

HISTORY

HISTORY OF MEDICAL PHYSICS – A BRIEF PROJECT DESCRIPTION

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I. INTRODUCTION

Medical Physics is a relatively young profession and medical physicists began to be employed in hospitals around the time of the introduction of X-ray equipment in medicine. At the same time the profession is very dynamic and new methods/equipment are constantly developed, introduced and replaced. This creates a need for a reference source showing the development of the profession and the progression of ideas. Such source is naturally a project describing the history of the profession. The projects aim will be to show the creation and the evolution of different equipment and methods, as well as their clinical application; the overall development of the profession and the main contributors in the various topics in medical physics.

The project results will be a very useful source of information for future new developments and will provide a canvas for future updates. Very importantly, the project results will be a written proof of the significant role played by medical physicists in contemporary medicine.

The idea about this project came at one of the EMITEL Encyclopedia project meetings (Lund, 2007) when its Consortium was discussing to include in the Encyclopedia of Medical Physics names of prominent medical physicists. It was decided that due to time restrictions of the EMITEL EU-funded project this is not viable at the moment. Soon after this I came up with the idea that the Encyclopedia experience might be used for the preparation of a concise project/book, dedicated to the development of our profession. The project was revived late in 2015 and discussed in the IOMP Publication Committee and IOMP Executive Committee. As a result it was decided the project to be developed as an international, IOMP-led activity.

Elements of medical physics history already exist in various Overviews/Reviews related to specific methods or equipment. Their authors will be contacted for collaboration

on the project, as well as any colleagues willing to help with this important initiative.

The project results will be a Compendium of various independent Volumes, as per the different branches of the profession. The results will be used not only by medical physicists, but also by medical doctors and other related professionals. The Compendium will be useful to researchers dealing with the stages of development/evolution of specific methods/equipment. The Compendium will be very useful to a broad audience and will create an excellent visibility for our profession.

The project will start with the time around the discovery of X-rays. The years before this period are very well described in Francis Duck's book "Physicists and Physicians", published by IPEM in 2013.

II. INITIAL STRUCTURE OF THE COMPENDIUM

The Compendium will have independent Volumes/Parts, which will reflect the main areas of development of medical physics, including:

- 1.Diagnostic Radiology (X-ray) Imaging
- 2.Computed Tomography
- 3.Radiotherapy (External beam)
- 4.Radiotherapy (Brachytherapy)
- 5.Nuclear Medicine Imaging
- 6.Ultrasound Imaging
- 7.Magnetic Resonance Imaging
- 8.Optical Systems and NIR in Medicine
9. Medical Informatics
10. Radiation Measurement and Protection in Medicine
11. Medical Physics – Professional Development
12. Medical Physics – Education&Training Development

Additional Volumes might be included to this initial spine (e.g. current methods as nanotechnology use, etc).

III. IDEA FOR THE SYSTEM OF PROJECT WORK

Each Volume of the Compendium will be relatively independent and will have its own Leads/Editors, who will prepare the internal structure of the Volume (its Chapters/Sub-chapters) and will invite colleagues to write these Chapters. This way the team for each Volume could span to more than 20 Contributors (especially when large Chapters have to be written). All these Contributors will write in parallel their Chapters and Sub-chapters, but will regularly send information about their progress to the Editors.

Each Chapter/Sub-chapter inside a Volume will refer to specific types of equipment and/or methods. The evolution of these will be described in a chronological manner – e.g.: what medical need existed, how the equipment/method idea has emerged; how it has developed; how it has been introduced into practice; how it has evolved; how it has been replaced by others OR has phased out OR has provided the background of something else, etc. These will be supported by a Reference list of the main publications (one system of citation to be used in all Volumes). It will be important the chronological order of development to be also applied for the Content of the Volume (when possible).

All Chapters and all Volumes of the Compendium will be developed in independent time periods. These will start and be completed at different times (some earlier, others later) depending on the teams and topics. When the content of one Volume is written, it will go through a Refereeing process (by another team of Colleagues). Their work will also be in independent periods of time. The Referees will also be listed as Contributors to the Volume. The development of the Compendium will pass through several “iterations”. The methodology of the projects will roughly follow the methodology of development of the Encyclopedia of Medical Physics project (www.emitel2.eu). This methodology was consulted at the time with historians.

The project will aim to present a comprehensive view of our professional history, this way its expected each volume to be at least around several hundred pages (depending on the topic). This will produce a significant overall size, whose development will take several years. The References to the respective Chapters and Sub-chapters will have to be kept relatively brief (the essential publications). The number of pages used for References (in each Volume) will be additional to the overall Volume size. The workload, distributed to many colleagues, will present a project, which will not be too difficult to develop (judging again by the experience with the Encyclopedia of Medical Physics).

Initially the project will start with several Volumes as a trial and later will expand to the development of other

Volumes. When one Volumes are ready, it will be printed as an Annex to the respective issue of the free online Journal of IOMP Medical Physics International (MPI). These Volumes will gradually form the Compendium *History of Medical Physics*.

The Editors and Contributors will have to have a broad view on the Volume topic and detailed knowledge about some of its parts. Care should be taken to have strong emphasis on the evolution of ideas over time (not so much on the current research). Early pioneers of some equipment/methods can be specially invited to contribute to the Volume. Many of the equipment and methods have been invented by members of AAPM and IPEM and this should be taken into consideration when selecting Editors/Contributors.

IV. AUTHORING AND COPYRIGHT

Each Contributor will be asked to prepare his/her Chapter/Co-Chapter free of charge. In case the Contributor uses students for Literature search, the names of these will be included as Contributors.

All Contributors, Editors and Referees form the overall team of Contributors to the respective Volume. Their names will be written next to the Respective Chapter/Sub-chapters in the Content of the book. All these names will continue to stay in the future updates (i.e. names cannot be excluded).

All Contributors should agree that the overall copyright will be with IOMP. In case of future paper print of the Compendium (or its Volumes), the income will be used solely for supporting the global development of the medical physics profession.

In case a Publisher wants to publish on paper the Compendium or some of its Volumes (in their existing form), the Publisher could have a License to Publish, but not the copyright (IOMP will hold the copyright of the electronic publication). This would allow future updates by the future IOMP teams, independently from the Publisher. This would further allow the electronic form of the Compendium (a sequel of e-books) to be updated at any time by the future teams of colleagues. This way the *History of Medical Physics* will form a life record of the development of our profession.

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Newton was not only a scientific genius, he was prescient in recognizing what was, and still is, the primary thrust and underlying theme of physics, to investigate the nature of matter and energy by going to smaller and smaller domains, each time finding the forces of attraction stronger than before. Now we're at the point where it appears we can't go any deeper than leptons and quarks, with the latter having a force of attraction so strong that we'll never see a free quark. And Newton saw it coming over 300 years ago.

Related Questions. More Answers Below. Stephen Hawking's book 'A Brief The History of Medical Physics project was initiated back in 2007. It was initiated in 2016 as an IOMP supported activity. The brief of the project was described in the Medical Physics International Journal (MPI 2017, v.5 No1, p.68), where all project results will be published in Special Issues. The project objective is to show the creation and evolution of different equipment and methods, as well as their clinical application; the overall development of the profession and the main contributors in the various topics in medical physics. This project will continue its development over many years

Reading (2). Brief history of physics. 1. Why do things fall to the ground, not away from it? Why do the stars move? Why does the Sun come up in the east and go down in the west? These are all questions that physics can answer, and a lot more! 2. In the beginning, people answered questions like these in philosophical or religious ways. A Greek philosopher Aristotle (384 BC – 322 BC) developed his theory of five elements (earth, water, fire, air, and aether). Archimedes (287 BC – 212 BC) discovered his principle of buoyancy. Ptolemy (90 – 168AD), created an Earth-centered model of the Solar sys