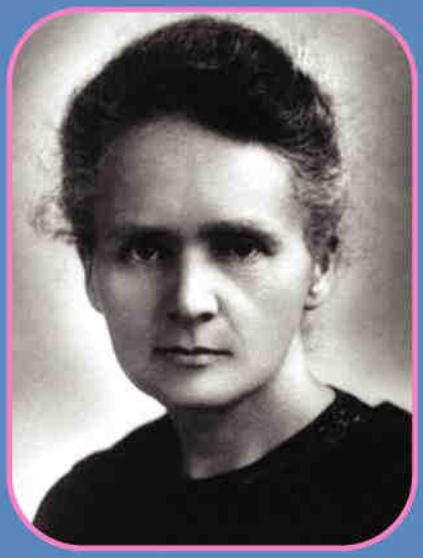
Voice of BMPS

An official e-Newsletter of BMPS / Issue 2 / November 2014

Bangladesh Medical Physics Society

International Day of Medical Physics (IDMP)
7th November, 2014



Marie Sklodowska-Curie
(7th November 1867 – 4th July 1934)

'Looking into the Body: Advancement in Imaging through Medical Physics'

Celebration

INTERNATIONAL DAY OF MEDICAL PHYSICS (IDMP)

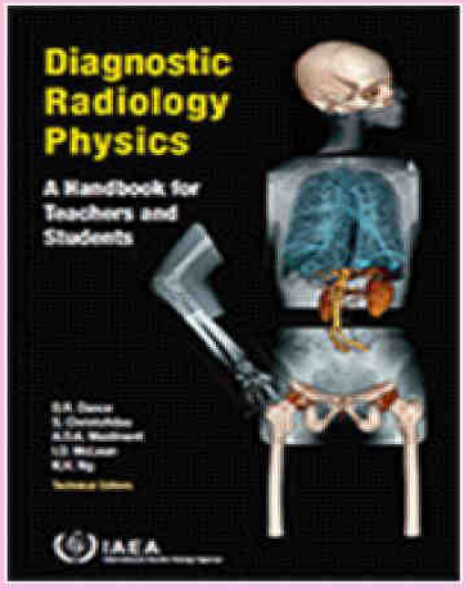
7TH NOVEMBER, 2014

Organized by:

Bangladesh Medical Physics Society (BMPS) & MPBME, GB

Venue:
Dept. of Medical Physics and Biomedical Engineering (MPBME), Gono University

Seminar, IDMP, 7th November 2014



A new Handbook of IAEA, published in 2014

2nd International Conference on Medical Physics in Radiation Oncology and Imaging (ICMPROI), 20-22 August 2014

Designed by Sajan Hossain, MPBME, GB

CONTENTS

Articles in this issue

News & Events

Awards and Honors

Editorial

Bangladesh Medical Physics Society (BMPS) is going to publish the 2nd issue of its official e-newsletter "Voice of BMPS" on the 7thof November, 2014. We feel honored to publish the newsletter each year in the International Day of Medical Physics (IDMP) that meets the birthday of Madam Marie Sklodowska–Curie, a pioneer in Medical Physics.

Bangladesh has now a young generation of medical physicists who are committed to improve education research and health care situation in their native land. They gather knowledge on job as well as receive individual training from aboard. Therefore BMPS has a plan to begin a training program with the support of foreign friends and international institutes in near future to develop qualified medical physicists in Bangladesh. Still then we can say that medical physics education as well as cancer treatment in Bangladesh is progressively better day by day. The readers can read this development in our newsletters.

This issue contains scientific articles, articles on education, news, events, progress in cancer hospitals and so on. We are happy to observe that even the students of medical physics and biomedical engineering are also contributing their activities in this newsletter.

The theme of this year IDMP is **"Looking into the Body: Advancement in Imaging through Medical Physics"**. This reminds us the importance of medical physicists in diagnostic imaging. As in most of the developing countries including Bangladesh this practice is still not developed. BMPS is aware of this problem and trying continuously to develop public awareness in all sectors of medical physics.

We deliver our thanks to AFOMP, who recognizes us through our activities in Bangladesh and also to IOMP for its continuous support. Lastly, We are also thankful to the members of this newsletter for their untiring efforts to publish this issue in right time after a successful "2nd International Conference on Medical Physics in Radiation Oncology and Imaging (ICMPROI-2014) in August this year.

With warmest thanks,

Dr. Hasin Anupama Azhari

Message

On 23 June 2014, AFOMP's members overwhelmingly voted for the Bangladesh Medical Physics Society be admitted to affiliate membership of AFOMP. Personally, I was very pleased that the vote was in favour of BMPS's admission to AFOMP as it was clear to me that it is a very active society that is working hard to promote medical physics in Bangladesh. The dedication and enthusiasm of its leadership is impressive and BMPS will be a major force in its region.

AFOMP is working hard to represent the interests of all medical physicists in the Asia-Oceania region. In some countries, such as Bangladesh, there is more than one medical physics society. In the past AFOMP has not actively tried to work with societies that are not already International Organization for Medical Physics members as IOMP and AFOMP only allow each country to have one medical physics society as a full member. The emergence of more medical physics societies in some countries has encouraged us to use alternative membership categories to ensure that we communicate with those medical physicists.

Medical physicists are to be found in more countries in the AFOMP region as medical services in smaller and in underdeveloped countries improve. Medical physicists are employed in Cambodia, Myanmar, Afghanistan, Uzbekistan, Tajikistan and Kyrgyzstan and French Polynesia, and in future, as radiation oncology service are established, medical physicists will also be employed in Laos, New Caledonia, New Guinea and Fiji. This provides a challenge to AFOMP as the number of medical physicists in these countries is so small that it is not feasible for them to establish national medical physicist societies, so until recently there was no way for them to have a formal association with AFOMP. So at the last Council and Executive meeting of AFOMP in Ho Chi Minh City in October, a new form of membership was established: Individual Membership. This is only available to medical physicists in countries where there are less than 10 medical physicists. The expectation is that once there are 10 physicists, then they will form a medical physics society that will become an AFOMP member.

AFOMP continues to work for the interests of medical physicists in its region by promoting the activities of its members, running the annual Asia-Oceania Congress of Medical Physics, publishing medical physics professional, education and workforce policies, etc. AFOMP's Executive and Council look forward to a fruitful relationship with BMPS that will extend and develop medical physics in Bangladesh and the AFOMP region.

I trust that the Bangladesh Medical Physics Society will join with the rest of the medical physics community in celebrating the International Day of Medical Physics (IDMP) on 7th November. This year the theme is "Looking into the Body: Advancement in Imaging through Medical Physics". Please look at IOMP's IDMP page www.iomp.org/idmp/ and the Facebook page https://www.facebook.com/InternationalDayOfMedicalPhysics. I am very pleased that BMPS is going to publish its 2nd newsletter (Voice of BMPS) on that important day. I wish BMPS every success for the future.

W. H. Round.

Howell Round
Secretary General, AFOMP

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Investigation of perturbation correction factors for PTW semiflex 0.125 cm^3 chamber with EGSnrc Monte Carlo transport code

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Abstract

Radiation dosimetry is an integral part of the radiation therapy process. The ultimate goal of radiation dosimetry is to determine the dose delivered to the tumor and to the normal tissues in a patient undergoing radiotherapy. There are several steps involved in radiation dosimetry: beginning with measurements performed at a national standards laboratory followed by reference dosimetry performed at a radiation therapy clinic and treatment planning to predict the dose to the patient and finally, an estimation of the dose delivered to the tumor. The ionization chamber is the simplest and the mostly widely used radiation detector for measuring radiation source output in radiation therapy practice. In the basis of the cavity theory, among others, perturbation corrections are necessary for determining the dose in water with the radiation detectors. The corrections are made by theoretically/experimentally or recently developed Monte Carlo techniques. This study presents Monte-Carlo based calculations with the 60Co radiation field for a common used PTW semiflex 0.125 cm3 ion chamber employing the CAVRZnrc code system. The CAVRZnrc is one of the code systems under EGSnrc. The EGSnrc Monte Carlo code (Electron-Gamma Shower) is a package of codes used for the simulation of electron and photon transport through an arbitrary geometry. The chamber geometry was used from the manufacturer's provided chamber specifications. A model of the PTW31010 "semiflex" thimble chamber with a volume of 0.125 cm3 was used for calculation of the electrode correction factor Pcel and the wall correction factor Pwall. The PTW31010 consists of almost hemispherical cavity with a graphite coated (0.82 g/cm3) and chamber wall made of PMMA (1.19 g/cm3). The aluminum electrode inside the air cavity is 0.5 cm long and has a diameter of 0.11 cm. The dimensions of the PTW31010 were partly taken from the chambers manual. The calculated value of Pwall, Pcel and Prepl is found to be 1.008 ± 0.6%, 0.995 ± 0.7% and 0.898 ± 0.7% respectively.

Introduction

Current dosimetry protocols for the determination of absorbed dose in radiotherapy beams are based on standards of absorbed dose to water [1, 2]. The usage of ionization chambers requires the application of beam quality correction factors to account for differences of ionization chamber response between calibration in a 60Co beam and measurement in the user's beam of different quality. The correction factors are ideally determined via measurements (e.g. with a calorimeter) for each ionization chamber and for each beam quality of the user. In many cases the measured correction is not available for a specific chamber type or beam quality, which requires application of calculated values based on cavity theory. Calculated beam quality correction factors as a product of stopping power ratios and single perturbation factors have been shown to give an accurate estimate of average measured values [3, 4]. The measurement of single perturbation factors is difficult or even impossible since most of them always occur together. Elaborate Monte Carlo Codes allow the calculation of ionization chamber response, accurate at the 0.1% level normalized to own cross sections [5, 6]. Perturbation factors have been calculated with the use of Monte Carlo simulations in the past, some of the results are used in dosimetry protocols. For example the central electrode correction factor Pcel in the TRS-398 and the TG-51 protocol is based on the study by Ma & Nahum [7]. It was discussed by Sempau et al. [8], that the use of single perturbation factors is based on approximations involved. One of the approximations underlined in their study is the assumed independence of the perturbation effects, which do not influence each other. They therefore calculated an overall correction factor for plane-parallel chambers in electron beams, omitting single perturbation factors.

In this present study, a set of separate perturbation correction factors is calculated for PTW semiflex 0.125 cm3 ionization chamber of model 31010 with 60Co beam. We compare the results with various published values found in literature and in the current dosimetry protocols.

Material and Method

EGSnrc Monte Carlo transport codes [9] are used to calculate the factors. The dimension of the water phantom was 20cm×20cm×20cm. The calculations depth was 5 cm with the radiation field of 10 cm diameter. 60Co spectrum with 80 cm SSD was used to calculations.

Table 1: The properties of the PTW semiflex 0.125 cm3 ionization chamber of model 31010 and dimensions.

Parameters	Value	Parameters	Value
Wall material	PMMA	Length of electrode	5 mm
Wall material density	1.19 g/cm3	Thickness of graphite coat	0.15 mm
Wall thickness	0.55 mm	Graphite density	0.82g/cm3
Central electrode	Aluminum	Radius of sensitive volume	2.75 mm
Aluminum density	2.69g/cm3	Length of sensitive volume	6.5 mm
Electrode diameter	1.1 mm	Effective volume	0.125 cm3

The dosimetry protocols based on absorbed dose to water standards make use of the Spencer-Attix cavity theory. The theory has three necessary assumptions: (1) the cavity does not change the electron spectrum in the medium; (2) the dose in the cavity comes from electrons that enter the cavity and not from those that are created within the cavity; (3) charged particle equilibrium (CPE) will be exist. In case of radiotherapy dosimetry, water phantom and air filled ionization chamber normally be used. The ion chambers do not satisfy the above assumptions and its need to be corrected for accurate dosimetry. This theory relates the dose in an air cavity Dair to the absorbed dose to water Dw by applying Spencer-Attix stopping-power ratios between water and air.

$$D_w = D_{air}\left(\frac{\bar{L}}{\rho}\right)^{water}_{air} P_{cel}\ P_{stem}\ P_{wall}\ P_{repl} \qquad (1)$$

$$\left(\frac{\bar{L}}{\rho}\right)^{water}_{air}$$

Where, is the mean mass collision stopping-power ratio. The factor P_{cel} accounts for the central electrode in a semiflex thimble ionization chamber. The wall perturbation factor Pwall is applied, since the chamber wall material differs from the surrounding water. The stem correction Pstem takes the existence of a chamber stem into account, but is usually ignored or included in some way in the wall correction. The replacement correction Prepl accounts for the fact that the air cavities of a cylindrical chamber causes less attenuation or build up than the water displaced by it and causes the upstream shift of the effective point of measurement.

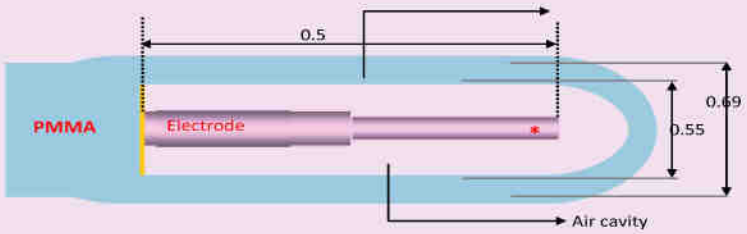


Fig.1: Schematic diagram of a PTW semiflex 0.125 cm3 ion chamber. All dimensions presents in cm.

CAVRZnrc user code [9] was used to simulate to calculate the factors. Where, photon and electron cutoff energy were modeled 0.001MeV and 0.521MeV respectively. 109 particle histories were simulated for each calculation. XCOM Photon Cross Sections data are used for simulation from NIST published by Hubbell et al [10].

Calculation of Pcel: The fluence was calculated to the chamber effective point of measurement with central electrode, Delec and without central electrode, Dnoelec. The factor Pcel is calculated using the eqn- 2.

$$P_{cel} = \frac{D_{noelec}}{D_{elec}} \qquad (2)$$

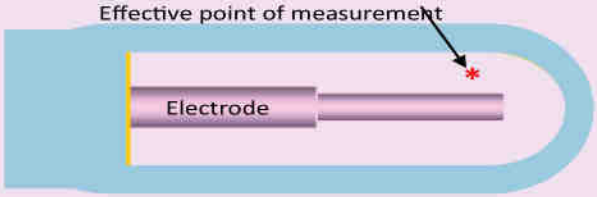


Fig. 3(a): PTW semiflex chamber model with central electrode for the calculation of D_{elec}

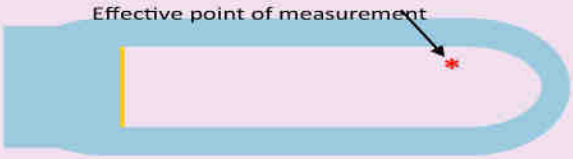


Fig. 3(b): PTW semiflex chamber model without central electrode for the calculation of Dnoelec.

Calculation of Pwall: The fluence was calculated on chamber effective point of measurement without central electrode with air filled, Dwall and without central electrode and wall, Dnowall. The existing wall material was replaced by water for Dnowall calculation. The factor Pwall is calculated using the eqn. 3.

$$P_{wall} = \frac{D_{nowall}}{D_{wall}} \qquad (3)$$

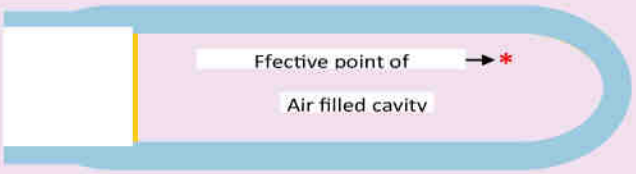


Fig. 4(a): PTW semiflex chamber model for the calculation of Dwall.

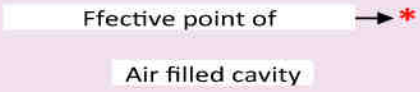


Fig. 4(b): PTW semiflex chamber model for the calculation of Dnowall.

Calculation of Prepl:

The factor was calculated directly with the simulation of EGSnrc code on chamber effective point of measurement without central electrode and wall with air filled cavity, Dair. Secondly, chamber was replaced by water and the calculation was taken from the effective point of measurement, Dwater. The factor was calculated by using the eqn. 4.

$$P_{repl} = \frac{D_{air}}{D_{water}} \qquad (4)$$

Results and Discussion

The calculated value Pwall is found to be 1.008 ± 0.6%. This is in good agreement with the published value 1.001 in TRS-398 [2] with PTW 31003 flexible ion chamber. The calculated value Pcel is found to be 0.995 ± 0.7%. This is in good agreement with the published value 0.993 in TRS-398 with PTW 31003 flexible ion chamber. The calculated value of Prepl is found to be 0.898 ± 0.7%. The AAPM's TG-51 [11] and TG-21[12] dosimetry protocols use a value of Prepl = 0.992 for a cylindrical chamber of inner diameter of 6 mm in a 60Co beam. This value is from the work of Cunningham and Sontag [13] who derived Prepl based on analytical calculations and experiments. For the same quantity the IAEA's TRS-398 Codes of Practice [2] use a value of 0.988 which is based on the measured data of Johansson et al. [14].

Reference

1. P. R. Almond, P. J. Biggs and B. M. Coursey et al., AAPMs TG-51 protocol for clinical reference dosimetry of high-energy photon and electron beams. Med. Phys. 26: 1847– 870 (1999).

2. P. Andreo, D. T. Burns and K. Hohlfeld et al., TRS-398: Absorbed Dose Determination in External Beam Radio therapy: An International Code of Practice for Dosimetry based on Standards of Absorbed Dose to Water. International Atomic Energy Agency, (2001).

3. P. Andreo, Absorbed dose beam quality factors for the dosimetry of high-energy photon beams. Phys. Med. Biol. 37: 2189–2211(1992).

4. D. W. O. Rogers, The advantages of absorbed-dose calibration factors. Med. Phys. 19(5): 1227–1239 (1992).

5. I. Kawrakow, Accurate condensed history Monte Carlo simulation of electron transport. I. EGSnrc, the new EGS4 version. Med. Phys. 27(3): 485–498 (2000).

6. I. Kawrakow, Accurate condensed history Monte Carlo simulation of electron transport. II. Application to ion chamber response simulations. Med. Phys. 27(3): 499–513 (2000).

7. C. M. Ma and A. E. Nahum, Effect of size and composition of the central electrode on the response of cylindrical ionization chambers in high-energy photon and electron beams. Phys. Med. Biol. 38: 267–290 (1993).

8. J. Sempau, A. Sanchez-Reyes and F. Salvat et al., Monte Carlo simulation of electron beams from an accelerator head using PENELOPE. Phys. Med. Biol. 46(4): 1163–1186 (2001).

9. I. Kawrakow, E. Mainegra-Hing and D.W.O Rogers et al., The EGSnrc Code System: Monte Carlo Simulation of Electron and Photon Transport. Ionizing Radiation Standards, NRC, Ottawa, Canada, NRCC Report PIRS-701 (2010).

10. J. H. Hubbell and I. ØverbØ, Relativistic atomic form factors and photon coherent scattering cross sections. J. Phys. Chem. Ref. Data, 9:69 (1979).

11. American Association of Physicist in Medicine, Task Group 51: Protocol for clinical reference dosimetry of high-energy photon and electron beams, Med. Phys 26: 1847–1870 (1999).

12. American Association of Physicist in Medicine, Task Group 21: A protocol for the determination of absorbed dose from high-energy photon and electron beams, Med. Phys. 10: 741–771 (1983).

13. International Atomic Energy Agency. Absorbed Dose Determination in Photon and Electron Beams: An Inter national Code of Practice, Technical Reports Series No. 277 (2nd edn in 1997), IAEA, Vienna, (1987).

14. K. A. Johansson, L.O. Mattsson and L. Lindborg et al., Absorbed dose determination with ionization chambers in electron and photon beams having energies between 1 and 50 MeV. National and International Standardiza tion of Radiation Dosimetry (Proc. Symp. Atlanta, 1977), IAEA, Vienna, 2:243–270 (1978).

On Occasion of 2nd International Day of Medical Physics

Suresh Poudel

On November 7, this year Medical Physicists around the world are going to celebrate 2nd International Day of Medical Physics (IDMP) to mark the birth date of Marie Sklodowska- Curie, the pioneer researcher on radioactivity, who was born on the same day in 1867. The theme of IDMP 2014 is "Looking into the Body: Advancement in Imaging through Medical Physics."

Last year on the same day, to mark 1st IDMP, a Symposium was organized at B. P. Koirala Memorial Cancer Hospital (BPKMCH), Bharatpur, Chitwan, Nepal. It had been a successful event. Nepalese Association of Medical Physicists (NAMP) is the professional organization of/for Nepalese Medical Physicists. NAMP is small in terms of its membership subscription. Nevertheless it has been an important organization to further the role of medical physicists in national context and in international arena. NAMP is a member of International Organization of Medical Physicists.

Although International Labor Organization (ILO) has listed medical physicists as health professions, it is the least heard profession in Nepal. Many of us even when we are in medical professionals do not know who medical physicists are and what exactly they do. So it has been urgent to make everyone clear about the role of Medical Physicist in Healthcare, particularly in diagnosis and therapy of cancer.

Medical Physicists are basically the physicists who apply their knowledge of physics to medicine. On the occasion of 2nd IDMP, I found it relevant to highlight the role of Medical Physicists in medicine. According to American Association of Physicists in Medicine (AAPM) many medical physicists are heavily involved with responsibilities in areas of diagnosis and treatment, often with specific patients. These activities take the form of consultations with physician colleagues. Medical physicists play a vital role and often leading role on medical research team. Their activities cover wide frontiers, including such key areas as cancer, heart disease, and mental illness. In cancer, they work primarily on issues involving radiation, such as the basic mechanisms of biological change after irradiation, the application of high energy machines to patient treatment, and the development of new techniques for precise treatment. Similarly in teaching often medical physicists have faculty appointments at universities and colleges, where they help train future medical physicists, resident physicians, medical students, and technologists who operate the various types of equipment used to perform diagnosis and treatment.

Besides in hospitals, medical physicist is generally responsible for specification, acceptance, commissioning, calibration and quality assurance of all radiotherapy equipment; radiation measurement of beam data; calculation procedures for determination and verification of patient doses; physics content of treatment planning and patient treatment plans; supervision of therapy equipment maintenance, safety and performance; establishment and review of QA procedures, radiation safety and radiation protection in the radiotherapy department. Besides they have important roles in education and research.

To conclude, medical physicist is an important member of cancer diagnosis and treatment team. She is a person who conducts scientific research on physics and medicine and also does teaching and deals with radiation protection and safety issues inside and outside the hospitals.

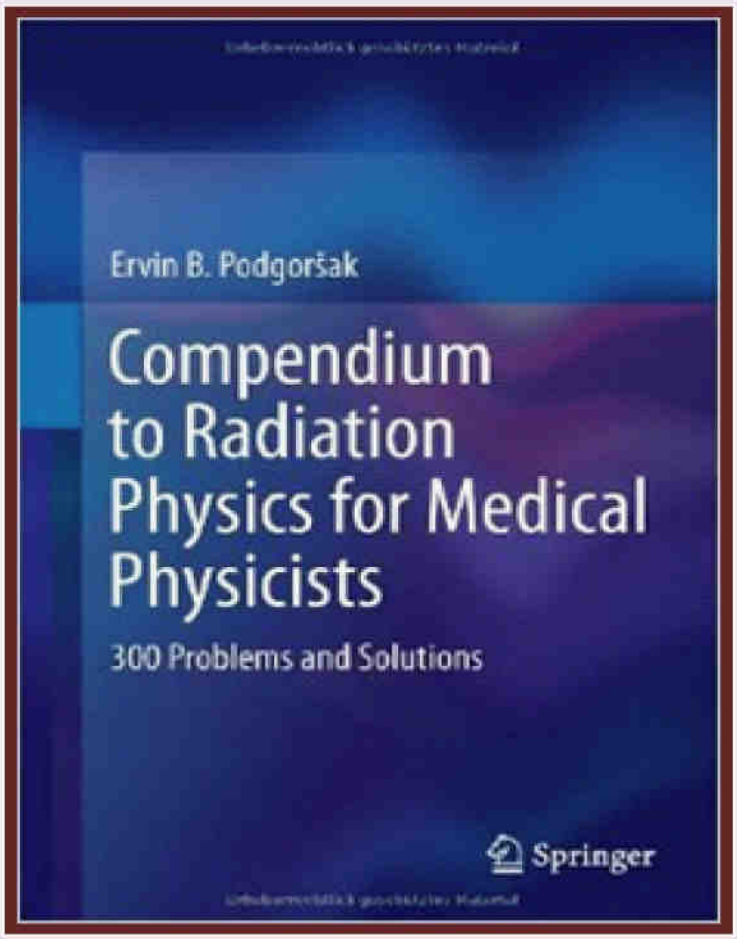
The writer is a student of Gono University, Savar, Dhaka, Bangladesh and a member of Bangladesh Medical Physics Society (BMPS).

Teaching and Learning in Medical Physics: The new "Compendium to Radiation Physics for Medical Physicists" by E. B. Podgoršak

Teaching as well as learning always requires good textbooks. Good textbooks on medical physics have been written or edited by a series of authors and are now well available. With reference to medical physics in radiation oncology one could especially mention the two more recently published and well known textbooks: "Radiation Oncology Physics: A Handbook for Teachers and Students" edited by E. B. Podgoršak and issued by the International Atomic Energy Agency, Vienna in 2005 [1], and the "Handbook for Radiotherapy Physics - Theory and Practice" edited by P. Mayles, A. Nahum, and J. C. Rosenwald and published by Taylor & Francis in 2007 [2]. In both books the text material has been developed with the assistance of a large number of contributing specialist authors from multiple continents under the expert guidance of the editors.

In addition and equally important, successful learning also requires continuous exercising. In this context the new recommendations of the European Parliament and Council regarding qualification appear quite important. These recommendations have introduced a new terminology and a new qualifications framework for Europe called the "European Qualifications Framework" (EQF) [3]. A key characteristic of that EQF is that qualification levels are defined in terms of learning outcomes, and that these learning outcomes are expressed as inventories of knowledge, skills and competences (KSC). The term "skills" refer to that type of qualification which must be acquired by exercises and training.

Consequently, books containing exercises and training material are needed as urgent as textbooks comprising the knowledge in the field. Now we have indeed such a new book in Medical Physics: The "Compendium to Radiation Physics for Medical Physicists" written by E. B. Podgoršak and published by Springer in 2014. The following text is taken from its preface:



This book is intended as a supplementary textbook for a radiation physics course in academic medical physics and biomedical engineering graduate programs as well as a reference book for candidates preparing for certification examinations in medical physics subspecialties. The book may also be of interest to graduate students in physics, chemistry, and various branches of engineering wishing to improve their knowledge and understanding of modern physics and its intimate relationship with radiation physics applied to medicine.

The book contains 129 specific sections grouped into 14 chapters. Each section contains one or more long questions that consist of several shorter questions related to the subject material of the specific section. The chapters and sections of this textbook follow the layout of the textbook: "Radiation Physics for Medical Physicists" published by Springer in 2010 and the 300 solved problems presented in this book are intended to provide supplementary information to the radiation physics textbook through examples relevant to the topics discussed in individual sections of the textbook.

A last remark: Having made the differentiation between gaining knowledge and gaining skills it is interesting to realize that this book "can also stand on its own as a radiation physics textbook serving as a tool for learning radiation physics through perusing a series of solved radiation physics problems". The following question is a nice example for that: Betatrons typically operated in the 25 MV x-ray mode. When 25 MV linacs were introduced into clinical service, percentage depth doses they produced in water were significantly shallower than those produced by 25 MV betatrons. How was this surprising finding explained and rectified?

I am sure that it may happen that even more experienced medical physicists not immediately know the answer and, accordingly, can improve their knowledge using this book.

In summary, I consider this new "Compendium to Radiation Physics for Medical Physicists" as a really significant enrichment for all involved in teaching Medical Physics.

Prof. Dr. Guenther Hartmann
European Federation of Organisations for Medical Physics
Chair, Education & Training Committee

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- Maximum number of source transfers: 100,000 transfers, tests included a curved applicator

ELEKTA

*Historically it was the first article written by Prof. Zakaria in 1991 in the initial phase of awaking the people to the new subject of Medical Physics in Bangladesh. We republish this important article for the new generation of medical physicists and biomedical engineers in Bangladesh- Editor, BMPS news letter

Scientific cooperation in medical physics between the People's Republic of Bangladesh and the Federal Republic of Germany*

Golam Abu Zakaria

Introduction

Experts of development work are unanimously of the opinion that the technology transfer to the developing countries will be helpful in long term to solve the problems of underdevelopment on the scene. A technology to be transferred would work successfully if enough specialists and know how are available in the respective countries. For this purpose cooperation in the field of science on the educational, training and research level between the industrial countries and the developing countries proved to be imperative.

This paper describes a concrete concept of such cooperation in the field of medical physics, between the People's Republic of Bangladesh and the Federal Republic of Germany (F.R.G). The paper has been divided into three parts. The first part gives a general historical review of medical physics as such and the facilities of higher training for medical Physicists as well as the areas of their professional activities in the F.R.G. The second part deals with the nature and level of studying medical physics and the areas of its application in Bangladesh. The third part of this paper finally illustrates the concept of cooperation in this field between Bangladesh and Germany.

Historical background

Medical physics is a branch of applied physics. It deals with the application of laws and methods of physics to solve problems in medicine. It is mainly exercised in medical care, education and research work (6, 7). Medical physics must not be confused with biophysics. Biophysics mainly deals with the physical analysis of biological structures, functions and behaviour. The application of physical findings in medicine isn't new.

Leonardo da Vinci (1452-1519) became famous for his pilot work in the field of human anatomy and blood circulation. Furthermore he noticed that wings of bats have a skin which strengthens the inner bones' structure. He advised to construct the wings of a flying machine based on the principal of bats' wings and not of simple birds' (7, 12).

The founder of the modern scientific methodology, who was also one of the most famous experimenters we ever had, Galileo Galilei (1564-1642), used the vibrations of a pendulum to determine his pulse. He also constructed a thermometer for measuring body temperature (12). Many other natural scientists transmitted physical inherent laws to medical processes.

In Wuerzburg in Germany on 8th November 1895, W. Conrad Roentgen (1845-1923) discovered "a new kind of rays" which today everybody knows as x rays. About 114 days later on the 1st March 1996, in Paris Henri Becquerel (1852-1909 discovered radioactivity. He was followed by his pupil Marie Curie (1867-1934), who identified the two radioactive elements polonium and radium in year 1898 (5, 11,12).

Other excellent physicist like Max Planck (1858-1947), Ernst Rutherford (1871-1937), Albert Einstein (1879-1953), Niels Bohr (1885-1962), Enrico Fermi (1901-1954) and Arthur Compton (1891-1962) made important fundamental scientific contributions, which were very important for the medical application of ionizing radiations (11,12).

These important scientific inventions introduced new areas in medicine, which opened up a lot of possibilities for diagnostically and therapeutically applications. With these new contributions, it became necessary to form a new discipline in medicine, which is now known as radiology. As far as the methodology is concerned radiology is based on the principles of radiation physics.

Radiation physics, better known as medical radiation physics is, as the name says, a main part of medical physics dealing with the application of ionizing rays in the field of medical diagnostics and therapy. The fields of application of medical radiation physics are radiological diagnostics, radiotherapy, nuclear medicine and radiation protection.

Some physicist like Sidney Russ (1879-1963) in England, W. Duane (1872-1935) in the USA worked in radiological departments of hospitals between 1910 and 1920. In the 30-s medical physics was first developed in England and Sweden. Among others Louis Harold Gray (1905-1965) from England and Rolf Sievert (1896-1966) from Sweden contributed a lot to develop medical physics at that time.The known "Department of Medical Physics" at universities of both countries were established in order to keep up with rising demand for medical physicist (5, 6).

In the beginning medical physics in Germany was practised only at the university clinics and hospitals by educated physicists. They had to acquire the necessary knowledge on their own in their profession. Physicist personalities like Friedrich Dessauer (1881-1963), Boris Rajewsky (1893-1974), Walter Friedrich (1883-1968), Richard Glocker (1890-1978) played pioneer roles to develop medical physics in Germany. The number of medical physicist in hospitals rose permanently. Since its foundation in 1969, the German Society for Medical Physics (DGMP) has taken part decisively to develop medical physics in general and to improve the professional image of medical physicists. Today the departments of medical physics at universities and hospitals form an indispensable part of the whole medical care. About 1300 medical physicists work in different independent departments or sectors of medical physics in institutions, clinics and hospitals. The medical physicist is the equal partner of the doctor in the health care (6, 8).

The higher training of the medical physicist as a qualified expert

The medical physicist has to be practically and theoretically qualified to bear the co-responsibility for the patient by his work in the hospital as the doctor's partner. The precondition for an independent work in the clinical area in Germany is a 2-years practice in medical physics under the supervision of a qualified medical physicist (9).

An additional extended qualification, like the specialisation of medical doctors, allows the physicist to carry the extra title "Medical Physicist with special recognition" or "Qualified Medical Physicist". Today it's nearly impossible to get a leading position in medical physics without recognition of this subject. The DGMP has fixed the principals for higher education to become a medical physicist with special recognition. According to these principals one needs a fundamental qualification, a university study which completes with a diploma paper or state examinations (like M.Sc. or M. Phil in English speaking countries) in a physical sector (6,13).

This extended qualification "Medical Physicist with special recognition" includes a professional practice of at least 3 years in medical physics and the participation of selected topics in different subjects (at least 360 hours), is orientated according to the guidelines of the DGMP and under the supervision of a tutor. The students shall acquire experiences and practical knowledge in medical physics, through those 3 years of professional practice in recognized institutions. The selected topics mediate useful lectures and reports, seminars and colloquies and practical exercises at different universities and academic institutions (13). The above mentioned 360 hours cover selected topics from the following 16 subjects (13):

1) Anatomy and Physiology
2) Biophysics
3) Bio mathematic and Computer Science
4) Medical-instrumentation
5) Organisation structure of hospital
6) Radiation Therapy
7) Nuclear medicine
8) Radio diagnostics
9) Medical Optics
10) Medical application of LASER
11) Medical Acoustic
12) Ultrasonic in the Medicine
13) Physical medicine
14) Production and Processing of diagnostic Images
15) Physical Measurement Technique in Medicine
16) Electromagnetic fields and NMR

The special recognition as a Qualified Medical Physicist is achieved after the fulfilment of the described conditions by the DGMP Recognition - Commission.

Similar demands of qualification exist in the countries of the European Community, the U.S.A., Canada, Sweden and in the other highly developed industrial countries (5, 10, 12).

Field of application of medical physics

As already mentioned, the fields of application of medical radiation physics are extended to radiological diagnostics, radiotherapy, nuclear medicine and radiation protection. In Germany, more than 90% of the medical physicists work in these fields. The rest works for instance in the following important sectors of medicine (8, 13):

- Medical optics
- Audiology
- Ultrasonic diagnostics
- Physiology
- Neurosurgery
- Nuclear magnetic resonance medicine
- Diving medicine

Now I shall describe the functions of the medical physicist in areas of medical radiation physics (5, 7, 9, 12).

In radiological diagnostics the medical physicist is responsible for the improvement of the image quality with minimal irradiation dose on patients. He is also responsible for the control of the instruments quality and for all matters connected with radiation protection for the staff working in this area. One further task of the medical physicist lies in cooperating with doctors to purchase of new types of devices for instance for computer tomography, MRI, Mammography and DSA-plants etc.

In the field of radiotherapy, large devices as for instance cobalt machines, betatrons, linear accelerators, accelerators for heavy particles and neutron generators are used for the treatment of tumours with ionizing rays. Medical physicists are responsible for maintaining and supervising the technical devices according to special radiological rules. A further important task for them lies in the determination of the dose and kinds of rays, necessary for the patient's treatment. With the help of measurements and calculations, the physicist determines all physical data which are necessary for the therapy. The calculated irradiation plan (distribution of rays in the patient's body) forms the basis of the medical treatment. This makes it possible to eliminate tumours whereas the healthy parts of the body around the ill ones are spared.

In the field of nuclear medicine the medical physicist is mainly responsible for the provision, control, dosage and distribution of radioactive substances which are applicable for an examination or treatment. He additionally has to secure the quality control of the nuclear medical devices as well as the supervision and control of radioactive waste and its disposal.

Each medical application of ionizing rays is connected with a risk and therefore requires a maximum of care. The medical physicist and the responsible doctor have to provide the care for the observance of the rules of radiological protection, a care must be taken for the handling of radiological substances, the instructions to the staff as well as the necessary measures in case of radiological accidents. In the light of this fact, the important role of the medical physicists during the Tschernobyl-affair must be mentioned. They were very active in informing and warning the population. By measuring the level of activity as well as the radioactive contamination of food, they accordingly informed the people about existing dangers. As they had no connections to the nuclear industry, they were appreciated as independent scientific advisers.

The state of medical physics in Bangladesh.

The situation of medical physics in a developing country like Bangladesh is insufficient. There are no statistics about medical physicists working in the different institutes and hospitals. There does not exist any organisation for medical physicists in Bangladesh. They are still represented in the Physical Society of the country. Before describing the state of medical physics in Bangladesh, it is necessary to give a report on general physics there.

The history of physics has a good tradition in Bengal. The turn of the century brought about decisive developments. During this time, in the cities of former Bengal like Calcutta and Dhaka there were such famous physicists as J.C. Bose (1858-1937), C.V. Raman (1888-1970), Megnad Saha (1893-1956), Satyendranath Bose (1898-1974) among others. Through their famous scientific works they prepared the fundaments of physics in Bengal. During his work in the physics department of the University of Dhaka Satyendranath Bose developed his famous quantum statistics of identical but indistinguishable particles of integral spin (2). Today they are known to any student of physics as Bose Einstein-Statistics. Furthermore, who has not heard the name of C.V. Raman? He won the Nobel Prize for 1930 in Physics for his famous work on the scattering of light and discovery of the effect known by his name (4).

Today in Bangladesh there also exist a relatively good infrastructure in physics institutions. However, because of the fact that the country's industry is poorly developed, physicists rarely find work in the industry. They mainly work in the fields of education, research and a small part of them in the field of health care.

Medical physicists in Bangladesh are working mainly in the Nuclear-medicine departments of different university hospitals, in the Central Institute "Atomic Energy Centre" in Dhaka and in the "Institute of Nuclear Science and Technology, AERE" in Savar near Dhaka (1). The Central Institute in Dhaka is responsible for all affairs of radiation protection in the country.

In cooperation with these institutes the physics departments of the universities offer single topics for master thesis and dissertations to students who afterwards can possibly work as medical physicists. Actually this is the only scientific possibility to get familiar with radiation physics in Bangladesh. Otherwise there remains only the possibility to gain knowledge during the profession itself. Furthermore the Central Institute organizes in cooperation with medical colleges, special courses for medical doctors to specialize in radiology.

In Bangladesh radiotherapy is poorly developed. In the departments of radiotherapy of hospitals, there exist only such equipment like Gamma radiation devices and Orthovolt-x-ray devices. There does not have any modern radiotherapy equipment like linear accelerators. Their acquisition however is already under discussion (In comparison: the number of linear accelerators in Germany up to the beginning of 1991: 184 for 80 Millions. people (3), Bangladesh has 110 Millions. inhabitants). In this important field of radiology (radiotherapy) there is almost no physicist in Bangladesh.

Concept of cooperation

In the middle of the 80-s a professor of physics, Dr. G. U. Ahmad from Bangladesh, visited the Radiological Clinic at the University of Heidelberg (my former working place). During his 3-mounths stay in the department of medical radiation physics he informed himself about the state of medical physics and possibilities of education for foreign scientists in the F.R.G.

He reported that his physics department in the Bangladesh University of Engineering and Technology (BUET) of Dhaka together with the institute "Atomic Energy Centre" were training scientists in the field of medical physics. He indicated that in Bangladesh there is a lack of well trained teachers for medical physics. For the development of medical physics in his country it would be very useful if some of the physicists could take part in special training in the F.R.G. In this sense he made a proposal to the head of the radiation physics department of the University Clinic Heidelberg, Prof. D. Fehrentz, for collaboration with the physics department of the BUET in Dhaka.

I've been working in the Gummersbach Hospital of the Academic Teaching Hospital of University of Cologne since 1986. Nevertheless I'm still maintaining contacts to my colleagues in Dhaka. Because of my personal relations with Bangladesh, Prof. Ahmad asked me to extend this collaboration to Gummersbach. During my 6-weeks stay (January 1990) in Bangladesh I elaborated the following concept together with my colleague Dr. Ahmad, describing the mutual cooperation.

1. Common care of university assistants from Bangladesh who are preparing their dissertation in medical physics.

The topics for the dissertations should be determined in such a way that the graduate can absolve the practical part of his work in a department of medical radiation physics in the F.R.G. For this, approximately one year is considered to be sufficient. Besides the practical part of the dissertation (doctoral thesis) here the student has further possibility to learn about modern devices, the rules for radiation protection and methods of educational system in the field of medical radiation physics in a highly developed country like the F.R.G. The theoretical preparation and the competition of the doctoral thesis will be done in Bangladesh. On one hand the concept allows to reduce the financial efforts whereas on the other hand it obliges the scientists to go back to their former working place.

2. Hospitation of Bengali scientists who are already working in an institute or hospital in Bangladesh

These scientists should be given the possibility for a 3-5 months stay in the F.R.G. During this time they should learn new scientific methods and technical knowledge. By gaining new knowledge they improve the state of medical physics in their country.

3. Invitation of German scientists to come to Bangladesh

It should be planned to invite scientists from Germany who are working in the field of medical physics to Bangladesh. There, they could participate in seminars, annual sessions and courses of qualification. The past experience has shown that many German scientists are ready to spare some days of their holidays for such scientific cooperation, since they have the chance at the same time to get to know South Asia.

4. Teaching materials and devices

Institutes in developing countries show their interest in teaching materials and devices which are exchanged against new ones in the F.R.G. This is an additional chance for the maintenance of the scientific collaboration.

For the realization of the above mentioned areas 1 and 2, the financing must be settled for every single case. Therefore we should ask for support from organizations such as research foundations, the DAAD and the technical programme of collaboration of the IAEA (International Atomic Energy Agency, Vienna). Area 3 can be realized without a lot of efforts. Area 4, however, must be solved by the respective institutes themselves.

Literature

1. Annual Report: July 1986 - June 1987, Scientific Information Division, Bangladesh Atomic Energy Commission, Dhaka

2. Bose, S.: Planks Gesetz und Lichtquantenhypothese Zeitschrift fuer Physik, Bd. 26, 1924 S. 178-181

3. Bruckenberg, E.: Gross geraetezuwachs in Deutschland ungebremst Dt. Aerztebl. 88, Heft 14, 4 April 1991

4. Jayaraman, A.: C.V. Raman - A memoir Affiliated East-West Press Private Ltd, New Delhi 1989

5. Laughlin, J.S.: Some Developments and trends in radiation Medical Physics
Medizinische Physik 1985 (Hrsg. G. Poretti) S. 1-12

6. Lorenz, W.J.: Ansprache des Vorsitzenden der Deutschen Gesellschaft fuer Medizinische Physik
Medizinische Physik 1983, (Hrsg. J. Schuetz) S. 9-14

7. Poretti, G.: von Wilhelm Roentgens „ Wunderstrahlen“ bis zur Nuklearmedizin
Der Bund / Bern, 2. Mai 1985

8. Rassow, J.: Ergebnisse der 5. Erhebung (Stand Februar 1989)
Mitteilungen der DGMP, Heft 22/1, Juni 1990, S. 5-27

9. Richtlinie Strahlenschutz in der Medizin vom 18. Oktober 1979, (GM Bl. 1979, S. 638)

10. Schmitt-Hanning, A.: Vergleichende Untersuchung ueber die Aus- und Weiterbildung von Medizin-Physikern in den EG-Laendern in Anwendung von EURATOM - Patientenrichtlinie
Medizinische Physik 1989 (Hrsg. H.-K. Leetz), S. 557-561

11. Schreier, W.: Biographien bedeutender Physiker,
Volk und Wissen, Volkseigener Verlag Berlin 1984

12. Walstam R.: Medizinische Physik- und Geschichte, derzeitiger Stand und zukuenftige Entwicklung
Medizinische Physik 1987 (Hrsg. H. Bergmann) S. 4-19

13. Weiterbildung zur Erlangung der Fachanerkennung fuer Medizinische Physik, Herausgeber DGMP 1986

* This article was a translated and modified version of the original article first published 1991 in German:

"Modellversuch einer Wissenschaftskooperation im Fach Medizinische Physik" published in year book 1991 of the African Asian Student Promotion in Goettingen, Verlag für interkulturelle Kommunikation, Frankfurt/Main 1991

This article or a part of this article was published many times in periodical, news letters and news papers in Bangladesh in the nineties of the last year hundred.

DELIVERY VERIFICATION OF ABSOLUTE DOSE AND DISTRIBUTION IN IMRT FOR PROSTATE CANCER

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The aim of the study is to determine the verification of delivered absolute dose and dose distribution in IMRT for prostate cancer. Our randomly selected ten patients were scanned at 5 cm slice thickness by GE Light Speed CT Simulator. Three dose regions 46 Gy (Pelvic Lymph node + Seminal vesicle + Prostate), 56 Gy (Seminal vesicle + Prostate) and 74 Gy (Prostate) have been contoured as Planning Target Volume (PTV) and bladder, rectum, Rt and Lt femoral head, small bowel as Organ at Risk (OARs). Seven and five equal space field's arrangement have selected for planning of 46, 56 and 74 Gy dose regions respectively. For verification plan we have scanned 20 cm slab phantom (T29672/u27→31016) along with semiflex ionization chamber (0.3 cm ^{3}) at the depth of 10 cm from the top for absolute and MULTICube Phantom along with 2D chamber array (MatriXXEvolution) at the depth of 11.1 cm from the top for distribution (Gamma Evaluation) measurements. All the verification plans have been delivered. For dose distribution, we delivered the plan to Matrix Evolution with MULTICube Phantom which has a thickness of 11.1 cm and scanned it where we found the line profile. The Matrix Evolution data is compared to plan data using the palette of intuitive evaluation tools with OmniPro-I'mRT (version 7.2) according to the Gamma (γ) method and distance-to-agreement (DTA) distribution which is used to determine the acceptability of the dose. Finally, we evaluated the both calculated and the measured values. For absolute dosimetry the average calculated value is 1.70 Gy and average measured value by the accelerator is 1.750 Gy and the average standard deviation is 0.96%. For dose distribution average pixel in range is 98. 62 % and the average standard deviation is 0.43%. At the end of the work we have found that for most of the evaluations of the calculated data with the measured data was within the tolerance according to the γ-index distribution where the dose-difference criterion should not exceed 3% and DTA criterion should remain within 3 mm. In conclusion, the entire work has been done frequently and it is suggested to the practitioner to follow when IMRT technique is applied for the prostate cancer patients.

*Preprint of the summary of the Master Thesis of Rahman M. M.

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Report of "2ND INTERNATIONAL CONFERENCE ON MEDICAL PHYSICS IN RADIATION ONCOLOGY AND IMAGING (ICMPROI-2014)" IN DHAKA, BANGLADESH

Hasin Anupama Azhari

BMPS organized the 2nd International Conference on Medical Physics in Radiation Oncology & Imaging (ICMPROI-2014 jointly with the Association of Medical Physicists of India (AMPI) and Nepalese Association of Medical Physicists (NAMP) from 20 to 22 August 2014 at Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. The ICMPROI-2014 was supported this time by Asia-Oceania Federation of Organizations for Medical Physics (AFOMP), Middle East Federation of Organizations of Medical Physics (MEFOMP) and The Abdus Salam International Center for Theoretical Physics (ICTP). Prof. Dr. Golam Abu Zakaria, Chairman and Chief Medical Physicist of Gummarsbach Hospital, Academic Teaching Hospital of the University of Cologne, Germany and Dr. Hasin Anupama Azhari, Chairman Department of Medical Physics and Biomedical Engineering of Gono Bishwabidyalay were President and Organizing Secretary of ICMPROI-2014 respectively.

Inaugural Ceremony, 1st day

Hon'ble Minister, Ministry of Foreign Affairs, Mr. Abul Hassan Mahmood Ali, M.P

Hon'ble Minister, Ministry of Foreign Affairs, Mr. Abul Hassan Mahmood Ali, M.P, was present to grace the occasion as the Chief Guest. The Charge d' Affaires, German Embassy to Bangladesh, Dr. Ferdinand von Weyhe and Director General, Directorate General of Health Services (DGHS) Prof. Deen Mohd. Noorul Huq were present in this occasion as Special Guests. President, Asia-Oceania Federation of Organizations for Medical Physics (AFOMP), Prof. Dr. Yimin Hu and President, Bangladesh Academy of Science & Vice-Chancellor, Gono Bishwabidyalay (University) Prof. Mesbahuddin Ahmad were present in the occasion as Guests of Honour and Prof. Dr. Golam Abu Zakaria was present as Organizing Chairperson of the conference. The session was presided over by Vice Chancellor of BSMMU and Patron of the Organizing Committee, ICMPROI-2014, Prof. Dr. Pran Gopal Datta.

Part of Audience

More than 300 participants (40 foreign participants) including many eminent scientists, young researchers from universities, hospitals and industries of 24 countries (Algeria, Arab Emirates, Australia, Bangladesh, Belgium, Canada, China, Germany, India, Iran, Italy, Japan, Lebanon, Mexico, Nepal, Oman, Pakistan, Poland, Srilanka, South Korea, Sweden, Switzerland, United Kingdom, USA) exchange their knowledge, experience and buildup a network. We were honoured to have with us President, Asia-Oceania Federation of Organizations for Medical Physics (AFOMP), Prof. Dr. Yimin Hu, President of Middle East Federation of Organizations of Medical Physics (MEFOMP), Dr. Ibrahim Duhaini, President of Polish Society of Medical Physics (PSMP), Prof. Pawel Kokolowicz, President of Pakistan Organization of Medical Physics (POMP) Syed Mansoor Naqvi, President of Nepalese Association of Medical Physicists (NAMP), Mr. P. P. Chaurasia, Secretary of Association of Medical Physicists of India (AMPI), Dr. Challapalli Srinivas, President of Bangladesh Medical Society (BMPS), Mr. Kumaresh Chandra Paul and International Atomic Energy Agency (IAEA) representative Dr. Ahmed Meghzifene.

Scientific sessions of ICMPROI-2014 were composed of Plenary Sessions, Invited Lectures, Oral, Poster and Vendor Presentations which had covered a wide range of issues related to Dosimetry, External Beam Therapy, Brachytherapy, Treatment Planning, Diagnostic Imaging, Nuclear Medicine, Quality Assurance, Radiobiology, Radiation Oncology, Radiation Safety, Biomedical Engineering and also on Education. 105 papers were presented in the different 18 scientific sessions. 33 posters were displayed. The committee of judges for poster session selected three posters for first, second, and third prizes.

Cultural Ceremony

Poster session

A workshop entitled 'Advanced Dosimetry and Treatment Planning' followed by a dinner was held at the evening of second day of the conference at Clinical Oncology Department in the Ahsania Mission Cancer and General Hospital (AMCGH). In closing day 22nd August, closing speech delivered by the Presidents and the Secretaries of different societies/organizations (AFOMP, MEFOMP, PSMP POMP, NAMP, AMPI, BMPS). In the award ceremony BMPS has recognized Prof. Dr. Golam Abu Zakaria and Prof. Dr. Guenther Hartmann as "Honorary Members".

Grand Dinner

Workshop AMCGH

Some of the Distinguished guests

Closing Ceremony

Report of 14th Asia-Oceania Congress of Medical Physics (AOCMP)

23-25 October 2014
Ho Chi Minh City, Vietnam

To promote the co-operation & communication between medical physics organizations and medical physics & related activities in the Asia-Oceania region Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) organize AOCMP each year in the different countries of the region.

This year 14th Asia-Oceania Congress of Medical Physics (AOCMP) was held from 23 to 25 October together with 12th South East Asian Congress of Medical Physics (SEACOMP) in Ho Chi Minh City, a beautiful city of Vietnam.

During this three days congress 240 participants from 20 different countries were attended and exchange their knowledge, experience and buildup a network. The scientific program of the congress was composed of a full day Pre-Congress, Plenary Sessions, Invited Lectures, Oral, Poster and Vendor Presentations which was covered a wide range of Medical Physics. There were 83 papers including 20 invited lectures and 99 posters were presented in the different scientific sessions.

On the first and second day of the congress I attended AFOMP Education and Training Committee (ETC) and AFOMP Council Meeting respectively which was very much exciting for me. In the ETC meeting, elaborate discussions were made regarding development and co-operation for education and training for the Medical Physicists in AFOMP region. All predefined agenda such as Individual Membership of AFOMP, AOCMP-2013, Singapore, AOCMP-2014, Vietnam, AOCMP-2015, China, Minutes of ETC meeting were discussed.

On the second day there was a fantastic cultural evening followed by Gala Dinner. The main attraction of the cultural programme was the exchange of culture among the participant's country. I have never seen this kind of blissful cultural evening before in past AOCMP (I have attended three AOCMP before)

AOCMP Council Meeting

Cultural Evening

On the last day, the closing session was very precise and enjoyable. In this session awardees received their AFOMP travel award, best oral and poster presenter award. There were six oral and six poster awards. In this year there were nine travel awardees from AFOMP and SEFOMP. It was my great pleasure to being one of the awardees. It was a great honour to me as well as for Bangladesh Medical Physics Society (BMPS). Young medical physicists will be encouraged for this type of support from AFOMP. I would like to express my gratitude to the chairman of the award committee Dr. Kin-Yin Cheung.

Participants of the congress

BMPS General Secretery recieving Travel Award

14th AOCMP 12th SEACOMP was a very successful event. I like to convey my special thanks to Nguyen Tan Chau and Nguyen Xuan Canh for their excellent and well disciplined organization of the congress. I was exposed to very many imminent medical physicists from different countries.

From this conference I gather a lot of experiences regarding the arrangement of the conference, arts of presentation and many ideas of medical physics. I have learnt lot of things and have seen very many new things in Vietnam that has enriched my ideas that will help me to take the wise step for BMPS in future. Bangladesh is a developing country in which we are struggling to strengthen medical physics education and also quality treatment. I would like to appeal to the AFOMP through the secretary general that it will be really helpful for our small society of medical physicists if we get some training from AFOMP countries as we have lack of clinical training programme.

I am very hopeful that more medical physicists will take part in the AFOMP program from Bangladesh in future.

M. Akhtaruzzaman
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&
Medical Physicist & RCO
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and accords it the associated rights and responsibilities.

W. H. Round.

Assoc Prof W H Round
Secretary General

23 June 2014

Workshop at Ahsania Mission Cancer & General Hospital (AMCGH)

As part of the 2nd International Conference on Medical Physics in Radiation Oncology & Imaging (ICMPROI-2014) a workshop entitled 'Advanced Dosimetry and Treatment Planning' followed by dinner was held at the evening of second day of the conference at Clinical Oncology Department in the Ahsania Mission Cancer & General Hospital (AMCGH), Uttara, Dhaka.

Director of AMCGH giving welcom speech

Brig. Gen. Syed Fazle Rahim, Director of AMCGH was the chief guest and the special guest was Prof. Dr. Golam Abu Zakaria, Director, Medical Radiation Physics Division, Gumarsbach Academic Teaching Hospital, University of Cologne & Prof. G. H. Hartmann, German Cancer Research Center, Heidelberg University, Germany. The workshop was presided over by Prof. Dr. Syed Muhammad Akram Hussain, Senior Consultant, Clinical Oncology Department of AMCGH. Dr. Hasin Anupama Azhari, Chairman, Department of Medical Physics and Biomedical Engineering of Gono University also delivered speech in this session. Welcome speech was delivered by Dr. M Jahangir Alam, Senior Medical Physicist and Mr. Md. Akhtaruzzaman, Medical Physicist & RCO, was the moderator of the workshop.

Workshop at AMCGH

In the workshop there were 80 participants including 35 foreign delegates and they were divided into two groups- One group for Treatment Planning and other group for Dosimetry. The Treatment Planning workshop was conducted by two eminent Medical Physicists Mr. Volker Steil from Germay and Dr. Kamlesh Passi from India. The dosimetry workshop was conducted by Mr. Tino Ebneth, Senior Application Specialist from PTW.

Workshop on "Absolute Dose Determination for High Energy Photons & Electrons using IAEA TRS-398 Protocol" at United Hospital Limited

Under the auspices of Medical Physics Unit, Department of Radiation Oncology, United Hospital Limited, Dhaka, Bangladesh a single day workshop was organized on "Absolute Dose Determination for High Energy Photons & Electrons using IAEA TRS-398 Protocol" on 18th September 2014. A total of fifteen participants including 12 clinical physicists working in different government and non-government hospitals of Bangladesh and 3 M.Sc students, GB attended the workshop. The workshop includes two brief presentations on dosimetric principles and absolute dosimetry for high energy photons and electrons using IAEA TRS-398 protocol separately followed by practical sessions.

An informal round table discussion cum feedback session and certificate giving ceremony was held at the end of the workshop. Dr. Md. Shakilur Rahman, Principal Scientific Officer and Project Director, Health and Nuclear Physicist, Secondary Standard Dosimetry Laboratory (SSDL), Institute of Nuclear Science & Technology, Dhaka, Bangladesh chaired the session.

Workshop at United Hospital

Celebration of 1st International Day of Medical Physics, 7th November 2013, MPBME, GB

On the occasion of its 50th anniversary in 2013, the International Organization for Medical Physics (IOMP) started celebrating 7th November as International Day of Medical Physics (IDMP) as an annual event in 80 national organizations of IOMP and countries all over the world. The day was chosen by IOMP in recognition of the pioneering research work on radioactivity of Marie Sklodowska-Curie's birthday (7th Nov, 1867-1934). The aim of IDMP is to make awareness of the importance of medical physicist in the clinical environment as well as in clinical research, and development of sophisticated

medical technology. The selected theme of IDMP-2013 was "Radiation Exposure from Medical Procedures: Ask the Medical Physicist!". Like other countries of the world, the Bangladesh Medical Physics Society (BMPS) and the Dept. of Medical Physics & Biomedical Engineering (MPBME) arranged a seminar at Gono Bishwabidyalay (University). Prof. Dr. Mesbahuddin Ahmad, the Honorable Vice Chancellor, Gono Bishwabidyalay (University) was the chief guest and the special guest was Prof. Dr. Sk. Golam Mostofa, Director, National Institute of Cancer Research & Hospital (NICRH). The seminar was presided over by Mr. Kumaresh Chandra Pual, President (acting) of BMPS. The welcome speech has been delivered by Md Aktaruzzaamn, Secretary, BMPS. Prof. Md. Serajul Islam presented the biography of Marie Sklodowska-Curie.

Former President of BMPS giving her speech

The Vice President of BMPS and Chairman of the dept. of Medical Physics & Biomedical Engineering (MPBME) Prof. Dr. Hasin Anupama Azhari also discussed the importance of the day.

A workshop on IMRT/VMAT clinical treatment planning organized, Germany

From 9th -10th October, 2014 a workshop titled " IMRT/VMAT clinical treatment planning" was held in Manheim Medical Center, Germany, organized by Elekta. The first day was designed for theoretical discussions. The 2nd day was designed for hands on training on VMAT planning, QA, discussions and evaluation. About twelve participants from different countries joined in the workshop. The vice chair of the department Prof . F. Lohr welcomed the participants. The other speakers were Dr. Wertz and Dr. Jahnke.

Vice President, BMPS Dr. Azhari with some participants

IAEA hands on training programme on Brachytherapy, NICRH & UHL

On 2-6th November 2014, International Atomic Energy Commission (IAEA) arranged a hand's on training program entitled " in co-operation with Bangladesh Atomic Energy Commission at the Institute of Nuclear Medicine and Alied Sciences in Dhaka Medical College Hospital (DMCH).

Professor & Head of the department of Radiation Oncology Dr. Shyam K Shrivastava , Asso. Prof. Dr. R. A Kinhikar, Ph.D of Medical Physics from Tata Memorial Hospital, Mumbai and Sr. Consultant & Chairman of Radiation Oncology Dr. S Hukku from BLK Super Specialty Hospital , Delhi were the an experts of this training program.

Closing day of the Training

The two days hands on training program were held in United Hospital and National Institute of Cancer Research and Hospital (NICRH) respectively. About 35 trainees including Radiation Oncologists, Medical Physicists, Resident Medical Officers from different public and private hospitals were attended in this training program.

Progressive Development in Medical Physics and Biomedical Engineering Education in Bangladesh

On on the 22th of May 2012, a cooperation contract was signed between Mannheim Medical Center of the Ruprecht-Karls-University, Germany and the Department of Medical Physics and Biomedical Engineering (MPBME), GonoBishwabidyalay (GB), Dhaka, Bangladesh. Prof. Dr. F. Wenz, Mr.V. Steil and Dr. F. Hensley are the cooperation partners in Germany. Prof. Dr. G. A. Zakaria is the coordinator of this cooperation. In this cooperation a total of 40 skilled manpower in Medical Physics and Biomedical Engineering, will be developed from Bangladesh in four years. These includes M. Sc degree from Heidelberg University, Ph.D Practical works, hands on training program, workshop, seminar, joint research thesis for M. Sc and PhD students, up-gradation of medical physics Lab etc. Also from Germany five expertiseswill visit in the department MPBME each year.

Ahsania Mission Cancer and General Hospital, Uttara has started its long awaited journey when it was formally inaugurated on 9th April' 2014 by the honorable Prime Minister of the Peoples Republic of Bangladesh. It is a 'State of the Art' 500 bedded modern hospital with its architectural beauty situated on the bank of river Turag in the northern part of Dhaka Metropolitan City. It is a 13 (thirteen) storied building with 2(two) basements having facilities for the treatment of both Cancer & general patients with an emphasis on cancer treatment. The objectives are to create a venue for World Class Treatment of cancer and cancer related diseases within Bangladesh within the reach of common people, AMCGH will be a Center of Excellence in the country in the field of cancer control, this will be run on NO PROFIT-NO LOSS Basis and minimizing going abroad for treatment & saving foreign currency.

Present status of Phase- I, Ahsania Mission Cancer and General Hospital (AMCGH), Uttara

a) Radiotherapy
b) Chemotherapy
c) Day Care
d) OPD
e) Laboratory
f) Radiology
g) Pharmacy
h) OT Service (Limited Scale)
i) Limited Indoor Service
j) Limited Emergency Service

In the 2nd Phase, we expect to provide following Services:

Diagnostic (Dx) Modalities	Clinical Ancillaries	Therapeutic (Rx) Interventional
? MRI	? Central Sterilization	? Radiation Therapy
? CT Scan	? Laundry	? OT (07)
? Laboratory Medicine	? Dietary	? Surgical Suite
? Special Procedure Suite	? Material Management	? Post Anesthesia Care Unit
? Primary Care Clinic	? Pharmacy	? Day Care/Chemotherapy
? Specialty Care Clinic	? Other Supportive Services & Function (i.e. Skill rising)	? Intensive Care Unit
? Emergency		? Inpatient Unit
? Nuclear Medicine		
? Endoscopy		
? Physical Therapy		

In-Patient Department (IPD), 500 beds of AMCGH, Uttara

? Surgical Oncology
? Medical Oncology
? Surgery
? Medicine
? Gynaecology
? Neonatology
? Intensive Care Unit
? Coronary Care Unit
? Gastroenterology
? Orthopedics
? Head & Neck (ENT)
? Nephrology
? Neurology

Academic Future Plan of AMCGH, Uttara

? Medical College Hospital
? Nursing Institute

Front view of AMCGH, Uttara, Dhaka

পিআইডি/বাংলার চোখ
প্রধানমন্ত্রী শেখ হাসিনা ৯ এপ্রিল বুধবার ঢাকার উত্তরায় 'আহ্ছানিয়া মিশন ক্যান্সার এন্ড জেনারেল হসপিটাল' উদ্বোধন করেন।

Ahsania Mission Cancer and General Hospital, Uttara

(A Project of Dhaka Ahsania Mission)

Plot # 3, Embankment Drive way, Sector # 10, Uttara Model Town, Uttara, Dhaka-1230, Bangladesh
Telephone: (880-2) 8932264, 8931141, 8962165, Fax: (880-2) 8962196,
E-mail: info.amcgh@gmail.com, www.ahsaniacancer.org.bd

Hands on Training on Radiotherapy, DGHS & NICRH

The Directorate General of Health Services (DGHS) has organized a six day long training programme titled "Hands on Training on Radiotherapy" from 22-02-2014 to 27-02-2014 at National Institute of Cancer Research and Hospital (NICRH), Mohakhali, Dhaka. Professor Dr. Golam Abu Zakaria, Chairman and Chief Medical Physicist of Gummarsbach Hospital, Academic Teaching Hospital of University of Cologne , Germany, Mr. Stephan Eismann, Medical Physicist in Radiation Therapy, German Cancer Research Center and Dr. Frank W. Hensley, University of Heidelberg were the honourable trainer. Doctors and clinical physicists of different government and non-government hospitals have joined the programme.

Awards and Honors

Award Ceremony in ICMPROI-2014

In the award ceremony of ICMPROI – 2014, BMPS has recognized Prof. Dr. Golam Abu Zakaria as the founder of Medical Physics in Bangladesh and honored him as "Honorary Member" for his extraordinary contribution for the education and development of medical physics in Bangladesh. We have also honored Prof. Dr. Guenther Hartmann as "Honorary Member"for his great contribution for the medical physics education in Bangladesh.

Award giving to Prof Zakaria from BMPS President

Award giving to Prof Hartmann from BMPS Secretary.

TAQI BINESH PRIZE: The Abdus Salam International Centre for Theoretical Physics (ICTP)

The Vice-President of Bangladesh Medical Physics Society (BMPS), Dr. Hasin Anupama Azhari visited The Abdus Salam International Centre for Theoretical Physics (ICTP) as an associate member of ICTP. During this period there was a College on Medical Physics on "Advances in Medical Imaging Physics to Enhance Healthcare in Developing Countries" from 1 – 19th September 2014. The College includes a session with posters on 11th October about the Medical Physics Professional status, Education and Training activities and other medical physics development and related questions (e.g. approximate number of medical physicists, number of some major medical equipment. Participants from one country are encouraged to prepare such posters. A prize (TAQI BINESH PRIZE) was offered for the best poster presentation. Out of participants from 27 countries Dr. Azhari got the first prize for her poster titled "Present Status of Medical Physics in Bangladesh". The coauthor is Md Nahid Hossain, working as senior scientific officer in the National Institute of Nuclear Medicine and Ailed Sciences, Bangladesh Atomic Energy Commission, Dhaka, Bangladesh, who also one of the participant in College on Medical Physics.

BMPS Vice President receiving TAQI BINISH PRIZE

She also delivered lectures in ICTP M.Sc Medical Physics course, do research in ICTP regarding Medical Physics.

TAQI BINISH PRIZE winners with participants

Dr Hasin Anupama Azhari is currently working as a Head of the Department of Medical Physics and Biomedical Engineering (MPBME) and Dean of Faculty of Mathematical and Physical Sciences, Gono Bishwabidyalay, Savar, Dhaka.

Poster of Bangladesh in ICTP

Bangla Academy Probashi Lekhok Purosker 2013

On 27th February 2014, Bangla Academy felicitates three writers (Bangla Academy Probashi Lekhok Purosker 2013) in Omor Ekushey Book Fair 2014. One of the awardees is Professor Dr. Golam Abu Zakaria, Chairman and Chief Medical Physicist, University of Colognae, Germany. Prof. Emeritus Anisuzzaman presided over the award ceremony. The chief guest was Rashed Khan Menon Honorable Minister, Ministry of Civil Aviation and Tourism, Govt. of the People's Republic of Bangladesh. The Director General of the Bangla Academy Dr Shamsuzzaman Khan delivered welcome speech.

Receiving moment of Bangla Academy Probashi Lekhok Purosker

The Department of Medical Physics and Biomedical Engineering, Gono Bishwabidyalay, Savar organized a reception program at its own auditorium on 9 March, 2014 in honor of writer Professor Dr. Golam Abu Zakaria. Professor Zakaria, visiting professor of the MPBME, Gono Bishwabidyalay and Professor of University of Cologne, Germany achieved 'Bangla Academy Probasi Lekhok Purosker 2013'.

Eminent language activist Ahmed Rafiq giving his speech

Eminent language activist Ahmed Rafiq & writer Professor Hayat Mahmud graced the reception program as chief & special guest respectively with Vice Chancellor Professor Dr. Mesbahuddin Ahmed in the chair. Professor Dr. Mahmud Shah Qureshi, Dean, Faculty of Basic and Social Science, Dr. Hasin Anupama Azhari, Dean, Faculty of Physical & Mathematical Science and Kumaresh Chandra Paul, senior lecturer, Dept. of Medical Physics and Bio Medical Engineering also delivered their speech in the program.

AFOMP Travel Award

The "14th Asia-Oceania Congress of Medical (AOCMP) & 12th South East Asia Congress of Medical Physics (SEACOMP)" was held from 23rd October – 25th October 2014 in Ho Chi Minh City, Vietnam. Mr. Md. Akhtaruzzaman, General Secretary of BMPS and Medical Physicist, Ahsania Mission Cancer & General Hospital was present his scientific paper entitled "Acceptance Tests and Commissioning of Linear Accelerator for Photon Beams". He was awarded for AFOMP Travel Award to participate in the above congress.

BMPS general secretary receiving AFOMP Travel Award

Upcoming Events

18-21 November
Workshop on "Implementation of the International Code of Practice for external beamradiotherapy dosimetry based on standards of absorbed dose to water, IAEA TRS-398"
United Hospital Limited, Dhaka, Bangladesh

20-22 November 2014
35th National Annual Conference- AMPICON 2014
Loni, Maharashtra, India
www.ampicon2014.org

1-2 December 2014
Workshop on Imaging in Radiation Oncology
Dhaka, Bangladesh
www.bmps-bd.org

20-22 February 2015
Int'l Conference on Medical Physics, Radiation Protection and Radiobiology (ICMPRPR2K15)
Jaipur, India
www.ampi.org.in

22-23 February 2015
Workshop on Medical Physics
Dhaka, Bangladesh
www.bmps-bd.org

13-24 April 2015
School on Medical Physics for Radiation Therapy: Dosimetry and Treatment Planning for Basic and Advanced Applications
The Abdus Salam International Center for Theoretical Physics (ICTP)
Trieste, Italy
www.ictp.it

16-19 April 2015
109th Japanese Society of Medical Physics Meeting
Yokohama, Japan
http://www.jsmp.org/conf/109_en

20 April 2015
Seminar on Medical Physics
Dhaka, Bangladesh
www.bmps-bd.org

24-28 April 2015
3rd ESTRO FORUM
Barcelona, Spain
www.estro.org

25-29 May 2015
15th Int'l Congress of Radiation Research (ICRR 2015)
Kyoto, Japan
www.congre.co.jp/icrr2015

7-12 June 2015
World Congress on Medical Physics & Biomedical Engineering
Int'l Union for Physical & Engineering Sciences in Medicine (IUPESM)
Toronto, Canada
www.wc2015.org

12-16 July 2015
AAPM Annual Meeting
Anaheim, CA
www.aapm.org/announcements/2015AMRFP.asp

9-12 September 2015
The 46th Annual Meeting of the German Society of Medical Physics (DGMP)
Marburg, Germany
www.dgmp.org

18-21 October 2015
ASTRO Annual Meeting
San Antonio, USA
www.astro.org

22-25 October 2015
15th Asia-Oceania Congress of Medical Physics (AOCMP)
Xian, China

22-23 November 2015
4th Annual Conference of Bangladesh Medical Physics Society (ACBMPS-2015)
Dhaka, Bangladesh
www.bmps-bd.org

Department of Medical Physics & Biomedical Engineering





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মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং বিভাগ

[বাংলাদেশে একমাত্র গণ বিশ্ববিদ্যালয়ে এ কোর্স পরিচালিত হচ্ছে। জার্মানী ও ভারতের বিশ্ববিদ্যালয়ের সাথে একাডেমিক চুক্তি বিদ্যমান]

গণ বিশ্ববিদ্যালয়ে ২০০০ সাল থেকে স্বাস্থ্য ও চিকিৎসা বিজ্ঞান অনুষদের অন্তর্ভুক্ত মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং বিভাগে এম.এসসি কোর্স এবং ২০০৫ সাল থেকে বি.এসসি (অনার্স) কোর্স পরিচালিত হচ্ছে।

ইউজিসি কর্তৃক অনুমোদিত	পরিচালিত কোর্সসমূহ	
	বি.এসসি (অনার্স) মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং	৪ বৎসর (৮ সেমিষ্টার)
	এম.এসসি মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং	২ বৎসর (৪ সেমিষ্টার)

মেডিকেল ফিজিক্স ও বায়োমেডিকেল ইঞ্জিনিয়ারিং

মেডিকেল ফিজিক্স বা চিকিৎসা পদার্থবিদ্যা হলো চিকিৎসা শাস্ত্রে ব্যবহৃত ফলিত পদার্থবিদ্যা। চিকিৎসা পদার্থবিদ্যার কাজ হলো রোগ নির্ণয় ও নিরাময়ে পদার্থবিদ্যার ধারণাগত কৌশল ও পদ্ধতি ব্যবহার করে চিকিৎসা ক্ষেত্রে ভূমিকা রাখা।

বায়োমেডিকেল ইঞ্জিনিয়ারিং হচ্ছে প্রকৌশল ও বিজ্ঞানের উচ্চতর জ্ঞানের একটি আন্তঃশাস্ত্রীয় বিভাগ যা চিকিৎসা ও স্বাস্থ্যসেবা-সম্পর্কিত কারিগরি সমস্যাগুলোর সমাধান দেয়।

কর্মক্ষেত্র – মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং

- সরকারী বা বেসরকারি হাসপাতাল অথবা ক্লিনিকে।
- ক্যান্সার চিকিৎসা প্রদানরত রেডিওথেরাপী বিভাগে।
- বিভিন্ন রোগ নির্ণয় কেন্দ্র বা ডায়াগনষ্টিক ইমেজিং সেন্টারে।
- বাংলাদেশ এটমিক এনার্জি কমিশনে (BAEC) ।
- চিকিৎসা সংশ্লিষ্ট যন্ত্রপাতি সরবরাহকারী বহুজাতিক কোম্পানীতে।
- শিক্ষা প্রতিষ্ঠানে, বিভিন্ন বিশ্ববিদ্যালয় ও গবেষণা প্রতিষ্ঠানে।
- এ বিষয়ে অনার্স/মাস্টার্স ডিগ্রী নিয়ে বাংলাদেশের বিসিএস সহ যে কোন সরকারি ও বেসরকারি প্রতিষ্ঠানে।
- বিদেশেও এদের ব্যাপক চাহিদা রয়েছে।
- ত্বকের রোগ নিরাময় চিকিৎসায় লেজার থেরাপী ও চোখের চিকিৎসায় লেজার অপারেশনে।


ল্যাবরেটরিতে প্রশিক্ষণরত শিক্ষার্থীবৃন্দ


বিভাগ ও বাংলাদেশ পরমাণু শক্তি কমিশনের যৌথ উদ্যোগে আন্তর্জাতিক সেমিনার

এই অনন্য ক্ষেত্রটিতে যা যা রয়েছে

বায়ো-ইন্সট্রুমেন্টেশন, রেডিওথেরাপী ট্রিটমেন্ট প্লানিং, রেডিয়েশন ডোসিমেট্রি, রেডিওথেরাপী ডিভাইস, বায়োমেটেরিয়াল, বায়োমেকানিক্স, নিউক্লিয়ার মেডিসিন, রেডিয়েশন প্রোটেকশন, মেডিকেল ইমেজিং, রেডিয়েশন অনকোলজি, ব্রাকিথেরাপী, লেজার মেডিসিন, পেসমেকার, অত্যাধুনিক যন্ত্র-চৌম্বক অনুরণন প্রতিবিম্ব প্রভৃতি।

বিভাগে অধ্যয়নরত ছাত্রছাত্রীদের সুযোগ সুবিধা

- বিভাগে আধুনিক যন্ত্রপাতি সমৃদ্ধ পদার্থবিদ্যা পরীক্ষাগার, চিকিৎসা পদার্থবিদ্যা পরীক্ষাগার, বায়োমেডিকেল ইঞ্জিনিয়ারিং ও ইলেক্ট্রনিক্স পরীক্ষাগার রয়েছে।
- সরোজ গুপ্ত ক্যান্সার সেন্টার ও রিসার্চ ইনস্টিটিউট ভারত-এর সাথে ছাত্র-শিক্ষক বিনিময় চুক্তি রয়েছে।
- নর্থ বেঙ্গল অনকোলজী সেন্টার (শিলিগুড়ি, ইন্ডিয়া) এর সাথে ছাত্র-শিক্ষক বিনিময় চুক্তি রয়েছে।
- অনকোলজী সেন্টার ইউনাইটেড হাসপাতালের সাথে সহযোগিতামূলক চুক্তি বিদ্যমান।
- এসএসডিএল, বাংলাদেশ এটমিক এনার্জি কমিশনের সাথে বিভাগের চুক্তি প্রক্রিয়াধীন।
- হাইডেলবার্গ বিশ্ববিদ্যালয়ে ক্যান্সার গবেষণা সেন্টার (DKFZ), জার্মানী এবং গণ বিশ্ববিদ্যালয়ের মধ্যে একটি ছাত্র-শিক্ষক বিনিময় সম্পর্ক চুক্তি রয়েছে।
- ২০০২ইং মার্চে গণ বিশ্ববিদ্যালয়ের সাথে আনহাল্ট ইউনিভার্সিটি অফ এ্যাপ্লাইড সায়েন্স, জার্মানী-এর সাথে ছাত্র-শিক্ষক বিনিময় চুক্তি স্বাক্ষর হয়েছে।
- জার্মানীতে শিক্ষার্থীদের উচ্চতর প্রশিক্ষণের সুযোগ রয়েছে।
- ছাত্রছাত্রীদের থিসিস জার্মানীর খ্যাত চিকিৎসা পদার্থবিদ এবং বিভাগের শিক্ষকরা যৌথভাবে তত্ত্বাবধান করেন। এগুলো ইতিমধ্যে আন্তর্জাতিক মানসম্পন্ন বলে গণ্য হয়েছে।


জাতীয় ক্যান্সার হাসপাতালে শিক্ষার্থীদের ব্যবহারিক ক্লাস।

- বিষয় ভিত্তিক বই, মূল্যবান যন্ত্রপাতি সরাসরি জার্মানী থেকে সংগ্রহ করা হয়েছে।
- বছরে দুই বার হাইডেলবার্গ বিশ্ববিদ্যালয় থেকে বিশেষজ্ঞ চিকিৎসা পদার্থবিদগণ গণ বিশ্ববিদ্যালয়ে এসে ছাত্রছাত্রীদের পাঠদানে সহায়তা করেন।
- বিভাগের বিশেষ ব্যবহারিক ক্লাশগুলো দেশের বিভিন্ন সরকারি এবং বেসরকারি হাসপাতাল যেমন – ন্যাশনাল ইনস্টিটিউট অব ক্যান্সার রিসার্চ এন্ড হাসপাতাল, ঢাকা মেডিকেল কলেজ হাসপাতালে করানো হয়।


জার্মানীতে বিশেষজ্ঞ ফিজিসস্টদের সাথে প্রশিক্ষণার্থী শিক্ষার্থীবৃন্দ।

ভর্তির যোগ্যতা

বি.এসসি (অনার্স) কোর্স : মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং

মাধ্যমিক ও উচ্চ মাধ্যমিক পরীক্ষায় পদার্থবিদ্যা ও গণিতসহ অন্তত ২য় বিভাগ/জিপিএ ২.৫। পলিটেকনিক ইনস্টিটিউট হতে ইলেক্ট্রিক্যাল, ইলেক্ট্রনিক্স, মেকানিক্যাল এন্ড ইলেকট্রোমেডিকেল ইঞ্জিনিয়ারিং-এ অন্তত ২য় বিভাগ/সমমান-এ ডিপ্লোমা।

এম.এসসি কোর্স : মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিং

মেডিকেল ফিজিক্স এন্ড বায়োমেডিকেল ইঞ্জিনিয়ারিংয়ে বি.এসসি অনার্স, পদার্থ বিজ্ঞান, ফলিত পদার্থ বিজ্ঞান, পণিত, রসায়ন, প্রাণরসায়ন ও বায়োলজিতে ন্যূনতম ২য় শ্রেণীর বি. এসসি (অনার্স) অথবা এম. এসসি পাশ এবং কম্পিউটার ইঞ্জিনিয়ারিং, ইলেক্ট্রিক্যাল ও ইলেক্ট্রনিক্স/ মেকানিক্যালে বি.এসসি ইঞ্জিনিয়ারিং-এ ২য় শ্রেণী/সমমান বা এমবিবিএস/ দন্তচিকিৎসাবিদ্যায় গ্র্যাজুয়েশন।

বর্তমানে এখান থেকে পাশকরা মেডিকেল ফিজিসিস্টরা এবং বায়োমেডিকেল ইঞ্জিনিয়াররা ঢাকা মেডিকেল কলেজ হাসপাতাল, ন্যাশনাল ইনস্টিটিউট অব ক্যান্সার রিসার্চ এন্ড হাসপাতাল, ক্ষয়ার হাসপাতাল, ইউনাইটেড হাসপাতাল, শেখ মুজিব মেডিকেল বিশ্ববিদ্যালয়, খাজা ইউনুস আলি মেডিকেল কলেজ এন্ড হাসপাতালের রেডিওথেরাপী বিভাগে, বিভিন্ন মেডিকেল যন্ত্রপাতি সরবরাহকারী বহুজাতিক কোম্পানীতে এবং গণ বিশ্ববিদ্যালয়ে কর্মরত আছেন।

Department of Medical Physics & Biomedical Engineering

[Only Department in Bangladesh: Collaboration with Germany & India]

In 2000 a full-fledged "Department of Medical Physics & Biomedical Engineering" was founded at Gono Bishwabidyalay, Savar, Dhaka, Bangladesh with M.Sc course of international standard. From 2005, B.Sc (Hons) course in Medical Physics and in Biomedical Engineering was launched.

UGC Approved	Courses Offered	
	B.Sc (Hons) in Medical Physics & Biomedical Engineering	4 years (8 Semesters)
	M.Sc in Medical Physics & Biomedical Engineering	2 years (4 Semesters)

Medical Physics and Biomedical Engineering

Medical Physics is the application of physics to medicine. It generally concerns physics as applied to medical imaging and radiotherapy, although a medical physicist may also work in many other areas of healthcare.

Biomedical engineering is an interdisciplinary field of advanced knowledge of engineering and science to solve medical and healthcare related problems.

This unique field encompasses

Bio-instrumentation, Radiotherapy Treatment Planning, Radiation Dosimetry, Bio-materials, Radiotherapy Devices, Nuclear Medicine, Bio-Mechanics, Radiation Protection, Medical Imaging, Radiation Oncology Physics, Brachytherapy, Cellular and Tissue Engineering, Laser medicine, Intensity Modulated Radiation Therapy (IMRT), Sophisticated Imaging Device: Magnetic Resonance Imaging (MRI), Computed Tomography (CT), Positron Emission Tomography (PET).

Job Scope : Medical Physics and Biomedical Engineering

- Radiotherapy Department in all public and private Hospitals
- Diagnostics Centers
- Bangladesh Atomic Energy Commission (BAEC)
- Medical Companies for Maintenance, Operation, Managment and Development of Equipment
- University or Research Institute
- Also in foreign countries.

Special Features

- Well equipped laboratories for Physics, Electronics, Medical Physics and Biomedical Engineering.
- Collaboration with the German Cancer Research Centre (DKFZ), Heidelberg University, Germany.
- Collaboration with Saroj Gupta Cancer Centre & Research Institute, Thakurpukur, Kolkata, India.
- Collaboration process is going on with the School of Bioscience & Engineering, Jadovpur University, Kolkata, India.
- Collaboration with Anhalt University of Applied Sciences, Germany
- Scope of higher training in Germany
- Thesis and project supervised by renowned Professors from German Universities.
- Updated books relevant to the subject and laboratory instruments are supplied from Germany
- Courses are taken by Guest Professors from Heidelberg University, University of Cologne, Germany.
- Facilities of practical training in the Government and non Government hospitals in Bangladesh (NICRH, DMCH, etc.)

Eligibility for admission

B.Sc (Hons) in Medical Physics and Biomedical Engineering :

GPA 2.5 in S.S.C & H.S.C with Math & Physics or Diploma on Electrical/ Electronics/Mechanical/Electromedical Engineering from Polytechnic Institute, minimum 2nd class or equivalent.

M.Sc in Medical Physics and Biomedical Engineering :

B.Sc (Hons) in Medical Physics & Biomedical Engineering, B. Sc (Hons)/ M.Sc degree in Physics/Applied Physics/Biochemistry/Biology/ Chemistry/Mathematics/MBBS/B.Sc in engineering, minimum 2nd class or equivalent.

Students passed from the department are currently working in Dhaka Medical College Hospital (DMCH), National Institute of Cancer Research and Hospital (NICRH), Square Hospital, United Hospital, Bangabandhu Sheikh Mujib University (BSMMU), Khwaja Yunus Ali Medical College & Hospital, Multinational company and also in Gono Bishwabidyalay.

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