 7 November (the birthday of Marie Skłodowska-Curie). The first IDMP was coordinated by John Damilakis, ETC Chair, and was organized by many national medical physics societies on November 7, 2013.

VIII. AFFILIATION WITH INTERNATIONAL UNIONS

8.1. International Union of Pure and Applied Biophysics (IUPAB)

Affiliation with International Union of Pure and Applied Biophysics (IUPAB) goes back to the early days of IOMP. The IOMP affiliation with IUPAB in 1964 was not a great success and, with the formation of IUPESM, the link was broken in 1982. However it was rekindled in the last few years, largely due to the efforts of Prof. Fridtjof Nüsslin, President of IOMP, with both direct informal links and collaboration through the ICSU Biocluster.

8.2 International Union for Pure and Applied Physics (IUPAP)

The International Union for Pure and Applied Physics (IUPAP) was established in 1922 as an international organization whose mission was to assist worldwide development of physics, to foster international cooperation in physics, and to help in application of physics toward solving problems of concern to humanity. IUPAP is a member of ICSU and has 20 Commissions (C.1-C20) and four Affiliated Commissions (AC.1-AC.4) on various sub-specialties in physics. [12]

As an umbrella organization for pure and applied physics, at the turn of century IUPAP decided to establish a Commission on Medical Physics with or without collaboration with IOMP. But it was important for IUPAP to cooperate with IOMP as an existing Organization for medical physics. Subsequently IUPAP and IOMP formed a joint Ad Hoc Committee and in 2003, IOMP President, Azam Niroomand-Rad, submitted a proposal to IUPAP for IOMP affiliation. One might think this was an obvious decision but it was not. In the past 30 years or so, archived documents at IOMP Headquarter, York, UK, indicate that IOMP was establishing relationship with biophysicists and

biomedical engineers. Also there was some concern about jeopardizing IUPESM affiliation with ICSU. At IUPAP Council and Commission Chairs Meeting at Tata Institute for Fundamental Research, Mumbai, meeting in India, October 15-16, 2004, Azam Niroomand-Rad, IOMP President reported for IOMP. She pointed out although medical physics is an applied physics; IOMP affiliation has been with bioengineers of IFMBE through union in IUPESM that is a member of ICSU. She indicated IOMP affiliation with IUPAP would improve relation with physics scientists. [13].

In 2005, at the IUPAP General Assembly meeting in Cape Town, South Africa, IOMP proposal was approved unanimously and an “Affiliated Commission on Medical Physics (AC.4)” was established. [14]. At this meeting IUPAP Council approved AC.4 membership; namely the positional membership of AC.4 shall consist of five IOMP elected Officers, Chairs of IOMP (SC, ETC, PRC, PC) with at most six IUPAP Liaisons including IUPAP Chairs of C6 (Commission on Biological Physics), C13 (Commission on Physics for Development), C14 (Commission on Physics Education). Subsequently this led to the formation of a new committee by IOMP known as “International Commission on Medical Physics (ICoMMP)” and establishment of IUPAP Young Scientist Award in Medical Physics in 2006, which is managed by IOMP but funded by IUPAP.

IX. COLLABORATION WITH OTHER INTERNATIONAL ORGANIZATIONS

Over the years IUPESM had informal collaboration with a number of international organizations and participated in several joint projects and activities with:

- *International Society of Radiology (ISR)*
- *International Commission on Radiation Protection (ICRP)*
- *International Commission on Radiation Units (ICRU)*
- *Bureau International des Poids et Mesures (BIPM)*
- *International Radiation Protection Association (IRPA)*
- *International Centre for Theoretical Physics (ICTP)*

In 2010 IOMP made a formal link with IRPA through a Memorandum of Understanding. This led to a ‘*Statement of Collaboration between IOMP and IRPA to foster Medical Physics in Developing Countries*’.

X. IOMP PUBLICATIONS, JOURNALS, AND BOOK SERIES

10.1 *Medical Physics World, MPW (1984) - Electronic Medical Physics World, eMPW (2010)*

In 1984 IOMP established Medical Physics World (MPW) to expand on the channels of communication among its membership. The Vice-President, Lawrence H. Lanzl, Founding Editor, announced inauguration of MPW and stated “The general content of MPW was to include a calendar of events, articles with news on national societies of medical physics, reports from the officers of IOMP, general IOMP information, editorial which will be controversial when the need arises, guest editorials, letters to the editor, and other relevant items [13]. Hard copies of MPWs were distributed through the national organizations to every medical physicist. In 25 years (1984-2010) a total of 6 Editors managed to publish 25 volumes (1064 pages) twice per year with some financial gains from advertisements. This could not have been achieved without the help of many members who served as Associate Editors, Calendar of Events Editors and Advertizing Liaison: The Editors were; Lawrence Lanzl (1984-1986), Colin Orton (1986-1988), Richard Maughan (1998-1992), Bhudatt Paliwal (1993-1994), Azam Niroomand-Rad (1994-2000), and Ishmael Parsai (2000- 2009).

In 1997 the Electronic Medical Physics World (EMPW) was established by John Cameron to compliment MPW. Kwan Hoong Ng and Larry Deward served as Managing Editors and John Cameron, served as Editor of the “Ask Your Medical Physicist”. Home Page of EMPW was maintained by the University of Wisconsin in Madison and at the time could be accessed on the Internet [16]. However, the EMPW was discontinued with the passing of John Cameron in 2005.

In 2010 MPW became electronic under leadership of Donald Frey, Editor and Ishmael Parsai, Associate Editor. The first publication of eMPW, Vol. 1(1) was in June 2010 and became available at the IOMP website. The general content of eMPW is the same as MPW with lesser restriction on cost and/or number of pages for each volume. Since 2012 under the leadership of Virginia Tsapaki and Magdalena Stoeva, Associate Editor, eMPW was further improved and continued with 2 editions per year. The Editor of eMPW were:

Donald Frey (2010-2011) and Virginia Tsapaki (2012-Present).

10.2 *Medical Physics International (MPI)*

In 2012 a new electronic Journal with free on-line access (www.mpijournal.org), Medical Physics International (MPI), was launched under Editorship of Slavik Tabakov (UK) and Perry Sprawls (USA). The first edition was published online in March 2013 [17]. The purpose of this Journal is to provide the global medical physics

community with articles that are not generally available in other publications. A special emphasis is to support educational activities and professional development of medical physicists and related professions and it will have links to many educational resources. Additional articles highlight recent advances in technology associated with medical physics with information on effective utilization to enhance both professional practice and education. MPI Journal also publishes proceedings from IOMP Conferences. The ICMP-2013 was the first such Conference.

10.3 *IOMP Official Journals*

Apart from the above publications, IOMP has recognized a number of other journals as “Official Journals”: ‘*Physics in Medicine and Biology*’ (the first journal to be designated as an official journal of IOMP in (1969), followed by ‘*Physiological Measurement*’ (1988) ‘*Medical Physics*’ (2006) and ‘*Medical Physics International*’ (2013). IOMP has also co-sponsored the ‘*Journal of Applied Clinical Medical Physics*’ since 2003.

10.4 *IOMP Book Series.*

In 1991 IOMP and the Institute of Physics Publishing (IOPP) entered into an agreement to publish ‘*The Medical Physics and Biomedical Engineering Series*’. In 2003 IOPP sold their book publishing business agreements to the Taylor and Francis Group and a new agreement was signed between them and IOMP in 2006. Since the start a total of 41 books have been published in these series.

XI. IOMP COMMITTEES AND SUBCOMMITTEES

11.1 *Developing Countries Committee (1982) and Professional Relations Committee (1997)*

Although there is no specific mention of developing countries in the Statutes of the IOMP, since the middle of the 1970s the IOMP has recognized the need to support medical physicists in developing countries. This led to the formation of the Developing Countries Committee (DCC) at the Council meeting of (6th ICMP and 1st WC) in Hamburg, Germany in 1982 [18]. The main duties were to find the needs of developing countries such as journals, spare parts and used equipment. Consequently two specific programs were established; namely – the International Libraries program and the Used Equipment program. In 1997 DCC was replaced by the Professional Relations Committee (PRC) to enhance professional activities and practices of medical physics in member societies as well. The DCC and PRC

Chairs were: Rune Walstam (1982-1989), Xie Nan-Zhu (1989-1994), M. S. S. Murthy (1994-1997), Andries Van Aswegen (1997-2000), Stelios Christofides (2003-2006), Kin Yin Cheung (2006-2009) and Raymond Wu (2009-2015).

11.1.1 Used Equipment Donation Program (1986)

The concept of providing used equipment and spare parts to developing countries was first discussed in 1986 during the meetings of DCC. Initially IOMP Vice-President Udipi Madhvanath agreed to manage this program and then M. S. Murthy, DDC Chair. Since 1998, the Used Equipment Donation Program has been successfully managed by Mohammed Zaidi and operates under PRC. This program follows the WHO Guidelines for Healthcare Equipment Donations (2000). The shipping expenses are required to be paid in advance or arranged by the recipient but financial help is available in some cases. This program has assisted delivery to and installation of 36 large equipment - including 2 Gamma Cameras and 5 Linear Accelerators in developing countries.

11.1.2. International Library Program (1987)

In 1987 the IOMP Secretary-General, Colin Orton, initiated the International Library Program to establish libraries in developing countries, some at institution level, others at departmental level, and to make arrangements for the supply of donated journals and books. The first library was situated in Guangzhou, China and, from then the program grew very rapidly under his leadership and Ms. Catherine Warmelink (later Alekhteyar), USA, took over as Curator (1990-1997). By 1994 a total of 55 libraries had been established in 36 developing countries and by 1997 there were 76 libraries in 49 countries. The subsequent Curators, all from the AAPM were: Marilyn Stovall (1997-2003) and Allan Wilkinson (2003-2015). The reason for such close ties with the AAPM was that, starting in the mid-1990s, the AAPM has sponsored the program by paying for all mailing fees for the books and journals. Since 1995 this has been a joint IOMP/AAPM program, and is currently managed by the International Affairs Committee of the AAPM and the Professional Relations Committee of the IOMP.

11.2 Nominating Committee (1985)

The IOMP President, Lawrence Lanzl, established the Nominating Committee (NC) in 1985. The goal of NC was to ensure individuals or national organizations make appropriate nominations and that they are suitable for elected positions by the Council. All nominees should be known internationally for their distinction in the field, for their organizing and leadership abilities and be able to serve their respective terms of the office. The IOMP

Presidents and since 2009 Vice-Presidents (with change in Bylaws) have served as the NC Chair:

Larry Lanzl (1985-1998), Jack Cunningham (1988-1991), Udipi Madhvanath (1991-1994), Keith Boddy (1994-1997), Colin Orton (1997-2000), Oskar Chomicki (2000-2003), Azam Niroomand-Rad (2003-2006), Barry Allen (2006-2009), Kin Yin Cheung (2009-2012), Slavik Tabakov (2012-2015).

11.3 Education and Training Committee (1985)

In 1985, the IOMP Education and Training Committee (ETC) was established at the 7th ICMP in Espoo, near Helsinki, Finland [19]. The intent was to develop task-oriented educational and training programs and to organize short refresher courses, seminars and workshops to improve medical physics education, to advance the practice of medical physicists worldwide, to support on matters relating to education and training, and development of training materials. ETC developed a system for assessment, endorsement, and funding of such activities. Since 1994 ETC has organized 70 workshops, seminars courses with attendee from 85 countries. About half of these events have been in collaboration with the ISEP. These programs helped to develop medical physics programs in many countries especially in Eastern Europe and Asia. The ETC Chairs were:

Carlos E. de Almeida (1985-1989), Norman Baily (1990-1992), Nagalingam Suntharalingam (1993-1997), Azam Niroomand-Rad (1997-2000), Slavik Tabakov (2000-2006), Anchali Krisanachinda (2006-2009), Maria do Carmo Lopes (2009-2012), John Damilakis (2012-2015).

11.3.1 International Scientific Exchange Program (1991)

One of the IOMP's most successful educational and training activities has been the International Scientific Exchange Program (ISEP) that was first conceived in 1989 by Azam Niroomand-Rad, when serving as Chair of ISEP Task Group in the International Affairs Committee of the American Association of Physicists in Medicine (AAPM). Since World Congress 1991 in Kyoto, Japan, these programs have been offered in collaboration with IOMP and became IOMP/AAPM ISEPs. The goals of these programs were and still are education and training of medical physicists worldwide and help to establish medical physics societies in those countries that lack such organizations. From 1992 – 2001, the ISEP was offered every year in therapeutic physics but since 2002 the diagnostic and nuclear medicine programs have been added. Two ISEP programs are now being offered on an annual basis; one in therapy and one in diagnostic and nuclear medicine. Currently 36 ISEP programs have been organized in 27 countries (www.iomp.org). This program has also helped to establish 10 national medical physics societies worldwide.

11.3.2 International Educational Projects with IOMP Participation

A number of EU e-learning materials were developed under the leadership of Slavik Tabakov. From the beginning IOMP and EFOMP were included as partners. In 2004 one of these projects, EMIT (European Medical Imaging Training) received the inaugural EU Prize for education – The Leonardo da Vinci Award. This was the first project of EFOMP and paved its way for further project funding. In 2006 IOMP was included as a full partner in the development of the first Medical Physics e-Encyclopedia and Dictionary of Terms in 29 languages – an EU project (EMITEL) which included many of the IOMP Officers and ETC members. This project (www.emitel2.eu) is a major educational reference for the profession with about 5000 users per month. [20].

In the period 2006-09 ETC developed, in collaboration with the IUPAP, a model curriculum for MSc Medical Physics courses. This project formed the basis of the recent IAEA guide for educational courses. [20]. In 2012 IOMP supported the establishment of an international MSc Medical Physics course, aiming to help colleagues from developing countries – a project of the ICTP and University of Trieste, Italy.

11.4 Science Committee (1994)

The Science Committee (SC) was formed in 1994 at the WC Rio de Janeiro, Brazil [21]. The initial goal was to develop medical physics scientific programs for the triennial WCs. But from the beginning its objective was to promote research on application of physics in medicine, to create an electronic network to disseminate medical physics scientific knowledge worldwide, and to address the science needs of medical physicists especially in developing countries by organizing and funding regional scientific workshops and symposia and by having IOMP be involved on various international projects [22]. In 2012 under the leadership of William Hendee, SC Chair, a new IOMP Policy statement: “Risk of Medical Imaging” was developed, which was published in MPI Journal No.1. The SC has been instrumental in the preparation of the scientific programs of all current ICMPs and WCs and has supported many scientists from developing countries to attend these programs. The SC Chairs were:

Gary Fullerton (1994-2000), Caridad Borrás (2000-2009), Harald Paganetti (2009-2012), William Hendee (2012-2014) and Geoffrey Ibbott (2014-2015).

11.5 Publications Committee (1998)

In 1998, the need for establishing an IOMP Publications Committee (PC) became evident when IUPESM was being accepted for membership in ICSU (1999) and when IUPESM was organizing the WC-2000 in Chicago [23]. The goal of PC was to manage operation of MPW, to

assist Regional and National Organizations of medical physics to prepare proposals for publication of new materials in traditional or new formats as necessary to extend the international medical physics knowledge base and to provide printed and electronic publications, documents and journals. The PC Chairs were:

Gino Fallone (1998-2003), Kwan Ng (2003-2006), William Hendee (2006-2012) and Tae-Suk Suh (2012-2015)

11.6 Awards & Honors Committee (1998)

Since 1988, IUPESM has been presenting two *IUPESM Awards of Merit* at the WCs; one to biomedical engineers and one to medical physicists who have made major contributions in advancing the goals of the Union. In 1998 the need for establishing an IOMP Awards & Honors Committee (AHC) was recognized by Azam Niroomand-Rad and John Cameron. The goals of AHC were to establish awards and honors criteria, to solicit nominees, to administer awards and make recommendation to the EXCOM for approval. The intent of the awards and honors are to recognize medical physicists who have made outstanding contributions to advance medical physics knowledge and practice through research and education. The AHC Chairs were:

John Cameron (1998-2000), Fridtjof Nusslin (2000-2003), Perry Sprawls (2003-2006), Slavik Tabakov (2006-2007), Donald Frey (2007-2012) and Tomas Kron (2012-2015).

11.6.1 The Marie Sklodowska-Curie Award (2000)

The Organization’s most prestigious award was inaugurated in honor of Madam Marie Sklodowska-Curie. The Marie Curie Award is presented triennially at the WCs to honor scientists who have distinguished themselves by their international reputation due to their contributions in (a) advancement of medical physics knowledge based upon independent original research, (b) education and training of medical physicists, medical students and residents, and allied health personnel and (c) advancement of the medical physics profession in adhering national and international organizations. The first award was granted to John R Cameron (2000), followed by Andree Dutreix (2003), Jack Cunningham (2006), Azam Niroomand-Rad (2009) and Charles Mistretta (2012).

11.6.2 The Harold Elford Johns Medal (2002)

The Organization’s major award in teaching was established by funding received from Canada in honor of Harold Elford Johns. This award is presented triennially at the WCs to IOMP members who have made major contributions to international medical physics education. The first Medal was granted to Perry Sprawls (2003),

followed by Slavik Tabakov (2006), Madan Rehani (2009), and Ahmed Meghizifene (2012).

11.6.3 The Young Scientist Award in Medical Physics (2006)

This award was introduced in 2006 following IOMP affiliation with IUPAP. This award is funded by IUPAP but selection is managed by AHC. Initially awarded triennially at the WCs but since 2012 on an annual basis, to IOMP scientists with less than eight years research experience. The first award was given to Ali Asghar Mowlavi (2006), followed by Leif Schroder (2009), Magdalena Stoeva (2012), and Ferdinand Schweser (2013)

11.6.4 Fellowship of IOMP - FIOMP (2013)

In 2007-2008, Slavik Tabakov and Donald Frey introduced the need and requirements for establishing an IOMP honor, Fellowship of IOMP (FIOMP). This honor aims to recognize IOMP members who have significantly helped to advance the goals of the Organization and its regional organizations over a significant period of time. Other achievements in medical physics are not considered as primary reasons for this honor. The Fellowship consists of a certificate and a pin and it bestows the right to use the title FIOMP after their names. The inaugural batch of 18 Fellowships were presented at IOMP 50th Anniversary at ICMP-2013 in Brighton, UK to these individuals:

Barry Allen, Carlos de Almeida, Cardid Borrás, Kin Yin Cheung, Oskar Chomiczki, Donald Frey, Gary Fullerton, William Hendee, Kwan Hoong Ng, George Mawko, Azam Niroomand-Rad, Fridtjof Nuesslin, Colin Orton, Madan Rehani, Peter Smith, Perry Sprawls, Slavik Tabakov, and Raymond Wu.

11.7 Finance Subcommittee (2000)

By 1995, need for Treasurer was recognized. The first (honorary) Treasurer was Ann Dixon-Brown (1995-1998) followed by Interim Treasurer, Gary Fullerton, IOMP Secretary-General.

By 2000, Finance Subcommittee (FSC) was established with an elected Treasurer to serve as Chair. The goal of the FSC was to manage financial affairs of the Organization. This includes (but not limited to) preparation of annual budget reports, arrangement for account audition and allocation and dispersion of funds to Officers, Chairs of committees and subcommittees subject to duties outlined in IOMP ByLaws. The FSC Chair were:

Nisakorn Manatrakul (2000-2001), George Mawko (2001-2009), Slavik Tabakov (2009-2012) and Anchali Krisanachinda (2012-2015).

11.8 Rules Committee (2000)

Up until 2000, the IOMP Statutes and Bylaws had been modified occasionally but they were becoming outdated. At WC2000, the Council decided that they needed a major overhaul. An ad hoc Governance Committee (Colin Orton, Past-President and Azam Niroomand-Rad, Vice-President) was formed to make these revisions and this led to the presentation and approval of extensively modified Statutes and Bylaws at WC-2003 and the establishment of a formal Rules Committee (RC). The goals of the RC were to advise on any matter referred to it by EXCOM or Council and to facilitate regular review of the Statutes, Bylaws and relevant policies and procedures and to make recommendations for changes to assure good governance, organization and administration of the Organization. Further modification to the Statutes and Bylaws was prepared by Fridtjof Nusslin and Peter Smith and was approved by the Council in 2009. The aims and functions of the Organization in the Statutes have remained unchanged. The RC Chairs were: Fridtjof Nusslin (2003-2009), Kin Yin Cheung (2009-2012), Slavik Tabakov (2012-2015).

11.9 International Advisory Council (2000)

An International Advisory Council (IAC) was formed in 2000 with members including representatives of IAEA, WHO, and PAHO. Membership also included two representatives from the Regional Federations and Officers. The charge was "To improve the global practice of medical physics by providing advice to the IOMP Assembly concerning international interactions, collaborations and programs that meet scientific, educational and professional needs". The name was changed from Council to Board in 2003. In 2006 EXCOM reviewed the role and effectiveness of the IAB and recommended to Council that the IAB should be dissolved due to lack of effective use of the body and existence of other more effective mechanisms for such advice. Council accepted the recommendation.

11.10. Committee of International Commission on Medical Physics - IComMP (2005)

In Section 7.2, details of IOMP affiliation with IUPAP were described. This affiliation led to the formation of an IOMP committee known as International Commission on Medical Physics (IComMP) in 2005. The goals of this committee were to provide direct access to IUPAP resources including support of young scientists and women in physics and collaboration with international programs and projects of mutual interest to the two Organizations. This included but was not limited to collaboration on biological physics, physics education and physics development. The original membership of IComMP consisted of five IOMP elected Officers, Chairs of IOMP (SC, ETC, PRC, PC) with at most six IUPAP Liaisons including IUPAP Chairs of C6 (Commission on Biological Physics), C13 (Commission on Physics for

Development), C14 (Commission on Physics Education). However since then the current membership of IComMP has slightly been modified. The IComMP Chairs were: Azam Niroomand-Rad (2003-2006), Barry Allen (2006-2009), Fridtjof Nusslin (2009-2015).

11.11 History Subcommittee (2008)

The IOMP History Subcommittee was established in 2008 under leadership of IOMP Past President, Azam Niroomand-Rad with close collaboration with Colin Orton, IOMP Past President and Slavik Tabakov. The goals of the Subcommittee are to archive published articles on IOMP history and recognize contributions of IOMP members by tabulating and listing their names. These include, but are not limited to those who served as EXCOM, Chairs and members of committees, Editors of MPW and members who assisted them, and Curators of International Library Program. In addition one of major goals of HSC is to interview and video prominent medical physicists who have made major contributions to international medical physics and the Organization. Azam Niroomand-Rad has served as Chair of HSC (2008-Present).

XII. IOMP IMPORTANT DOCUMENTS AND POLICY STATEMENTS

12.1 Review and Way Forward Document

In 2003 President Azam Niroomand-Rad and Secretary-General Peter Smith prepared a comprehensive Review and Way Forward Document with input from EXCOM. This was a valuable document to review the current activities of the Organization and to set out both short and long term priorities and plans for the Organization. The goal was to provide valuable working guidelines to EXCOM, Committees and Council for future direction of the Organization. It was also of value to a variety of organizations including potential sponsors, grant awarding organizations (e.g. charitable foundations), Corporate Members, as well as those organizations with whom we had mutual interests such as IUPESM, IFMBE, IAEA, WHO and IUPAP. In February 2006 this document was circulated to Council for discussion and was approved at the WC 2006 in Seoul, Korea.

The Review and Way Forward document consisted of the following sections:

- Past, Present and Membership of the Organization,
- Current Activities and Proposed Developments,
- External Relations,
- Administrative and Financial Affairs,
- Strategic Themes and Priorities, and
- Specific Proposals with Assigned Priorities for the next 5 years.

It was planned that Council should review this document

at regular intervals and it would evolve as IOMP evolves. A draft of most recent update of Review and Way Forward (2006-2012) document is available at the IOMP Website (www.iomp.org).

12.2 IOMP Policy Statements

In 2003 Oskar Chomicki proposed definition for medical physics and medical physicist and after some modification Council for the first time agreed on definitions of the terms '*Medical Physics*' and '*Medical Physicist*'. These were later considered in the IOMP Policy Statement 1.

In 2006 Council suggested a series of Policy Statements on key topics be prepared for their consideration. To date three Policy Statements have been approved:

- **IOMP Policy Statement No. 1: Role and Responsibilities of Medical Physicists** (2012)
- **IOMP Policy Statement No. 2: Basic Requirements for Education and Training of Medical Physicists** (2012)
- **IOMP Policy Statement No. 3: Predictions of Induced Cancers and Cancer Deaths in a Population of patients exposed to low Doses (<100mSv)**

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Contacts of the corresponding author:

Prof. A Niroomand Rad