

THE IMPACT OF THE ICTP COLLEGE ON MEDICAL PHYSICS FOR THE ESTABLISHMENT OF MEDICAL PHYSICS IN DEVELOPING COUNTRIES

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Abstract- The regular College on Medical Physics at ICTP (the Abdus Salam International Centre for Theoretical Physics), Trieste, Italy, has been a strong support for the development of medical physics in developing countries. Additionally ICTP has participated in several medical physics education/training projects and has hosted several International Conferences in this field. Recent feedback assessment shows significant (66%) increase of participants knowledge. During its more than 20 years history the college has educated more than 1000 young medical physics colleagues from developing countries.

Keywords- Education, training, developing countries.

INTRODUCTION

The International College on Medical Physics (CMP) at ICTP (the Abdus Salam International Centre for Theoretical Physics) in Trieste, Italy has operated for more than 20 years. Although ICTP does not have a permanent Research Activity in the field of Medical Physics, a very vigorous training and Conference activity takes place. It started with an International Conference on the Applications of Physics to Medicine and Biology in 1982 (organised by Giorgio Alberi). Another successful Conference and several Workshops were organised in the following years, demonstrating the need for Medical Physics education for the developing countries. This convinced ICTP to expand their training activities with Medical Physics. The first College on Medical Physics took place in 1988 (a 4 week activity with the participation of 68 scientists from developing countries). The regular series of Colleges begun in 1992 and continues to run on a regular basis (usually bi-annually). During the period the ICTP has educated more than a 1000 young medical physicists mainly from developing countries. From the beginning corner stones for the ICTP involvement in Medical Physics were Luciano Bertocchi (then Deputy Director of ICTP) and Anna Benini (then IAEA Officer). Additionally, a number of prominent

professionals were engaged with the College on Medical Physics, including John Cameron (USA), Sergio Mascarenhas (Brazil), Perry Sprawls (USA) and Slavik Tabakov (UK). The current Co-Directors include also Franco Milano (Italy) and George D Frey (USA), while the Hospital training is organised by Mario De Denaro.

MEDICAL PHYSICS COLLEGES AT ICTP

The transfer of knowledge and experience to the developing countries is a major objective of the College. Each participant receives a full set of lecturing materials, including Power Point slides, e-Learning materials, access to web sites, etc. These have triggered tens of Medical Physics activities and courses in the developing countries and helped hundreds of colleagues from these countries to practice the profession. Due to this reason CMP is always one of the most over-subscribed training activities of the ICTP – see Figure 1.

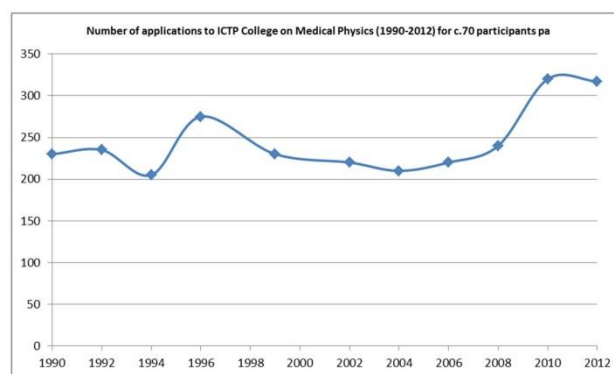


Figure 1. Applications to ICTP College on Medical Physic

CMP usually accepts colleagues from 30 to 40 developing countries. It is known that in general, physicists from these countries have good educational foundations in general physics. The College builds on

this foundation by providing education on the recent advances in medical physics. Participants of previous Colleges on Medical Physics have demonstrated its great value as they have formed a significant medical physics infrastructure in their countries.

ACTIVITIES AND EFFECTIVENESS OF THE ICTP COLLEGE ON MEDICAL PHYSICS

Some areas of Applied Physics in medicine (especially Radiotherapy physics) are covered by specific courses provided by various institutions, organizations, and agencies, however there are not sufficient courses, available elsewhere, which cover Physics of Medical Imaging. Additionally very few of those include training on the practical application and optimization. Because of this the CMP emphasis during the last decade is on Medical Imaging Physics.

The effectiveness of the 2010 and 2012 Colleges (both with focus on Digital Imaging) was assessed with 3 Questionnaires – collecting feedback on the College Organisation, syllabus, knowledge transfer and suggestions. The results of these questionnaires showed significant effectiveness in increasing the knowledge of participants. In brief while the student's estimate of their knowledge prior to the College was with a mean of 45%, after the College it was with a mean of 75%. This regular feedback is also used for modifying the programme for each following College. This approach to improve the Curriculum with the active participation of the students has been one of the successes of CMP.

The increased interest of ICTP in Medical Physics led to its inclusion in several international projects. Most notable are EMERALD, EMIT and EMITEL. The first two developed e-Learning training materials in physics of: X-ray Diagnostic Radiology, Nuclear Medicine, Radiotherapy, MRI and Ultrasound Imaging. EMERALD was not only the first e-learning in medical physics, but introduced one of the first ever e-books. Currently each participant receives a free set of these materials. In connection with these training materials ICTP hosted three International Conferences (in 1998, 2003 and 2008) – these were the first international Conferences on medical physics training. The importance of the above projects can be judged by the fact that in December 2004 the EMIT project received the inaugural European Union "Leonardo da Vinci" award.

The Conference in 2008, related to project EMITEL, introduced the first e-Encyclopaedia of Medical Physics (currently used by some 9000 colleagues each month). This Conference established a good relationship of ICTP with IOMP (also a partner in EMITEL). Recently IOMP supported other medical physics activities of the ICTP.

Apart from the regular CMP in Trieste, ICTP initiated

similar courses in other countries. The first Regional College on Medical Physics was conducted in Mumbai, India during November 2007. The first week was devoted to The Physics and Technology of Medical Imaging and the second week to The Physics and Technology of Radiation Therapy. Perry Sprawls and S.D.Sharma were the Academic Directors and the College was also supported by the ICTP, and the Bhabha Atomic Research Centre (BARC), Mumbai, India. Additional co-sponsors were the American Association of Physicists in Medicine (AAPM) and the Association of Medical Physicists in India (AMPI).

ICTP operates under the aegis of UNESCO and IAEA and naturally alongside the CMP, hosts many IAEA Workshops and Symposia. In 2005 ICTP was the Co-Organiser of the World Conference "Physics and Sustainable Development" in Durban, South Africa, where one of the main directions for applied physics in the XXI century was voted to be Physics in Medicine.

ICTP also supports Medical Physics research in a similar way to other scientific areas. This is through two programs for individuals: The Associate Members and the Programme of Research and Training in Italian Laboratories. Associate Members are scientists from developing countries who are given the opportunity of spending periods of up to three months, three times during their appointment, to use the Centre's facilities and to conduct research. So far some 50 scientists have been appointed as Associate members in medical physics.

The programme of Research and Training in Italian Laboratories - TRIL - gives the opportunity to experimental scientists to spend periods of time up to one year joining a group in an Italian laboratory. In the area of Medical Physics 48 Italian laboratories offer this opportunity, and a total of 97 scientists were trained so far.

CONCLUSION

During its long history the College on Medical Physics at ICTP has introduced successful educational models and has helped many colleagues from less developed countries to begin/stabilise their medical physics activities. Many colleagues from these countries see ICTP as one of their first encounters with the profession and IOMP has always shown high appreciation and support for this international impact of the ICTP for the developing countries.

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