Asia-Oceania Federation of Organizations for Medical Physics

AFOMP Newsletter

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Editorial

The Need for Reform in Medical Physics Education and Training

Dear Readers,

Greetings from Editorial Office,

We are pleased to welcome you to read the latest issue of AFOMP Newsletter June 2022. This issue presents with lots of information about the Execute Committee of AFOMP activities including messages from AFOMP officials, highlights of recently held AFOMP School Webinar report, IMPW 2022 celebration, scientific invited article, AFOMP awards & honors, announcements, advertisements, book review in the field of Medical Physics.

The necessity for reforming the Medical Physics education and training has been recognized by international organizations such as WHO and IAEA and also many international professional societies including IOMP. In concordance with the above organizinzations, the AFOMP also has taken initiatives for reforming the education recently. However, how to strengthen Medical Physics education and training further is important deliberations and debates which are taking place amongst the peer professionals across the globe. In this context, the purpose of this editorial is planned to investigate basic questions such as who has to start the reform? Why do we need the reform in medical physics education and training?, What are the essentials required for reforming the education?, how to implement the measures to adequately address the needs? when to redesign and restructure the educational program? where will it be delivered for the effective implementation?

As the AFOMP is being Asia-Oceania regional professional society, it is important to initiate the reformation in the medical physics education and training by developing the uniform educational policy among the national members organizations within the AFOMP region. The need for reformation in medical physics education is to improve the medical and health services to the humanity and to built better educational system to develop quality workforce in order to maintain the high quality standard of practice in the health organizations.

There are essentials required for reformation such as (i) harmonization and uniform curriculum and syllabus (ii) establishment of accredited education as well as training programs, (iii) adequate infrastrures and resources in terms of educational materials, physical and electronic libraries, experimental laboratories and skilled faculties with sufficient student and faculty ratio, (iv) assessment and evaluation process (v) clinical residency training specialised to the subspecialties of medical physics and (vi) develop the credentialing process of continuous educational polices in order to maintain and posses adequate knowledge ,skills and competencies for the required practice. The strategic planning, implementation process development and periodic monitoring, by the competent professionals who are authorised by the government regulatory bodies, are the best ways to retain the quality education in health organization. The health science and technology is rapidly advancing and many innovative curricular are required to incorporate into the system of education and training. Hence there should be of minimum period within which the program should be reviewed, resigned and restructured as per the environment and requirements or local needs. Once the educational policies have been developed with consensus of stakeholders, the same policy needs to be recommended to the government educational and practice regulatory bodies for the effective implementation across the respective nations or may be through WHO/IAEA organization via IOMP. The healthy future of profession cannot be achieved without putting the health and well-being of populations at the centre of public policy. Therefore the educational reform is the way forward in achieving the sustainable development goals to which all societies, regardless of their level of economic development, have committed and established for. It is the need of the hour to act upon.

"Education is not the learning of the facts but training of the mind to think"- Albert Einstein

Hope you will enjoy in reading this issue of Newsletter.

Thanks & Regards

Dr.V.Subramani
Editor, AFOMP Newsletter
Asst. Professor Radiation oncology Medical Physics AIIMS, New Delhi

From the desk of President AFOMP

Dear AFOMP members,

I am very happy to bring to you the AFOMP newsletter of June 2022.

Now we observe that the wrath of COVID-19 pandemic is receding and the world is coming to normal again. The in person meetings and activities have started again after a gap of about 2 years. In person meetings has many advantages as they give a chance to interact face to face, learn culture, visit interesting places and enjoy the cousins of place you are visiting. The IUPESM world congress on medical physics and biomedical engineering [WC2022] is being held in Singapore during 12- 17 June 2022 in hybrid mode; bringing an opportunity to meet many professional colleagues.

The annual meeting of AFOMP - 22nd AOCMP2022 is being held in Taipei, Taiwan during 10-12 December 2022 in hybrid mode. The website of the conference www.aocmp2022.org is functional and the abstract submission is on. I request you to submit your abstract and encourage your students, colleagues to do so. In recent years AFOMP has started many awards and opportunities for its members, Dr Udipi Madhvanath memorial AFOMP best PhD award in Radiobiology is the latest. Please keep an eye on AFOMP website www.afomp.org for the announcement inviting applications for the awards and travel grants.

AFOMP is regularly organizing monthly AFOMP webinars and AFOMP school webinars which are CPD accreditation by ACPSEM, the information is available on AFOMP website. Further the recordings of all the completed webinars are available on AFOMP website, you can watch anytime.

Medical physics education is evolving very fast with various newer technologies and applications for diagnosis, treatment and hence AFOMP has constituted a task force to prepare a harmonized basic and advanced syllabus of medical physics education encompassing the competencies needed by medical physicists not only today but tomorrow relevant for AFOMP region, it will be released soon.

I appeal to all of you to contribute to AFOMP so as to uplift the standards of practice of medical physics. Further IOMP has started accreditation of medical physics education, residency program and CPD accreditation of conferences,teaching programs. I expect institutions running medical physics education programs and residency programs gets IOMP accreditation for standardization, visibility and credibility of programs. Further the education programs like conferences, training programs, workshops get IOMP CPD accreditation with CPD/CME points. The details of IOMP accreditation programs are available at IOMP website (www.iomp.org)

It is very important to note that the ICMP2023 will be held in AFOMP region, at Mumbai, India in 2023. I am sure you will plan to participate in this important meeting being organized jointly by IOMP, AFOMP, SEAFOMP and AMPI. The venue of 2024 AOCMP will be decided by AFOMP council meeting during AOCMP2022, the bids for hosting the 24 AOCMP in 2024 will be invited soon. The interested can get prepared to submit the bids for AOCMP2024.

Communication and participation are the vehicles of fulfilling the objectives of any professional organization and so also of AFOMP. I take this opportunity to request all of you individually and as AFOMP member organization to contribute in whatever way you can to support our fellow colleagues in the region for updating and upgrading themselves. Your suggestions are always welcome.

I am happy to note that many AFOMP NMO's have organized activities on occasion of IMPW 2022 and sure you will do on occassion of IDMP2022 on 7 November 2022. The Theme of IDMP2022 is "Medical Physics for sustainable healthcare"

I hope you will enjoy reading AFOMP newsletter and wish you all very nice time ahead professionally, socially and individually.

Prof. Arun Chougule
President AFOMP
Chair ETC IOMP
Chairman IOMP accreditation board
Member Board of Directors IMPCB

AFOMP Vice-President's Message

Dear Colleagues,

It is wonderful to see that the IUPESM World Congress on Medical Physics and Biomedical Engineering will be held in near future, both face-to-face as well as online. For many of us it will be the first post-pandemic international conference where we can present live and network with our colleagues. Yes online meetings, webinars,…have been excellent and kept us connected and offered access to continuing education. But still, they cannot fully replace face-to-face participation. Hopefully, many of you can attend the Congress. The program looks excellent. Please visit: https://wc2022.org/.

IOMP Global Workforce Survey

The IOMP National Member Organizations (NMO) were invited to participate in a survey about the current numbers of medical physicists in their countries as well as about their medical physics training and accreditation pathways (UniSA Ethics Protocol 204527). The data will allow IOMP to identify medical physics workforce status, training diversity and future demands around the world. It will only take ~15-20 minutes to complete. Analyzed data will be presented at relevant professional conferences and in a publication. Collecting this type of information allows IOMP to analyze trends and statistics and provide better service to medical physics community worldwide. It is expected that the data will also be useful for AFOMP to better guide our education activities, medical physics program development, accreditation pathways and so on. The NMO representatives were sent the link to the survey.

Radiation Research Journals need to stipulate minimal requirements for publishing research using X-radiation exposures.

My recent activity (with Prof pam Sykes and Prof Loredana Marcu) was related to publishing an editorial in the Radiation Research Journal on minimal requirements for publishing research using X-radiation exposures: *"The goal of publishing research is to enable the work to not only be disseminated, but also to be replicated. True replication can only be achieved by providing the appropriate experimental details in the published literature and/or to contact the authors to obtain the required information. Often the small nuances of experimental protocols may require the latter but the basic information should be present in the published article. In many papers which report responses to radiation exposure, a very detailed protocol is supplied for the molecular and cellular end-points, and yet the Radiation Exposure protocol can often consist of only a few sentences and then without even the most basic detail. Draeger et al, 2020 report that on review of 1758 papers from 469 journals, the dosimetry/calibration was appropriately reported in only a small proportion of papers: the protocol (1.2%), geometry (2%), equipment (15.9%) and medium (3.9%). What was most alarming from their review was that highly cited journals and articles are systematically more likely to be lacking experimental details related to the irradiation protocol."* This needs to change, and all radiation journals should require reporting of the full irradiation protocol and experimental set up for radiobiological experiments.]

A new award has been established.

Dr. Udipi Madhvanath Memorial AFOMP Best Ph.D. Award in Radiobiology has recently been announced.Dr. Udipi Madhvanath was the founding father of medical physics in India and had contributed greatly to medical physics across the globe. He was also the first IOMP President from the AFOMP region (1991–1994) and had contributed greatly to the Journal of Medical Physics (JMP), one of the AFOMP's official journals. Dr. Madhvanath is survived by a meritorious son Sriganesh Madhvanath who is Senior Director of Applied Research at eBay Inc in the USA. He has graciously proposed and supported the starting of "Dr. Udipi Madhvanath Memorial AFOMP Best Ph.D. Award in Radiobiology". More information can be found at: https://afomp.org/2022/02/26/dr-udipi-madhvanath-memorial-afomp-best-ph-d-award-in-radiobiology-announced/

AOCMP2022 travel awards.

AOCMP 2022 will be held Taipei 10-12 Dec 2022. For more details visit: http://aocmp2022.com/. Taiwan still has travel restrictions in place and as such, the call for these awards will be decided at a later stage depending on the availability of the quarantine free travel (or similar) to Taiwan.

Other AFOMP awards will also be announced in near future.

Finally, I would like to thank all our members for their contribution towards AFOMP activities and looking forward to seeing you in Singapore at the Wc2022.

Eva Bezak
Vice President, AFOMP

Reference:

1. L Marcu, E Bezak, P Sykes "Radiation research journals need to stipulate minimal requirements f o r publishing research using X-radiation Exposures", Rad Res 2022, in press.

2. Draeger et al. A dose of Reality: How 20 years of incomplete physics and dosimetry reporting in radiobiology studies may have contributed to the Reproducibility Crisis. Int, J. Radiat. Oncol. Biol. Phys. 2020 Feb 1;106(2):243-252. doi: 10.1016/j.ijrobp.2019.06.2545.

AFOMP Secretary General's Message

Dear Members,

The AFOMP was founded in 2000 with the goal of promoting medical physics in Asia and Oceania by raising the profession's status and standard of practice. AFOMP has had a substantial impact on medical physics advancement since its inception. AFOMP EXCOM, AFOMP Committee members, assisted in the publication of newsletters, announcement of orations, various types of awards, monthly webinar, school webinar, and policy statements. AFOMP also continues to collaborate with other regions. EFOMP and AFOMP signed a Memorandum of Understanding this year.

AFOMP newsletter is brought out half yearly in January and June of every year. AFOMP will publish Vol.14 No.2 June 2022 issue as a continuation of its half-yearly publication. This newsletter is a source of information focusing on AFOMP activities and medical physics science and research-related articles, reports, educational material, scientific activities, workshops, and conference-related information items of interest to AFOMP members. It contains timely information to represent the landscapes of medical physicists in the region. I appreciated the complete dedication and support of the newsletter editorial board and the members who contributed to writing the wonderful and inspiring articles with tireless efforts.

Healthcare technology is always advancing. The greatest method to improve the medical physics community is to increase capacity and certify QMPs. Several devoted medical physics specialists have worked tirelessly to raise AFOMP to the status of a thriving organization and regional leader in medical physics development in the Asia-Pacific area.

At last, I would like to request all the members, NMOs, regional organizations, and others to come forward to develop an adequate policy for clinical training, residency programs, accreditation, and certification of medical physics all over the AFOMP region. It will extend the community and maintain the standard quality of our professions. Lastly on behalf of AFOMP I am inviting all of you in the upcoming AOCMP conference from 10-12 December 2022.

Stay happy and safe.

Prof. Dr. Hasin Anupama Azhari
General Secretary
Asia–Oceania Federation of Organization for Medical Physics (AFOMP).
CEO South Asia Centre for Medical Physics and Cancer Research (SCMPCR)

AFOMP School Webinar Series

Prof Arun Chougule and Rajni Verma

The Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) started the AFOMP school webinar series after the great success of AFOMP monthly webinars. Due to the unprecedented situation created by COVID-19 pandemic, it was nearly impossible to organize or attend the usual physical meetings/ conferences. No one has expected this COVID situation to extend for such a long time. There was a huge demand and interest for further online educational activities especially from students and early career medical physics. This made AFOMP start a more elaborate educational activity in the form of AFOMP School Webinar series.

Educational activities are always on the top priority of AFOMP. This school webinar series has been proven one of the key academic programs of AFOMP with overwhelming response globally. During difficult times of COVID this school series has provided a perfect bridge between subject experts, students and early career professionals. These schools have provided a classroom experience to students and refreshing updates for professionals. The International Organization of Medical Physicists (IOMP) also encouraged organizing virtual meetings. These schools became extremely popular among the young generation of medical physicists, as it is easy to participate without much logistical arrangements and absolutely free without any fees.

The whole idea of the AFOMP School webinar series was conceived in May 2021. The organizing team led by Prof. Arun Chougule, President AFOMP was all geared up with schedule and logistical arrangements in May 2021. Previous experience has given lots of confidence to start this new academic quest.

Prof. Arun Chougule made the first announcement about the AFOMP School webinar series on virtual platforms during monthly webinars and on AFOMP website. Every school was meticulously planned to cater to the needs of the participants incorporating feedback received. They were planned with a subject topic of wide interest and special emphasis was given to basics of the subject with practical aspects. Every school was planned with a subject expert team. This two- three hours long program usually includes three to four speakers/talks along with live discussion with the whole team and participants. Most of the time a member of the expert team will take a lead and moderate the program. Schools were organized every month with new teams and new subjects. E-webinar flyers were prepared for every month and circulated as per the schedule. This informative e-webinar flyers includes all the necessary information related to school such as the theme of the school, titles of the talks, details of speakers and moderator, registration guidelines to participants in a simplified approach including webinar dates, Greenwich Mean Time (GMT) and registration link. The registration was free but mandatory for participation. These e-webinar flyers were posted on websites and circulated among all the National Member Organizations (NMOs) in the AFOMP region. After a successful registration by the participants they receive a confirmation email containing all information about joining the school and the link. These schools were organized and managed by the AFOMP team, Dr. Arun Chougule, President AFOMP and Dr. Jin Xiance, Chair Education & Training committee AFOMP, managed the scientific contents of the webinars. Dr. Chai Hong Yeong, Chair Professional Relations Committee AFOMP, looks after the certificate and CPD point management. Rajni Verma,

Website Manager AFOMP, managed communication and technical aspects. This webinar series could not be a success story without continuous support of AFOMP Secretary General, Dr. Hasin Anupama Ahzari.

The school webinars were launched with the first school on 19th June 2021 on a commercially available virtual platform "ZOOM" Globally. First expert team of AFOMP school included Dr. S.D Sharma, Prof. Rajesh Kinhikar, Dr. Sudesh Deshpande and Prof. Arun Chougule. The subject of the school was "Reference and Relative Dosimetry of Photon Beams". This webinar got an overwhelming response globally and with this a series of AFOMP schools started rolling. Due to their relevance and success, now every school is accredited with two CPD points per hour from Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM). These schools provided a perfect virtual forum to fulfill the objective of knowledge dissemination. This has encouraged exchange of ideas and foster knowledge up-gradation with special emphasis in the AFOMP region. The recordings of these schools have been posted on AFOMP website, which can be accessed by any one at all time. This has given audiences a wide scope to reach out to the AFOMP school deliberations if somehow they missed it or want to listen it again.

ACPSEM
CPD Endorsed Activity

Many renowned academicians and medical physicists had been part of this wonderful journey. Various topics of scientific and practical importance were included in the series. Many topics and talks were included because of participant's requests.

AFOMP School

AFOMP has launched the special webinar series **AFOMP School** starting from June 2021. The first webinar is scheduled to take place on June 19, 2021 6:30AM to 9:30AM GMT.

Upcoming AFOMP School Webinars

Special Webinar – May 14, 2022 — Global School on Research Excellence

Webinar 05 – May 21, 2022 — Targeted Radionuclide Therapy and Personalised Dosimetry

Previous AFOMP School Webinars

Webinar 04 – Apr 23, 2022 — Radiotherapy Advanced Techniques

Webinar 03 – Mar 26, 2022 — Real-World Case studies in Medical Physics Leadership

Webinar 02 – Feb 26, 2022 — Medical Physics and Nuclear Medicine: Nuclear Medicine Physics and beyond

Webinar 01 – Jan 27, — Medical Physics and Advanced Cancer Services 2: Stereotactic and special

With AFOMP's 12th school webinar organized on 21st May 2022 the whole year of academic celebration is concluded. However, even after COVID-19 pandemic, these schools will prove to be a perfect platform for academic activities. This pandemic has forced us to learn new ways of life and effective use of virtual platforms is one of them. These virtual platforms have many advantages such as easy accessibility without much logistical arrangements. It is proved to be a boon to young students and professionals who mostly face issues for participation in physical meetings organized worldwide such as financial and travel related. These virtual meetings are quite appealing to students and young professionals as there are no fees and do not require travel.

Due to the advantages of virtual meetings and increasing demand to continue the AFOMP school webinars, AFOMP has decided to continue this educational journey in future as well.

The AFOMP executive committee was always a constant source of motivation for the whole academic journey. We gratefully acknowledge the active participation, cooperation and support of all the subject experts, participants and all individuals involved in organization of AFOMP school webinars. We hope that the AFOMP educational journey will achieve great heights with these school webinars along with benefiting students and young professionals on a large scale.

AMPI Report of IMPW 2022 Webinar on "Strengthening Medical Physics in India: A Roadmap"

Dr.V.Subramani and Dr.S.D.Sharma, AMPI India

International Organization for Medical Physics (IOMP) has started to celebrate a week devoted to the contributions of medical physicists to healthcare as international Medical Physics Week (IMPW) from 2020.This year to celebrate the IMPW was celebrated during May 09-13, 2022.

The purpose of these webinars was promoting the medical physics profession among professional colleagues in the clinical and non-clinical field and also among the public. These activities also intend to promoting awareness of medical physics among physics colleagues and to let them know how their students can find a career in medical physics.

Association of Medical Physicists of India (AMPI) has organized the online webinar program on Strengthening Medical Physics in India: The Roadmap" on the occasion of IMPW2022 on all five days having 5 invited lectures of one hour each on every day from 09-13th May evening 7:30 -8:30 PM IST. More than 100 participants have attended on all days across the country.

On the first day, Dr.S.D.Sharma President, AMPI started webinar program with welcome address and Dr. Robert Jeraj, Professor of Medical Physics, University of Wisconsin, USA has opened the meeting with brief introductory note and shared his view on global collaboration on Medical Physics research and importance of SWOT analysis towards strengthening medical physics in India with members of Indian Medical Physicists. Dr.V.Subramani, Secretary, AMPI has organized and coordinated with all the speakers and moderators throughout five days and made successful scientific activities on the special occasion on behalf AMPI. The scientific program with invited lectures on the occasion of IMPW 2022 was as follows:

LAP's automated water phantom streamlines commissioning and QA of MR-Linac and bore-type Linac machines

The THALES 3D MR SCANNER from LAP is helping medical physicists to fast-track QA test routines on their MR-guided radiotherapy systems, while a new iteration of the phantom delivers similar workflow efficiencies on bore-type linacs

User-friendly QA: thanks to its lightweight design, LAP's THALES 3D MR SCANNER is easily transferred from the carriage system to the patient couch.

Following the full product launch in the spring of last year, the THALES 3D MR SCANNER has emerged as something of a game-changer in the radiation oncology clinic, providing a "gold-standard dose accuracy check" for medical physics teams tasked with overseeing the acceptance and ongoing verification of the new generation of MR-guided radiotherapy (MR/RT)systems.

Developed by laser and radiotherapy QA specialist LAP, the THALES 3D MR SCANNER provides the radiotherapy physicist with a 3D and MR-compatible motorized water phantom that's tailored specifically for streamlined commissioning and QA of MR-Linac treatment machines. By necessity, the phantom is MR-conditional – i.e. all system components are made from non-ferromagnetic materials certified for use within the MRI scanner's magnetic field – while the automated set-up (which takes under 15 minutes to prepare) and

predefined measurement sequences are intended to help the medical physics team save time and simplify their test routines.

"It's still early days, but we're really encouraged by the clinical response and uptake of the THALES 3D MR SCANNER within the MR/RT user community," explains Thierry Mertens, a physicist himself and LAP's business development manager for healthcare.

Prioritizing workflow efficiency

Commercially, too, there's no shortage of momentum for LAP's new water phantom. Significant milestones ticked off in the first quarter of 2021include 510(k) regulatory approval from the US Food and Drug Administration (FDA), while the subsequent CE mark has enabled LAP to ramp up installations with clinical customers in the European Economic Area (EEA). In both regions, the phantom comes with a yearly

maintenance visit, software and hardware updates, and a configurable multiyear warranty.

The traction with early-adopting clinical sites in the US and EEAis doubly important. After all, it's feedback from these customers that will shape the development roadmap for the THALES 3D MR SCANNER in 2022 and beyond. Near term, it seems, product innovation is rooted in LAP's relentless focus on workflow efficiency. "We are enhancing the phantom's software functionality with this in mind – and specifically the introduction of a continuous scanning mode," notes Mertens. "In this way, radiotherapy physicists will be able to spend less time on their machine QA so that they can focus on other important tasks."

While the initial version of the phantom is optimized for the QA of View Ray's MRIdian MR/RT system, Mertens and colleagues are working on a custom water phantom to support Elekta's Unity MR-Linac machine. The development work is already advanced, with LAP's product development engineers in collective exchange with Elekta Unity clinical end-users. "The voice of the radiotherapy clinical useris fundamental to our requirements-gathering and for understanding – at a granular level – how the MR-Linac is being put to work in a clinical context," Mertens adds.

Independent verification

At the clinical sharp-end, of course, it's the medical physicist who is ultimately accountable for safe and effective MR/RT treatment delivery. This is where independent QA and verification tools – like the THALES 3D MR SCANNER – really come into their own, providing rigorous beam data and beam model visualizations to verify that the delivered radiation as it applies to the patient is indeed correct.

Made to measure: The reference detector is put in place with the help of the positioning plate, after which the phantom can be moved into the MR-Linac.

Operationally, the THALES 3D MR SCANNER is being deployed alongside a portfolio of QA tools – some providing daily, weekly and monthly QA checks, with the water phantom reserved for system commissioning and ongoing verification of dose delivery after any major upgrades to the MR-Linac hardware or software (i.e. perhaps once or twice a year). “It’s all about confidence and trust,” adds Mertens. “The water phantom will give the medical physicist peace of mind, ensuring that their MR/RT system is calibrated accurately for the verification of delivered dose to the patient.”

Beyond initial QA applications for MR/RT systems, LAP has released a version of the water phantom for the commissioning and QA of traditional bore-type linacs – specifically targeting clinical users of Varian’s Halcyon image-guided radiotherapy system and ETHOS, the vendor’s AI-enabled adaptive radiotherapy machine. **“Alongside the original THALES 3D MR SCANNER,” concludes Mertens, “we have now launched the THALES 3D SCANNER. In the long term, this ‘2 in 1 concept’will allow more clinics and treatment centres to use the water phantom.”**

What the customers say

Workflow automation, intuitive software for data collection and analysis, plus minimal training overhead: these are just some of the recurring themes from LAP customers who have deployed the THALES 3D MR SCANNER over the past 12 months to support their MR/RT commissioning and machine QAefforts.

For Thierry Gevaert, professor and head of medical physics at UZ Brussel (UZB), Vrije Universiteit Brussel (VUB) in Belgium, and an early-adopter of the LAP THALES 3D MR SCANNER, the priorities when choosing a water phantom are ease of use, straightforward software to perform the measurements, and the ability to incorporate different types of ion chambers. “The reason for this is that our water phantom is only used extensively during commissioning and thereafter just a few times a year,” he explains.

In this regard, it seems the LAP THALES 3D MR SCANNER ticks all the boxes for the commissioning and QA of UZB’s View Ray MRIdian system. “With only one day of training, we were able to use the phantom’s software to rapidly perform all the necessary data collection,” adds Gevaert. “Moreover, being fully automated, wegained time during the commissioning testing procedure versus our traditional manual phantom.”

That headline take is echoed by Randa El Gawhary, a medical physicist at San Pietro Hospital FBF in Rome, Italy, where the LAP THALES 3D MR SCANNER is also being used for the characterization and QA of the clinic’s ViewRay MRIdian system. “We have been impressed with the LAP phantom from the very beginning,” she explains. “It is a reliable QA system with high-quality electronics, while the software allows a very smooth workflow for fast and accurate measurements.”

Asia-Pacific Special Interest Group [APSIG] – here to help

Access to advanced radiotherapy technology and complex treatment techniques is essential to help tackle the rising incidence of cancer globally. This requires a significant broadening and depth of knowledge by Medical Physicists in all countries. A good example is the transition from Cobalt-60 teletherapy to linear accelerators capable of delivering treatment techniques such as IMRT and VMAT. It is no small task to gain the required knowledge in specialised areas including small field dosimetry, treatment planning and dose delivery validation. The introduction of on-board kV cone beam CT imaging for the purpose of image guided radiation therapy (IGRT) require new skills in image processing, analysis and the development of quality control testing to ensure the accuracy of patient alignment is achieved and maintained.

Medical physicists typically have a high clinical workload which leaves very limited time to acquire the skills and knowledge needed to commission new technology or implement new techniques. To help with this the Asia-Pacific Special Interest Group (APSIG) was established in 2009 to facilitate greater communication for education and training between countries. APSIG consists of members of the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) mostly working in Radiation Oncology, who support the training of their colleagues in neighbouring countries. We quickly realized we can have a more direct and immediate effect by sending experienced volunteer medical physicists to provide face to face training and support for staff who are implementing the new radiotherapy technology.

Since 2009, APSIG has provided volunteer trainers in radiotherapy (and once for diagnostic imaging) to Cambodia, Laos, Mongolia, Myanmar, Philippines, Papua New Guinea and Vietnam. The length of visits has ranged from 1 to 18 weeks but generally four weeks is the minimum. APSIG has also partnered with the Australian government on six occasions over the past 12 years for other long term volunteer assignments for physics trainers in Cambodia (12 months), Mongolia (3 months), Papua New Guinea (3 months) and Vietnam (3 visits, 19 months). The combined total of all the volunteer assignments that APSIG has helped provided over the past 12 years is 49 months or a little over 4 years of support to cancer centres.We are currently providing remote training and support to the medical physicists at the new cancer centre in Port Moresby General Hospital (PNG) and we plan to have volunteers on site in the lead up to when it opens in 2023.

APSIG has achieved a lot in 12 years, however we have often been restricted by the limited number of volunteers we can find. These volunteers often need to use their holiday leave or unpaid leave which can have a significant impact on their careers and financial situation. APSIG is supported by donations from ACPSEM members as well as radiotherapy vendors but there is no capacity to provide our volunteers much more than living and travel expenses during their assignments.

I often feel APSIG could have a greater impact in supporting cancer centres in neighbouring countries. Aside from the limited number of available volunteers and funding required, it can often be difficult for the staff to take the time to spend with the physics trainer since they are often busy completing their daily duties. Certainly, increasing the length of the assignment can help in this respect and we have seen this with the longer assignments done in partnership with the Australian government. Perhaps a better way would be to have volunteers visit a country and coordinate training with staff from multiple hospitals, preferably somewhere that staff are not distracted by their own hospital duties and can concentrate on the training being given. There is still a need to transfer this training back to the hospital to be implemented so perhaps a combination of offsite and onsite training is the best balance.

The COVID-19 pandemic temporarily halted our on-site volunteer program but on the positive side this has caused us to develop better ways of providing remote support. For example, instead of funding one medical physicist to come to the ACPSEM national conference as we used to do, we now provide up to 20 people with a free registration to attend the conference virtually.Now that you are a little familiar with APSIG, I'd like to invite you to contact me if you are interested in our activities, either to find out more about how we can help your centre or how you can help others as an on-site volunteer, a remote trainer, or as a fundraiser. Maybe you have a new idea for a training project in radiotherapy or another area of medical physics – if so we'd love to hear from you!

Simon Downes
Chairperson, APSIG
simon.downes@health.nsw.gov.au

AFOMP Awards and opportunities

Prof Arun Chougule
President AFOMP

Asia Oceania Federation of Organizations for Medical Physics- AFOMP was founded in May 2000 and has completed 22 years and now have 19 National Medical Physics organizations as full members and 2 organizations as associate member of AFOMP representing over 12000 medical physicalists. AFOMP is one of the largest regional organizations (RO) of IOMP. Recently AFOMP has started many awards to encourage, research, professional development and recognize the contribution of medical physicists from AFOMP region.The following awards are given annually to the medical physicists at the Asia-Oceania Conference on Medical Physics (AOCMP). All the details regarding the awards are and past awardees are available at AFOMP website.

1. **C.V Saraswathi A.N Parameswaranmemorial AFOMP best PhD award:**
   The C.V. Saraswathi -A.N. Parameswaran Memorial AFOMP best PhD award is given for the best PhD thesis in Physical Sciences with relevance for medicine. Postgraduate students who have been awarded their PhD at a university in the AFOMP region are eligible to be nominated. Ph.D. thesis is judged by AFOMP's Awards and Honors Committee (AHC) with the objective of demonstrated excellent in Ph.D. research work in terms of clinical relevance, scientific merit, and publications capacity.This award is given annually at AOCMP meeting for best PhD thesis and awardconsist of a cash prize of US$400, a certificate and a memento.
   The award is kindly supported by Parameswaran family.

2. **P.N Krishnamoorthy Memorial AFOMP Young achiever award:**
   The PN Krishnamoorthy memorial AFOMP Young Achiever Award is commitment of AFOMP to support and encourage promising young medical physicists from the AFOMP region at an early stage in their career. The PN Krishnamoorthy memorial AFOMP Young Achiever Award is presented annually at the AOCMP to the medical physicist judged by AFOMP's AHC to have demonstrated excellent contributions to medical physics, research and communities in the AFOMP region as appropriate for early career professionals.The Award will consist of a cash prize of US $ 400, a certificate and a memento.The award is kindly supported by Parameswaran family.

3. **AFOMP Journal Prize:**
   To recognize excellence in medical physics published work, based on originality, science, clarity, and potential impact on practical applications or theoretical foundations.This prize is awarded annually for the best paper on original work published in an AFOMP Journal (Radiological Physics and Technology, and Physical and Engineering Sciences in Medicine and Journal of Medical Physics) authored by an AFOMP member. The editor of each of three AFOMP journal nominates up to 10 best publications in a calendar year preceding to the publication award year. The AHC evaluates the submissionsand rank them on scores they receive. AFOMP Journal Prize is presented annually at the AOCMP to the first author of the best paper individually judged by AFOMPAHC. The Award consists of a cash prize of US$400, certificate and a memento. The award is kindly supported by three of AFOMP journals.

4. **AFOMP Lifetime achievement award:**
   The AFOMP Lifetime Achievement Award is to honours a medical physicist who has established a distinguished career in their fields, serving the profession and the community. The AFOMP Lifetime Achievement Award is presented annually at the AOCMP to the medical physicist judged by AFOMPAHC to have demonstrated a significant contribution to medical physics and community in the AFOMP region.The nominee must have worked (or still working) as a medical physicist in the AFOMP region for at least 20 years. The nominee must be of more than 50 years of age on 1st January of the awarding year.

The Award consists of a citation, certificate and a memento

5. **Prof. Kiyonari Inamura Memorial AFOMP oration award:**
To recognize and appreciate the outstanding contributions of medical physicists from the AFOMP region, an oration award in the name of Prof. Kiyonari Inamura is started. Prof. Kiyonari Inamura Memorial AFOMP Oration awardof the AFOMP is given annually at the AOCMP meeting.The awardee should have worked as a medicalphysicist in the AFOMP region for the last 15 years at least.The Oration Committeeselects the awardee.
The oration awardee gets the citation and plaque from AFOMP.

6. **Professor Sung Sil Chu AFOMP Best Student's Publication Award :**
AFOMP established the **"Professor Sung Sil Chu AFOMP Best Student's Publication Award".** The "Professor Sung Sil Chu AFOMP Best Student's Publication Award" is an annual award given to the best publication by MSc or PhD students in medical physics to encourage publications from students during their postgraduate or doctorate studies. To encourage research in low- or lower-middle-income countries (LMI) from AFOMP region a postgraduate students are eligible for this award. The "Professor Sung Sil Chu AFOMP Best Student's Publication Award" is presented annually at the AOCMP to the awardee judged by the AHC for the best publication in the year of award in terms of clinical relevance, scientific merit, and clarity of presentation. The Award consists of a cash prize of US$ 400, a certificate and a memento. Award is supported by Korean Society of Medical Physics (KSMP)

7. **Dr. Udipi Madhvanath Memorial AFOMP Best Ph.D.award in Radiobiology:**
Dr. Udipi Madhvanath memorial AFOMP best Ph.D award in radiobiology"is started from 2022.The Dr. Udipi Madhvanath Memorial AFOMP Best PhD Award in Radiobiology is given for the best PhD thesis in radiobiology or related fields. Postgraduate students who have been awarded PhD at a university in the AFOMP region in the past 18 months are eligible to be nominated. The nominations are invited by AFOMP and judged by AFOMP AHC. The award is given annually during AOCMP meeting.

The Award consists of a cash prize of US$400, a certificate and a memento.

The award is kindly supported by Dr. Madhvanath's family.

AFOMP is thankful to families and KSMP for the kind donations for supporting these awards.

On addition to awards mentioned above, AFOMP awards travel grants to participate in AOCMP meetings to eligible participants. The AFOMP- AOCMP awards 18 prizes to best oral and poster presentations during AOCMP.

The announcement will appear on AFOMP website, please keep on visiting the AFOMP website (www.afomp.org) for the updates. For any additional information or clarification you can contact the Secretary General AFOMP.

AFOMP Prof Sung Sil chu Best student publication Award

Received by:Dr.Hemalatha.A,Assistant Professor,Dept of Radiological Physics,SP Medical College,Bikaner, Rajasthan, India, at the AOCMP 2021.

It was great pleasure to receive the AFOMP best student publication award.The award is given in the name of Prof Sung Sil Chu to honour his contribution to medical physics in the AFOMP region. Prof Sung Sil Chu was a founding member of the Korean Society of Medical Physics (KSMP).He also contributed significantly to international collaborations with a membership of IOMP.

I would like to express my sincere gratitude to the Association of Medical Physicist of India (AMPI), AFOMP and KSMP for selecting me for the award. My special thanks goes to AFOMP president and my research guide Prof. Dr. Arun Chougule, Dr. Mary Joan for the support and guidance they provided me to make my participation possible in the contest.My sincere thanks go to AFOMP Award and Honours chairman Prof.Eva Bezak and AOCMP organizing committee 2021,Bangladesh for given me this platform. The effort and initiation made by AFOMP and KSMP to support the young Medical physicist researchers from developing world is appreciable indeed.

My research paper selected for this award was “Out-Of-Field Dose Measurement and Second Cancer-Risk Estimation Following External Beam Radiotherapy and Brachytherapy for Cervical Cancer Treatment: A Phantom Study” which was published in Iranian Journal of Medical Physics, July 2020 edition. It was great honour to represent India on the prestigious International forum and getting award for that . This award encourages young researchers in the field of medical physics to develop new techniques and methods and publish their findings. The funding also allows them to actively participate in workshops and international conferences in the future. Last but not least I thank to department of Radiotherapy and Radiological physics ,Saradar Patel Medical college,Bikaner,Rajasthan ,India for their continuous support to pursue this research work and publishing.

Yoshiro Ieko (Medical Physicist, Department of Radiation Oncology, Iwate Medical University)

Radiological Physics and Technology
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The impact of 4DCT-ventilation imaging-guided proton therapy on stereotactic body radiotherapy for lung cancer

Yoshiro Ieko[1,2] · Noriyuki Kadoya[1] · Takayuki Kanai[1,3] · Yujiro Nakajima[1,4] · Kazuhiro Arai[1,5] · Takahiro Kato[5,6] · Kengo Ito[1] · Yuya Miyasaka[1,2] · Ken Takeda[7] · Takeo Iwai[2] · Kenji Nemoto[2,3] · Keiichi Jingu[1]

As a medical physicist and assistant professorat Iwate Medical University, my research interest includes deformable image registration (DIR), 4D-CT ventilation, and 4D-CT ventilation-based functional treatment planning.Our paper,published in Radiological Physics and Technology (RPT) (DOI: https://doi.org/10.1007/s12194-020-00572-5, SharedIt: https://rdcu.be/cOdGC), received the AFOMP Best Paper Awardin2021. In this study, weassessed the potential impact of using 4D-CT-ventilation imaging-guided proton therapyin lung functional-avoidance radiotherapy to reduce radiation-induced pulmonary toxicity.Our results showed that proton therapy significantly reduced functional mean lung doses and the high-functional lung regions receiving moderate and low doses compared to those in 3D-CRT and VMAT due to the physical characteristics of the Bragg peak, indicating that 4D-CT ventilation-based proton therapy may lower lung toxicity.

In addition to the AFOMP Best Paper Award, this paper received the RPT Doi Award*.
*Doi Awards (for outstanding articles)
The Japanese Society of Radiological Technology (JSRT) and the Japan Society of Medical Physics (JSMP) established the Doi Award in 2008, to be given to the best article in each of three selection categories: Medical Imaging, Radiation Therapy, and Nuclear Medicine and Magnetic Resonance Imaging, annually. The Doi Award has been named in view of Professor Kunio Doi's notable contributions to medical imaging and computer-aided diagnosis while he was a Professor of Radiology at the University of Chicago for 40 years, and also as the first Editor-in-Chief of this journal.

I would like to thank to AFOMP, JSRT, JSMP, and all co-authors.


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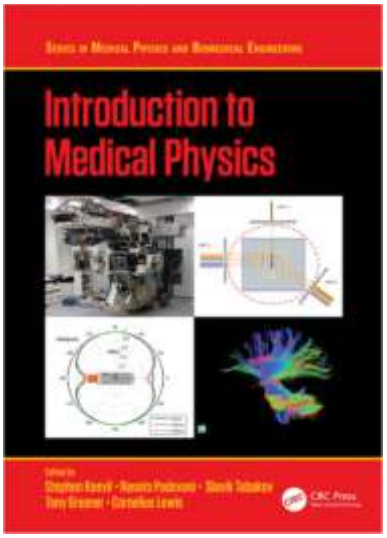
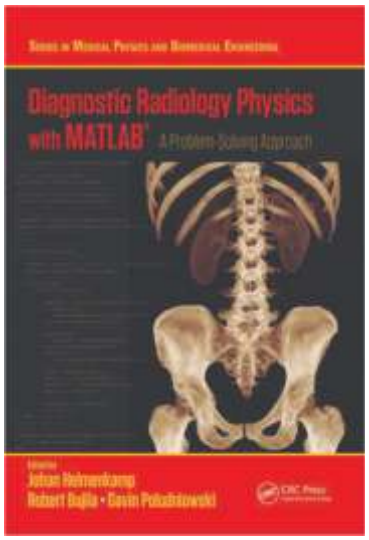


This textbook provides an accessible introduction to the basic principles of medical physics, the applications of medical physics equipment, and the role of a medical physicist in healthcare.

Introduction to Medical Physics is designed to support undergraduate and graduate students taking their first modules on a medical physics course, or as a dedicated book for specific modules such as medical imaging and radiotherapy. It is ideally suited for new teaching schemes such as Modernising Scientific Careers and will be invaluable for all medical physics students worldwide.

Key features:

- Written by an experienced and senior team of medical physicists from highly respected institutions
- The first book written specifically to introduce medical physics to undergraduate and graduate physics students
- Provides worked examples relevant to actual clinical situations



Imaging modalities in radiology produce ever-increasing amounts of data which need to be displayed, optimized, analyzed and archived: a "big data" as well as an "image processing" problem. Computer programming skills are rarely emphasized during the education and training of medical physicists, meaning that many individuals enter the workplace without the ability to efficiently solve many real-world clinical problems

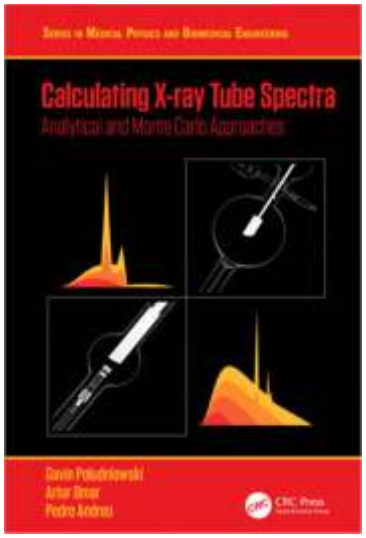
This book provides a foundation for the teaching and learning of programming for medical physicists and other professions in the field of Radiology and offers valuable content for novices and more experienced readers alike.

It focuses on providing readers with practical skills on how to implement MATLAB® as an everyday tool, rather than on solving academic and abstract physics problems. Further, it recognizes that MATLAB is only one tool in a medical physicist's toolkit and shows how it can be used as the "glue" to integrate other software and processes together. Yet, with great power comes great responsibility. The pitfalls to deploying your own software in a clinical environment are also clearly explained. This book is an ideal companion for all medical physicists and medical professionals looking to learn how to utilize MATLAB in their work.

Features

- Encompasses a wide range of medical physics applications in diagnostic and interventional radiology
- Advances the skill of the reader by taking them through real-world practical examples and solutions with access to an online resource of example code
- The diverse examples of varying difficulty make the book suitable for readers from a variety of backgrounds and with different levels of programming experience.

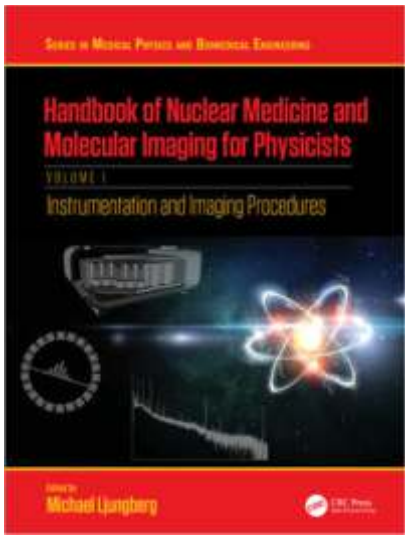
Calculating x-ray tube spectra provides a comprehensive review of the modelling of x-ray tube emissions, with a focus on medical imaging and radiotherapy applications. It begins by covering the relevant background, before discussing modelling approaches, including both analytical formulations and Monte Carlo simulation. Historical context is provided, based on the past century of literature, as well as a summary of recent developments and insights. The book finishes with example applications for spectrum models, including beam quality prediction and the calculation of dosimetric and image-quality metrics.



This book will be a valuable resource for postgraduate and advanced undergraduate students studying medical radiation physics, in addition to those in teaching, research, industry and healthcare settings whose work involves x-ray tubes.

Key Features:

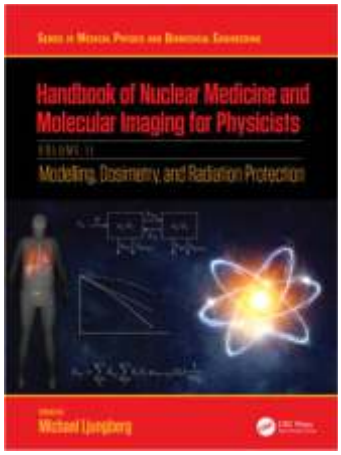
- Covers simple modelling approaches as well as full Monte Carlo simulation of x-ray tubes.
- Bremsstrahlung and characteristic contributions to the spectrum are discussed in detail.
- Learning is supported by free open-source software and an online repository of code



This state-of-the-art handbook, the first in a series that provides medical physicists with a comprehensive overview into the field of nuclear medicine, is dedicated to instrumentation and imaging procedures in nuclear medicine. It provides a thorough treatment on the cutting-edge technologies being used within the field, in addition to touching upon the history of their use, their development, and looking ahead to future prospects.

This text will be an invaluable resource for libraries, institutions, and clinical and academic medical physicists searching for a complete account of what defines nuclear medicine.

- The most comprehensive reference available providing a state-of-the-art overview of the field of nuclear medicine
- Edited by a leader in the field, with contributions from a team of experienced medical physicists
- Includes the latest practical research in the field, in addition to explaining fundamental theory and the field's history.



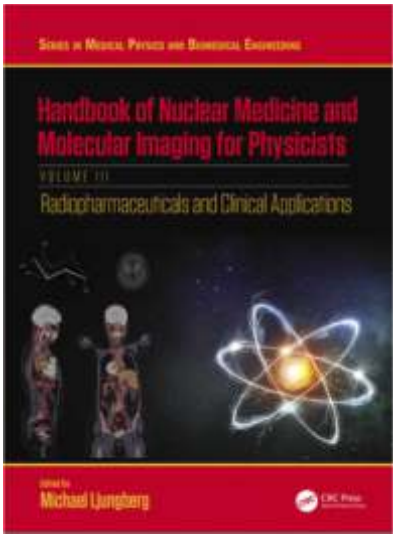
Mathematical modelling is an important part of nuclear medicine. Therefore, several chapters of this book have been dedicated towards describing this topic. In these chapters, an emphasis has been put on describing the mathematical modelling of the radiation transport of photons and electrons, as well as on the transportation of radiopharmaceuticals between different organs and compartments. It also includes computer models of patient dosimetry. Two chapters of this book are devoted towards introducing the concept of biostatistics and radiobiology. These chapters are followed by chapters detailing dosimetry procedures commonly used in the context of diagnostic imaging, as well as patient-specific dosimetry for

radiotherapy treatments.

For safety reasons, many of the methods used in nuclear medicine and molecular imaging are tightly regulated. Therefore, this volume also highlights the basic principles for radiation protection. It discusses the process of how guidelines and regulations aimed at minimizing radiation exposure are determined and implemented by international organisations. Finally, this book describes how different dosimetry methods may be utilized depending on the intended target, including whole-body or organ-specific imaging, as well as small-scale to cellular dosimetry.

This text will be an invaluable resource for libraries, institutions, and clinical and academic medical physicists searching for a complete account of what defines nuclear medicine.

- The most comprehensive reference available providing a state-of-the-art overview of the field of nuclear medicine
- Edited by a leader in the field, with contributions from a team of experienced medical physicists, chemists, engineers, scientists, and clinical medical personnel
- Includes the latest practical research in the field, in addition to explaining fundamental theory and the field's history.



This state-of-the-art handbook, the third and final in a series that provides medical physicists with a comprehensive overview into the field of nuclear medicine, focuses on highlighting the production and application of radiopharmaceuticals. With this, the book also describes the chemical composition of these compounds, as well as some of the main clinical applications where radio pharmaceuticals may be used.

Following an introduction to the field of radiopharmacy, three chapters in this book are dedicated towards in-depth descriptions of common radio nuclides and radiopharmaceuticals used during diagnostic studies utilizing planar/Single Photon Emission Computed Tomography (SPECT) imaging, in addition to during Positron Emission Tomography (PET) imaging, and, finally, radiotherapy. These chapters are followed by those describing procedures relating to quality control and manufacturing (good manufacturing practices) also encompassing aspects such as environmental compliance. Furthermore, this volume illustrates how facilities handling these chemicals should be designed to comply with set regulations.

Like many pharmaceuticals, the development of radiopharmaceuticals relies heavily on the use of mouse models. Thus, the translation of radio pharmaceuticals (i.e., the process undertaken to assure that the functionality and safety of a newly developed drug is maintained also in a human context), is covered in a later chapter. This is followed by a chapter emphasising the importance of safe waste disposal and how to assure that these procedures meet the requirements set for the disposal of hazardous waste.

Several chapters have also been dedicated towards describing various medical procedures utilizing clinical nuclear medicine as a tool for diagnostics and therapeutics. As physicists may be involved in clinical trials, a chapter describing the procedures and regulations associated with these types of studies is included. This is followed by a chapter focusing on patient safety and another on an imaging modality not based on ionizing radiation – ultrasound. Finally, the last chapter of this book discusses future perspectives of the

field of nuclear medicine.

This text will be an invaluable resource for libraries, institutions, and clinical and academic medical physicists searching for a complete account of what defines nuclear medicine.

- The most comprehensive reference available providing a state-of-the-art overview of the field of nuclear medicine
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Dr. Tae-Suk Suh
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The Catholic University of Korea,
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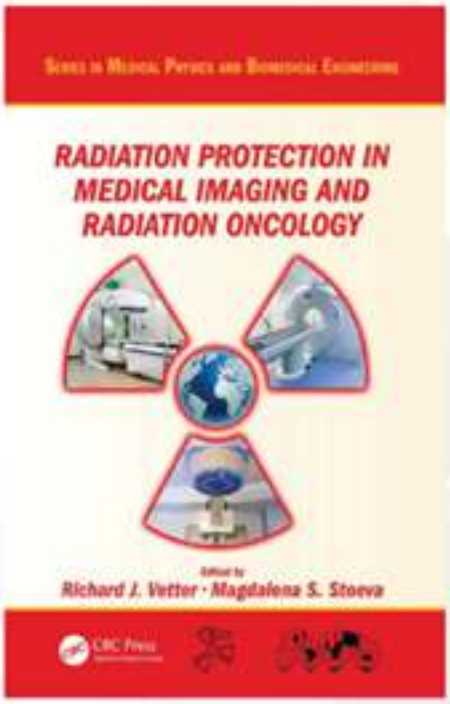

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