Asia-Oceania Federation of Organizations for Medical Physics

AFOMP Newsletter

Australia • Bangladesh • China • Hong Kong • India • Indonesia • Iran • Japan • S. Korea • Malaysia • Mongolia Myanmar • Nepal • New Zealand • Philippines • Singapore • Taiwan • Thailand • Vietnam

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Editorial

Dear Readers,

Warm Greetings to all,

On behalf of the editorial board, I am pleased to welcome you all to read the latest issue of Newsletter of AFOMP.

Despite India's second wave became the worst COVID-19 surge in the world and the sudden spike in cases has brought the nation's healthcare system to its knees, the editorial office has made sincere efforts for timely publication. This issue presents with lots of information on professional activities across the Asia-Oceania region. The AFOMP officials, through their messages, have highlighted about important scientific activities on the occasion of International Medical Physics Week 2021 (IMPW2021) in the Asia-Oceania region. Also, the AFOMP have recently instituted new memorial awards such as young achiever award, best PhD awards and other recognitions for the member's contribution. In addition, the report of ACOMP professional course on Radiobiology, scientific invited articles, book review, announcements and advertisements are covered in this issue with your interest in mind.

Therefore, we, the editorial board, would like to thank to the conference and professional course organizers for the reports and authors for scientific articles and book review.

Hope you will be enjoying in reading this issue and welcome for your valuable comments and feedback.

Thanking you

Sincere Regards
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President's Message

Dear Readers and Members of the AFOMP, kindly accept my greetings from the office of President AFOMP.

We are happy to bring out the June 2021 issue of AFOMP newsletter despite of COVID-19 pandemic and difficult situation. Thanks to Dr.V.Subramani, Editor, AFOMP-EXCOM and contributors to the Newsletter. As you know since early 2020, the world is grappling with Covid-19 pandemic. Still many countries of the world and Asia-Pacific are suffering from the menace of Covid-19 pandemic and its follow-up.

Despite of the difficult times AFOMP is trying its level best to keep the activities of the AFOMP and achieve aims,objective, and aspirations of the members.

In last one year during the 20th anniversary of AFOMP, officers and chairs of various committees have tried to do their best to fulfil the commitment and the responsibilities. As you know that AFOMP has started the best publication of article award in addition to recognising the contribution of Medical Physicists by starting outstanding medical physicists award. We also starting the best PhD work from AFOMP region soon to encourage good quality work which can lead to improvement in health care.

The AOCMP 2020 was held in hybrid mode at Phuket during 3 - 5 December 2020 despite of difficult situation. Prof. Anchali Kishanchinda and her team deserve the credit for successful conference. AFOMP is hoping that the Covid situation will come under control and the AOCMP 2021 will be held in hybrid mode during 10 -12 December 2021 at Cox Bazar, Bangladesh and look forward for your participation.

During Covid-19 to keep the educational activities ongoing AFOMP started monthly virtual webinars on various topics of interest to the members of AFOMP and other participants since May 2020. Due to exceptionally good participation and interest the monthly AFOMP virtual webinars they are being continued and the schedule for July- December 20 21virtual webinars is finalised and is posted on AFOMP website, you can take advantage of these virtual webinars of one hour duration.

International Medical Physics Week [IMPW]2021 was celebrated during 26 - 30 April and on this occasion AFOMP organised a virtual scientific webinar of two hours on 28th April which was attended by many participants. The recordings of all the earlier virtual webinars' and AFOMP- IMPW webinar is available on AFOMP website.

Please do visit the AFOMP website and give your feedback to improve and make more useful website.

The IDMP is being celebrated every year on seventh November since 2013 and this year it will be celebrated on 7 November 2021, the theme of this year's IDMP is “Communicating the role of medical Physicist to Public “. I expect large participation and activities by all the AFOMP NMO's so that the objective of starting the IDMP is fulfilled.

Medical physics is a very dynamic and vastly evolving profession and therefore we must upgrade our knowledge and skills continuously. Despite of approval by ILO and WHO as health Profession many countries medical physicists are not getting the dues as is expected.

As health professions the clinical medical physicists needs to be certified and registered by the national authority of the country so that directory of registered clinical medical physicists is maintained. Recently IAEA has brought out guidelines for certification of medical physicist in form of teaching course series document TCS 71 which is endorsed by IOMP and IMPCB.

This document is freely available for download from IAEA website.

I am sure that you will use this document to get the medical physicists' certification and registration from your country authority.

As you know cooperation and coexistence is the key for growth of oneself and as a profession. I request all of you to kindly provide your feedback to us so that we do the needful for fulfilling your requirements and the aspirations.

I hope and wish that the Covid-19 pandemic will over soon, and we will be able to function more effectively and efficiently.

Looking forward to meeting you all in person at Cox Bazar Bangladesh during 10-12 December 2021 during AOCMP 2021.

With good wishes,

Prof. Arun Chougule
President, AFOMP

Vice-President's Message

Dear Colleagues
Once again, I trust that you are safe and well and managing the continuation of all the services medical physicists provide without too many disruptions. I also hope that the vaccinations in your respective countries are progressing well. We have not succeeded as yet in defeating this pandemic and our lives and work in these highly stressful and modified/managed conditions will continue for months to come.

As such most of our education will keep being delivered via online meetings and educational programs, including those provided by AFOMP and IOMP. Thank you for your strong participations in these webinars.

Thanks to the outstanding engagement of AFOMP President, Prof Chougule, and kindness of generous donors, two new AFOMP awards have been established to celebrate the work and success of our young medical physics achievers. These include:

a) **The PN Krishnamoorthy memorial AFOMP Young Achiever Award** will be presented annually at the Asia-Oceania Conference on Medical Physics (AOCMP) to the medical physicist judged by AFOMP's Awards and Honours Committee (AHC) to have demonstrated excellent contributions to medical physics, research and communities in the AFOMP region as appropriate for early career professionals.

b) **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. The award is kindly supported by the Parameswaran family.

The call for the awards will be released in the coming weeks.

Another matter of interest to you may be the following publication. IOMP Women in Medical Physics group together with the Women in Medical Physics and Biomedical Engineering Task Group of the International Union for Physical and Engineering Sciences in Medicine (IUPESM) conducted a survey on the effects of COVID-19 pandemic on medical physics and biomedical engineering workforce. AFOMP Medical physicists and biomedical engineers had strong participation in the survey with 921 valid responses received from biomedical professions in 76 countries: 339 males, 573 females, and 9 prefer-not-to-say/other. Quantitative survey results have been published in the Gender Work & Organization Journal: *The impact of COVID-19 pandemic on gender-related work from home in STEM fields—Report of the WiMPBME Task Group (https://doi.org/10.1111/gwao.12690).*

The analysis of the qualities survey data is currently under way and is aimed to be published by the end of the year.

I would like to share a result on the challenges encountered by clinical scientists and academics (medical physicists and biomedical engineers) regarding online work.

The data shows great similarities among male and female responders. Some of the main reasons reported by the survey participants are the following:

- Technical challenges:

    - Training (or lack of) for operating online platforms
    - Internet speed and connectivity; infrastructure connection
    - Security and data protection
    - Remote access to restricted hospital files and clinical data
    - Lack of skills to conduct online activities
    - Short time to learn new skills for online work

- Communication / interpersonal challenges:
    - Gaining participants' attention
    - Assuring confidentiality, trust, and integrity during online assessment
    - Maintaining interaction and motivation
    - Assessing students' and trainees' understanding through body language
    - Lack of interactivity and feedback
    - Remote workers faced limited internet access, limited interaction with peers
    - Communication (or lack of) between different professions within clinics

- Logistical challenges:
    - Adaptation to new online platforms
    - Reorganize/convert materials to fit the online system
    - Consider/design new evaluation methods suitable for online assessment
    - Lack of access to research facilities

- Distraction from work:
    - Living together with small children often caused interruption / interference with online activities
    - Various domestic tasks
    - Keeping concentration for long time.

Considering the current situation, the AOCMP 2021 will be held as a hybrid meeting. We may not as yet be allowed to travel. But I am sure many of us will participate virtually to keep connected and motivated. Wishing you to be safe and healthy.

Best Wishes
Eva Bezak
Vice President, AFOMP

Secretary-General's Message

Dear Colleagues and Friends,

AFOMP newsletter is brought out half yearly in January and June of every year. Medical physics science and research related articles, reports, educational material, scientific activities, workshop & conference related information are published in AFOMP newsletter. AFOMP newsletter is widely circulated not only in AFOMP region but across the globe.This is one of the best ways of sharing knowledge, thoughts and ideas within the medical physics community.

The diversified background of different countries in AFOMP region in terms of education, cultural, social, economical is very important to harmonize and establish this field. The most prominent activities are the celebration of International Medical Physics week (IMPW). On April 28, 2021 (Day-3), Asia Oceania Federation of Organizations for Medical Physics (AFOMP) organized and hosted two-hour long webinar on inspirational speech from the renowned speakers from Germany, Italy, China, and India on the occasion of IMPW 2021.

In parallel, monthly webinar program is organized on different branches of MP which has a tremendous effect on knowledge transfer among countries of AFOMP region.

In all activities the main focus is to recognize MP in each country to the general public through awareness program regarding the important role of medical physicists' services to medical, educational, and research institutions. Also, in the pandemic state all regional and national medical physics organizations are encouraged to plan and implement appropriate activities taking into account the constraints. We are happy to observe the progressive role and status of medical physicists in the AFOMP region.

AFOMP has taken steps to award medical physicists for best publication, PhD work, outstanding medical physicist award, young achiever award and continuously trying to arrange fund for this kind.

AFOMP request the office bearers of the NMO's to be proactive to make the national medical physicist organization in their respective country to be more vibrant for propagating knowledge, and improving the status of medical physicist and the profession. I am looking forward to interact with members of different MP organizations and to bring their ideas and concerns on the issues which we care most both as professional medical physics and as patrons of health care.

Our editorial office will look forward to receiving contributions of news, announcements, obituaries, and essays.

Please receive our cordial invitation to the upcoming AFOMP congress “AOCMP 2021”to be held 10-12 December 2021 at Cox Bazar Bangladesh.

Please feel free to offer any suggestions for the improvement of our newsletter. Warm thankful to the newsletter editorial board and the members for their the full dedication and support.

Prof.Dr. Hasin Anupama Azhari
General Secretary, AFOMP

Report of IMPW 2021 on Patient Radiation Protection Hosted by AFOMP

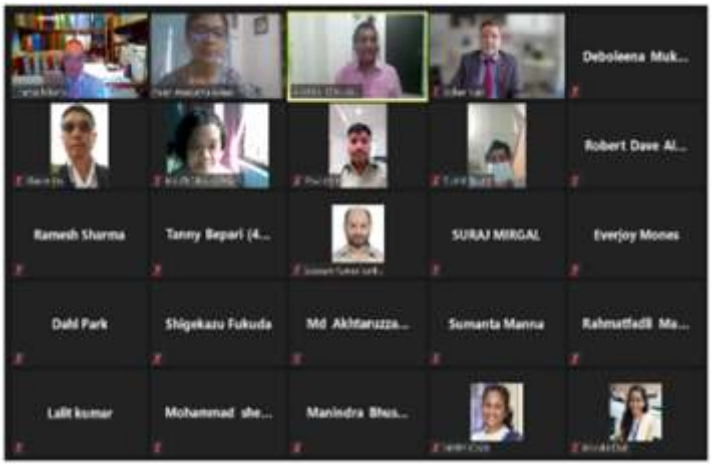
Prof. Hasin Anupama Azhari and Prof. Arun Chougule

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,the IOMP School organized a series of webinars during April 26-30 2021. The purpose of these webinars was popularizing 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. On April 28, 2021 (Day-3), Asia Oceania Federation of Organizations for Medical Physics (AFOMP) organized and hosted two hour long webinar on 'Patient Radiation Protection' on the occasion of IMPW 2021.

The main objective of IMPWcelebrations is to promote the organization of activities in a defined week leading to the expansion of medical physics stories around the world. The general public is unaware of the important role that medical physicists play in providing services to medical, educational, and research institutions. All regional and national medical physics organizations are prompted and encouraged toplan and implement appropriate activities taking into account the constraints due to the pandemic. The COVID 19 pandemic has been a major challenge in all sectors of our society. Regulations related to distance and social mobility has led to significant reduction in education and training activities. As a result, digital learning has greatly improved. The year 2021 is another time for new educational approaches to be tested for its efficacy and newer opportunities.

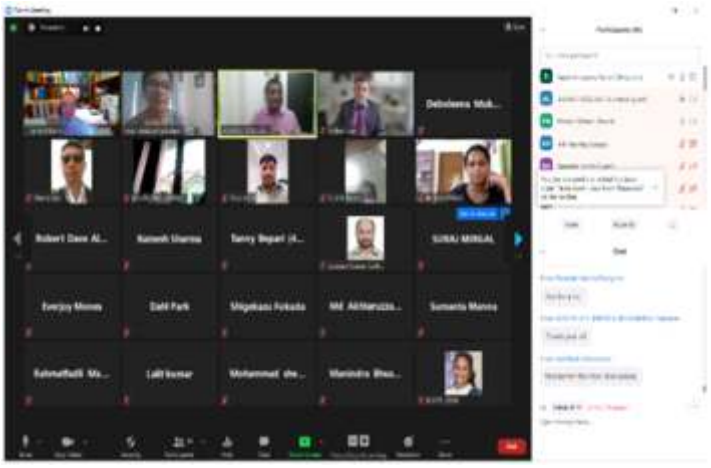
The webinars of IMPW 2021 were a great success despite the time zone differences. The AFOMP webinar on 28th April, the 3rd day of IMPW was also not an exception. The 3 speakers along with President and Secretary General AFOMP, Prof Arun Chougule and Prof Hasin Anupama Azhari and the IOMP President Prof Madan Rehani lead the deliberations on various aspects of medical physics practice, current rationales and varying challenges across the world. To encourage efficient dissemination of insights and active participation a 10 minutes question-answer session on the topics were scheduled at the end of the programme. All IMPW webinars were free to register and attend. The only prerequisites were thirst for knowledge and a broader understanding of the topic.

The theme of the AFOMP webinar to celebrate IMPW was 'Patient Radiation Protection'. The program was started with the Inaugural speech by ProfDr Hasin Anupama Azhari, General Secretary, AFOMP followed by a welcome address by Prof. Arun Chougule, President AFOMP.Prof Madan Rehani, President IOMP conveyed the greetings and IMPW message through a pre-recorded video.



He couldn't join livedue the time difference. The scientific programme of this webinar consisted of four talks by experts from across the world. A very relevant topic of the current times 'Medical Physicists in the COVID19 Pandemic' was deliberated and discussed by Prof Dr Xiance Jin, Chief Medical Physicist and Vice Director, Radiation and Medical Oncology Department, The First Affiliated Hospital of Wenzhou Medical University, China. He presented the AFOMP guidelines on medical physics practice during COVID 19 pandemic through a video message. Dipl.-Ing. Volker Steil, Authorized Representative for Radiation Protection and Head of Department Medical Physics and Radiation Protection, University Medical Center Mannheim, Germany gave his lecture on 'Challenges Faced by Medical Physicists'. He presented the challenges medical physicists' faces in education and in hospitals comprehensively. The next lecture on 'IMPW Celebration: 'To raise awareness or to strengthen the community of medical physics? 'by Prof Franco Milano, Senior Physicist, Florence University Hospital; Medical Physics Professor, University of Catania; Medical Physics Professor, University of Florence elaborated in depth on the relevance and necessity of IMPW celebrations in the current clinical atmosphere in hospitals and universities. The last talk of this webinar 'Medical Physics Education, Accreditation and Certification' by Prof Arun Chougule, President, AFOMP was an eye opener and need of the hour especially for the young thriving medical physicists. The question and answer session where participants could ask their questions to the speakers were very informative and helpful for the participants. Most of the queries and doubts from the delegates were satisfactorily addressed by each of the speakers. This was indeed a morale boosting experience for everyone who attended and an assurance to young medical physicists that there is definitely light at the end of the tunnel.

AFOMP was very happy to support IOMP as its regional organization in this initiative and organizing this kind of webinar with renowned speakers and moderators. The AFOMP webinar was very much informative and effective in disseminating knowledge to the participants as well as a valuable attempt fulfilling the objectives of IMPW celebrations to promote the organization of activities leading to the expansion of medical physics stories globally. AFOMP urges all its NMO's to do such activities which will act as an appeal to the regional governments to make them understand the importance of medical physicists in hospitals, especially in cancer treatment and care. Wish you all a very happy and fruitful international medical physics week and all the success in all professional endeavors.



Report of International Conference on Radiation in Health Care On the occasion of International Medical Physics Week

Dr Mary Joan and Prof. Arun Chougule

The department of Radiological Physics, SMS Medical College and Hospitals, Jaipur hosted two days international Conference on Radiation in Health Care CRHC 2021 virtually on 26th and 27th April 2021 on the occasion of the International Medical Physics Week (IMPW) celebrated from 26th to 30th April 2021.

Contribution of Medical Physics in healthcare is multi-dimensional and it has improved the healthcare tremendously. The recent advancements in Medical Physics may it be in Radio diagnosis, Radiotherapy, Nuclear Medicine and various fields specially using ionizing radiation has made monumental sprints. To bring over it and recognize the contribution of Medical Physics to healthcare, International Organization for Medical Physics (IOMP) has started to celebrate 7th November, the birthday of Madam Marie Curie as International Day of Medical Physics (IDMP) since 2013. However, it was thought that a week devoted to the contributions of medical physicists to healthcare to be celebrated as International Medical Physics Week. For the first time, it was celebrated from 11th-15th May 2020, where various academic and teaching institutes showcased the contributions of medical physicists to healthcare globally.

IMPW was launched with the purpose to motivate organization of activities in a defined week that result in the promotion of the subject of medical physics globally, increasing the visibility of the profession and outreach to fellow professionals and general public. The theme of this year's celebrations was 'Communicating the Role of Medical Physicists to the Public'. The Department of Radiological Physics, SMS Medical College and Hospitals, Jaipur, India celebrated IMPW with a two days international scientific programme Conference on Radiation in Health Care. The rapidly evolving applications of physics in medicine and the current pandemic all over the world demands new set of skills as well as outlooks to meet the challenges efficiently and successfully.

This virtual conference offered a forum for sharing invaluable experiences for improving the practice of Medical Physics and an opportunity to listen to a number of great people holding and practicing high ideas in life as well as profession.

The scientific programme included talks and teaching sessions by eminent speakers in the field of medical physics. On 26th April 2021, the first day of the conference, the scientific programme started with 'Saraswati Vandana' a prayer to the goddess of knowledge as per the Indian tradition.

An introduction to the purpose and objectives of CRHC 2021, IMPW celebrations and a congenial welcome to all speakers and participants were proposed by the Organizing Secretary Dr Mary Joan.

A prerecorded video message on the IMPW celebration from the President IOMP, Prof Madan Rehani and a live message from the President AFOMP, Prof Arun Chougule were

conveyed. An e-Souvenir and Abstract Book of the conference was released thereafter. Greetings and best wishes for CRHC 2021 from Prof James Goh, President IUPESM, Prof Madan Rehani President IOMP, Prof Raja Babu Panwar, Hon Vice Chancellor RUHS, Jaipur, Prof Sudhir Bhandari, Principal and Controller SMS Medical College and Hospitals Jaipur, messages from Prof Arun Chougule, President AFOMP and the Organizing Chairman, Dr Mary Joan, Organizing Secretary and abstracts of all the invited talks, special lectures and addresses, poster and oral presentations, endorsements and advertisements from knowledge and trade partners, a brief narration about the Pink City, Jaipur comprised the e-Souvenir.

A keynote address by Shri N K Pushpakar, Site Director, NPCIL Rawatbhata Rajasthan Site, Kota followed the inaugural session. He has described about various applications of ionizing radiation in healthcare, regulatory stature, contributions of Rawatbhata site to the production and supply of different radioactive sources and other services provided by the NPCIL. Prof Arun Chougule wrapped the session by further elaborating on the other services supported by the NPCIL like CBRN emergency preparedness and response, contribution in the power requirement of the country and other services under the corporate social responsibilities.

There were four more scientific sessions on the first day. Advancements in the use of radiation in health care, Advanced therapeutic radiological procedures, Radiation protection and dosimetry in radiotherapy, radiology and nuclear medicine were the next three sessions where Prof Madan Rehani, USA, Prof G A Zakaria, Germany, Prof Carmel Caruana, Malta, Prof S D Sharma, Mumbai, Mr Karan Bhateja PTW, Dr Chai Hong Yeong, Malaysia, Dr Dayananda Sharma, Chennai, Dr K Ganapathy, Chennai, Dr A K Shukla, Lucknow, Dr Pankaj Tandon, Mumbai, Dr J K Bhagat, Jaipur, Dr Subhash Kheruka, Lucknow, Dr Xiance Jin, China deliberated on topics varying from medical physics professional roles, challenges, dosimetry, radiation protection, artificial intelligence, diagnostic radiology, nuclear medicine and radiotherapy including proton therapy.

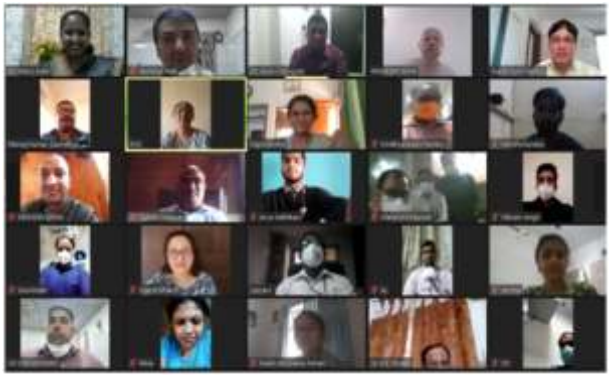
A best poster session was conducted thereafter to encourage and promote the young and early career medical physicists and scientists. 12 young investigators from Srinagar (a northern most state capital city) to Thiruvananthapuram (a southern most state capital city) and the neighboring country Bangladesh presented their research work. Shriram A Rajurkar from Mumbai and Gokul Raj from Bikaner won the first and second best poster awards respectively.

A 'Saraswati Vandana' to evoke the presence of the Goddess of knowledge marked the beginning of the second day scientific programme also followed by a recapitulation of first day programme by Prof Arun Chougule, Organizing Chairman.

A special highlight of the second day scientific programme was 'meet the expert' session. Dr S Murali from BARC Mumbai spoke about 'Radiation Safety, Surveillance, Prevention, Preparedness and Response to Exigency' with emphasis on

Radiation Technology / Nuclear Medicine usage'. Following meet the expert lecture was a plenary talk by Prof Madan Rehani on the theme of the conference which is also the theme of the IMPW this year. Dr MK Sandilya of the Atomic Mineral Directorate, Jaipur gave a special address on 'Management of Radiological emergencies in public domain and Role of Emergency Response Centers'. A very interesting and enlightening discussion followed, and many queries regarding regulatory and professional affairs were answered by AERB representatives present during the discussions, Prof SD Sharma, President, AMPI and Prof Arun Chougule, President AFOMP and the organizing chairman.

The next session Medical Physics in Health Care introduced by Prof Chougule and Prof Hasin Anupama Azhari, Bangladesh and Dr V Subramani, New Delhi elaborated on the varying multidimensional roles of medical physicists in the multidisciplinary radiological specialties in the healthcare system. This session was also marked by a very active and informative discussion following the talks. Not only the speakers but also the other experts present took part actively in answering the queries from the delegates.



A very thrilling best oral paper session where 12 delegates presented their research work followed. The question and answer session following the presentation was also enticing and invigorating. The delegates were opportune enough to listen to the enlightening explanations provided by the expert faculty present during the discussion. Sarin B from Thiruvananthapuram and Dr VP Pandey from Bhopal won the first and second best oral awards respectively.

The last scientific session discussed the current issues and way forward.The impact of Covid-19 on medical physics practices in Africa was presented by Prof Christoph Trauernicht, S Africa who is also the recently elected President of the Federation of African Medical Physics Organizations (FAMPO). Nurturing a global initiative in medical physics leadership and mentoring by Dr AikHao Ng, Malaysia was also very encouraging especially to young and early career medical physicists. Main achievements of the International Union for Physical and Engineering Sciences in Medicine (IUPESM) for the profession – a summary of 40 years progress was presented in a nutshell by Prof. Slavik Tabakov, Vice-President IUPESM. Many professional issues and probable solutions were discussed and the queries from the delegates were answered. It was a very nurturing experience to listen to stalwarts in Medical Physics and it indeed was confidence boosting to the younger generation of medical physicists.

The various social and awareness activities planned to commemorate the role of Physics in Medicine has turned into virtual activities only because of the pandemic. We had a keynote address, plenary talk, special address and a meet the expert session in addition to the 18 invited talks and 12 proffered oral and poster presentations each. Delegates from about 28 countries across the world, mostly of medical physics students and early career radiation professionals took part in this virtual conference. An expert line of speakers from around the world were also gathered on the virtual platform to share their views and experience on diverse professional issues and their resolution. It was a unique platform for all radiation professionals from different domains of radiation physics, radiation biology,

radiation dosimetry and clinical medical applications to get together, know each other and appreciate and acknowledge the contributions of each domain. The organizers would like to take this opportunity to sincerely thank each and every one who spared the valuable time to actively participate in this conference enhancing the scientific exactitude of each other.We are confident that CRHC 2021 will prove to be a milestone for the medical physics community and help us all in developing ourselves as indispensable healthcare professionals.

We have been very efficiently planning the radiation treatment for cancer patients, corroborating quality assurance of equipment and procedural protocols, researching on new diagnostic and treatment modalities, ensuring radiation protection and safety of patients and personnel in various streams of healthcare. It is the need of the hour to raise the professional profile of medical physics and we have tried to bring light to the current issues and how to resolve them.

The organizers highly appreciate the active participation, cooperation and endorsementof the organizations IOMP, AFOMP, AMPI and SCMPCR along with RUHS, NPCIL Kota, AMD Jaipur, IARP and ISRB for their support in organizing this conference. A word of thanks to our trade partners, without whom this conference couldn't be arranged as beautiful as it was.

As discussed and disseminated in the CRHC 2021, the first two days of the IMPW celebrations, a single day IDMP celebrations or a week long IMPW celebrations might not completely serve the purpose of uplifting the professional status of medical physicists in healthcare. We should equip and improve ourselves to meet the challenges efficiently. There are great times ahead of us; Country needs our service. Each one of us is needed - in our country, community and university - to ensure decisive, visible and measurable actions are taken for the medical physics profession.

As we celebrated the IMPW 2021 by holding this international Conference on Radiation in Health Care, CRHC 2021, the spirit of this conference will make each and every one of us to be a leader not only within our own spheres of influence but also in the associated multidisciplinary specialties and commit to take pragmatic action to accelerate professional and personal development. Wishing everyone a fruitful IMPW 2021!

The celebration of International Medical Physics Week 2021 in Malaysia

Jeannie Hsiu Ding Wong[1], Hafiz Mohd Zin[2], Aik Hao Ng[3], Ngie Min Ung[4], Che Ahmad Azlan[1], Sharizan Shaharuddin[5], Kwan Hoong Ng[1]

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The Malaysian medical physics community celebrates the International Medical Physics Week (IMPW 2021) with series of webinars dedicated to various professional, educational and organisational aspects of Medical Physics. The IMPW 2021 aims to motivate organisation of activities that result in the promotion of medical physics. A 4-day webinar series was held on 26 – 30 April 2021 over the ZOOM webinar platform. The main organiser was the Continuing Biomedical Imaging Education (CBIE), Department of Biomedical Imaging, Faculty of Medicine, University of Malaya, Malaysia. The event was co-organised by the three medical physics professional organisations in Malaysia; the Medical Physics Division, Institut Fizik Malaysia (IFM), Malaysian Association of Medical Physics (MAMP) and Persatuan Pegawai Sains Fizik KKM (PERFEKS). The organising team comprises members from the various professional organisations, universities and hospital medical physicists. The team was headed by Associate Professor Dr Jeannie Hsiu Ding Wong from the University of Malaya.

The 4-days webinar series focused on the following topics pertinent to the medical physics profession in the country. A total of 16 speakers were invited to speak in the webinar sessions. The topics include updates of the Allied Health Professions Act (Act 774), training and certifications for medical physicists via the International Medical Physics Certification Board (IMPCB) route, roles and current issues of medical physicists, and research collaboration aspects shows the poster for the event.

Malaysia had recently gazetted the Allied Health Professions Act (Act 774) in 2016 and enforced in 2020. The Act provided for the establishment of the Malaysian Allied Health Professions Council (MAHPC), to provide for the registration of persons practising as allied health practitioners and persons carrying on activities relating to allied health, to regulate the practice of Allied Health Professions, and for related matters. Act 774 governs 26 allied health professions, including the medical physicist.

The online forum had Mr Saravanakumar A/L Maniam, the Allied Health Sciences Division secretariat representative to introduce and report on the current status of the enforcement of the Act. Dr Hafiz Zin, MAHPC council member, elaborated on the current challenges of the medical physics profession in Malaysia and the way forward through the Act 774 framework. We also invited Dr Supriyanto Ardjo Pawiro, Chairperson, Indonesian Association of Physicists in Medicine, to share the Indonesian experience.

Medical physicists are healthcare professionals that use physics principles in medicine. We are involved in many different areas of healthcare, particularly in radiotherapy, medical imaging, nuclear medicine, working hand in hand with our clinical specialist colleagues and other allied health professionals such as radiographers, radiotherapists, radio pharmacists, etc. A clinically competent medical physicist is crucial in ensuring patient safety.

In many developed countries such as the US, UK and Australia, and some developing countries, they have a national medical physics training and certification system to ensure medical physicists working in the hospitals are well trained. However, this kind of settings may not be available in every country. In Malaysia, we also do not have such a system in place. On Day 2, four IMPCB board members, Emeritus Professor Dr Colin Orton, Dr Raymond Wu, Associate Professor Dr Adel Mustafa from the United States and Dr Tomas Kron from Australia, shared their views and the pathway of achieving accreditation and certification via IMPCB.

On Day 3, four experienced clinical medical physicists – Miss Woon Yea Lee, Mdm Azleen Mohd Zain, Mdm Aminah Mohamed, and Dr Bidi b Ab. Ahmad shared their experience as medical physicists in radiotherapy, nuclear medicine, diagnostic radiology and regulatory division, respectively. Their sharing demonstrated how medical physicists work hand-in-hand with our clinical specialist colleagues to provide quality patient care and improve patients' life.

Medical physicist (MP) plays a vital role in the healthcare system, including developing new technologies that have revolutionised the way medicine is practised. On the last day of the webinar series, Dr Jeannie Wong (University of Malaya), Dr Chai Hong Yeong (Taylors' University), Dr Norizan bt Rosli (Ministry of Health (MOH) Institute of Clinical Research), Dr Ng Aik Hao (chairman of the MOH Medical Physics Research Task Force), and Ms Pearl Cheah from the industry were presented their views on the medical physics research collaboration. They shared current updates on the research activities and ways to foster multi-institutional collaborations of medical physicists in Malaysia. It also covered the current research focuses, initiatives and opportunities related to medical physics in the Ministry of Health, public and private universities. The speakers also addressed the limitations and challenges faced by the medical physicists while engaging all stakeholders to fill the gap through collaborations.

The recordings of the Zoom webinars and selected speakers slides were made available on the following Youtube and websites:-

IMPW 2021 event website: https://medicalphysics.um.edu.my/international-medical-physics-week-2021

Selected PDFs of the speakers' slides will be available to be downloaded from the following google drive site.
https://drive.google.com/drive/folders/1lfv5ncWK7pDQVPJpItPYy8pnKx822HYO?usp=sharing

In addition to the webinar series, the postgraduate students from the Master of Medical Physics programme, University of Malaya also conducted interviews with four experienced medical physicists – Mdm Gek Suang Sim, Mdm Zamzarinah Kamaruzzaman, Mdm Shu Yee Fong and Dr Hwee Shin Soh. Their stories were published online on the programme website.

Figure : Poster for IMPW 2021 Malaysia.

The IMPW 2021 was a success, with a total of 246 participants from more than six countries attended the webinar session over the four days. Many attended on multiple days. The average number of participants was 157, ranging from 116 to 223 participants.

From the local scene, the participants mainly came from universities (45%), medical physicists working in private hospitals and centres (17%) and government agencies (26%). Feedback from the participants was very positive on the quality and content of the sessions

In conclusion, we believe that the IMPW 2021 Malaysian celebration was a step towards uniting the medical physics profession in the country, paving the way forward in striving for broader awareness and recognition of the profession.

Acknowledgment:

We thank the support of the Visibility Unit of the Faculty of Medicine, University of Malaya and the PhD students – Miss Umi Nabilah, Miss Janatul Madinah Wahabi and Miss Nur Diyana Afrina who helped with the Zoom hosting, all the speakers and moderators, as well as the organising committee.

A Report on the AFOMP Monthly Webinar Series

Prof. Arun Chougule & Mrs Rajni Verma

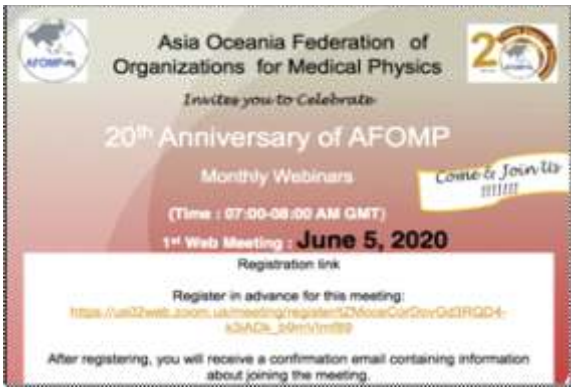
The Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) started the AFOMP monthly webinar series as part of 20th anniversary celebration of AFOMP. Academic meetings always play a vital role in disseminating knowledge and discussing new avenues of any subject. This monthly webinar series had been proven a key academic program of AFOMP with enthusiastic response globally from whole medical physics community. This webinar series provided a perfect platform for academic discussions and knowledge dissemination in the difficult time of COVID-19 pandemic. Due to the unprecedented situation created by COVID-19 pandemic, it was very difficult or almost impossible to organize or attend the usual physical meetings/ conferences. The International Organization for Medical Physics (IOMP) also encouraged organizing virtual meetings. This kind of web series was unique and was the need of the hour with growing interest among participants. These webinars became extremely popular among the young generation of medical physicists, as it is easy to participate without much of logistical arrangements.

The whole idea of this webinar series was conceived in May 2020. It was planned to be organized on every first Thursday of the month as part of the year long celebration of 20th anniversary of AFOMP (May 2020-May 2021). The organizing team lead by Prof. Arun Chougule, President AFOMP was all geared up with scheduling and making necessary logistical arrangements in May 2020.

Prof. Arun Chougule made the first announcement about the AFOMP monthly webinar series during the AFOMP's International Medical Physics Week (IMPW) 2020 celebration on virtual platform. Every webinar was planned with a subject topic of wide interest. These hour-long webinars were hosted with a new speaker and moderator every month from AFOMP region. The-webinar flyer were prepared for every month and circulated as per the schedule. These informative e-webinar flyers included all the necessary information related to webinar such as the title of talk, details of speaker and moderator, registration guidelines to participants in a simplified approach including

webinar dates, Greenwich Mean Time (GMT) and registration link. The registration was free and mandatory for participation. These e-webinar flyers were posted on AFOMP website and circulated among all the National Member Organizations (NMOs) in the AFOMP region. On successful registration by the participants, they received a registration confirmation email containing all information about joining the webinar. These webinars were organized and managed by 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, looked after the certificate and CPD point management. Mrs. Rajni Verma, Website Manager AFOMP, managed communication and technical aspects. This webinar series cannot be a success story without continuous support of AFOMP Secretary General, Dr. Hasin Anupama Azhari.

The first webinar of this webinar series was launched on 5 June 2020 on a commercially available virtual platform “ZOOM” globally. Prof. Tomas Kron and Dr. Peta Lonski were speakers for the first webinar. Dr. Jin Xiance moderated this webinar. The title of the talk was **'Total Body Irradiation with X-rays and Electrons: Dosimetry and Techniques'.** This webinar got overwhelming response globally and with this the series of webinars started. As a year is completed, it is proved to be a fruitful journey to academic excellence. Due to its relevance and success, every webinar from the third one is accredited with two CPD points from Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM). These webinars 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 given to the needs of medical physicists of AFOMP region. The recordings of these webinars have been posted on AFOMP website, which can be accessed by all.



ACPSEM CPD Endorsed Activity

Many renowned academicians and medical physicists had been part of this wonderful journey as a speaker and a moderator. Various topics of scientific and practical importance were included in the series. Many topics and talks were included to fulfill the requests of the participants. The 12th Monthly webinar held on 6th May 2021 marked the successful completion of the 20th anniversary celebrations of AFOMP.

However amidst of the COVID-19 pandemic, this series proved to be a perfect mode for academic activities. This virtual platform has many advantages such as easy accessibility to all without much of logistical requirements. It is proved to be a boon to young students and physicists who mostly faces economic constraints and opportunity issues for participation in physical meetings organized worldwide and these reasons made these virtual meetings quite appealing to students and young physicists. Because of these advantages and efficacy observed, AFOMP has decided to continue this scientific endeavor. The schedule of webinars for upcoming months is already announced and available on AFOMP website.

AFOMP executive committee was always a constant source of motivation for the whole of this academic

journey of monthly webinars. The whole team gratefully acknowledges the active participation, cooperation and support of the speakers, moderators, participants and all individuals involved in organization of these webinars.

To improve the professional status of medical physicists in the AFOMP region, we have to work collectively and effectively to improve knowledge and achieve international best standards. Our commitment to the profession and cooperation will take us to the achievement of the desired goals. These monthly academic webinars shall be a best forum for active discussions and constructive debates to improve ourselves academically, scientifically and professionally.

ACOMP Professional Courses 2021:

Radiobiology in the era of precision medicine

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Radiobiology is considered essential in the field of radiation therapy. There are limited refresher radiobiology courses offered for clinical medical physicists and other related healthcare professionals in the ASEAN region. Hence, ASEAN College of Medical Physics (ACOMP) has taken the initiative to organize a series of radiobiology lectures for clinical medical physicists, oncologists, dosimetrists, radiographers, trainees, etc. The course aimed to provide basic understanding of radiobiology principles, its clinical applications and implementations in radiation therapy. The course consisted of 3 series of two-hour online lectures and was held respectively on 9, 16, 23 April 2021using Zoom cloud meetings software (Zoom Video Communications, Inc, California, USA) and was also broadcasted on YouTube (Google, California, USA) ACOMP Channel, on a free of charge basis. The course was co-organised by Associate Professor Dr. Chai Hong Yeong from the Taylors' University and Dr. Aik Hao Ng from the Kuala Lumpur Hospital, under the mentorship of Professor Eva Bezak from the University of South Australia shows the poster of the course and the snapshot of the participants and speakers of the online course.

Invited speakers and course programme

Malaysia and Romania were invited, consisted of Professor Eva Bezak, Professor Loredana G. Marcu, Professor Dr. Fuad Ismail, Dr. Wendy M. Phillips, Dr Jake Forster and Dr. Aik Hao Ng. The course started with the welcome notes by the Director of ACOMP, Professor Dr. Ng Kwan Hoong. The first series of the course was focused on the basic knowledge of radiobiology of tissues interactions with ionizing radiation, molecular and cellular responses to radiation-induced damage and factors that affect cell survival curve. A quantification software for the biological evaluation of a treatment plan named “BIOPLAN” was introduced and its applications in clinical setting were demonstrated. In the second series of the course, both renowned speakers shared about the biological basis for fractionation of radiotherapy (hypo- and hyper-fractionated) and dose-response relationships in the clinic as well as other approaches to improve radiotherapy were covered in depth, which included treatment interruption and re-treatment issues, targeting hypoxia and combined radiotherapy/chemotherapy. In the third series of the course, the current understanding of radiobiology in radionuclide therapy, the techniques of internal dosimetry calculation, the latest development of the biomarkers and its clinical applications in precision medicine were addressed. The course wrap up was delivered by one of the course directors, Associate Professor Dr. Yeong Chai Hong. Table 1 shows the 3-series of the course programme which took place for the 3 consecutive Fridays.

Table 1: Course programme

Date	Topics	Speakers
9-Apr-21	Introduction of the course	Kwan-Hoong Ng
9-Apr-21	Radiobiology of tissue interaction with radiation	Aik-Hao Ng
9-Apr-21	L-Q model, TCP and NTCP calculation, Lyman-Kutcher, QUANTEC, Relative serial model (Emami / Burman data) + Bioplan+Sensitivity analysis	Eva Bezak
16-Apr-21	Clinical application of L-Q model, Radiobiology of altered fractionation (hypo, hyper), hypoxia, extension of L-Q for SABR	Wendy Phillips
16-Apr-21	Reirradiation, treatment interruptions and combined therapy	Fuad Ismail
23-Apr-21	MIRD formalism, diagnostic procedures	Jake Forster
23-Apr-21	Latest development of the biomarkers and its clinical applications	Loredana G. Marcu
23-Apr-21	Course wrap-up	Chai-Hong Yeong

More than 580 participantsregistered their interest, and about 289, 265 and 161 participants attended the live Sessions 1, 2 and 3, respectively. About 57% of the participants were medical physicists, 30% were students, 3% were radiographers and the remaining were lecturers, oncologists, radiobiologists, regulators, radiation therapists, radiation protection officers, a nuclear medicine physician, etc. Most of them were from the ASEAN countries (Malaysia, Indonesia, Philippines, Singapore, Brunei, Cambodia, Vietnam) and some were from India, Taiwan, Australia, Nepal, United Kingdom, Hong Kong and United States. We received very good response and comments overall with excellent ratings regarding the quality of the course. 91% of the participants commented that the course was very helpful. Figure 2 shows the recordings of the course that were made available on the YouTube links as below and have achieved more than 1,200 total views as of today:

Session 1: https://www.youtube.com/watch?v=mA3ObVNwLOo&t=1791s
Session 2: https://www.youtube.com/watch?v=sJgo54f4NhE
Session 3: https://www.youtube.com/watch?v=TBey3ODzsho&t=225s

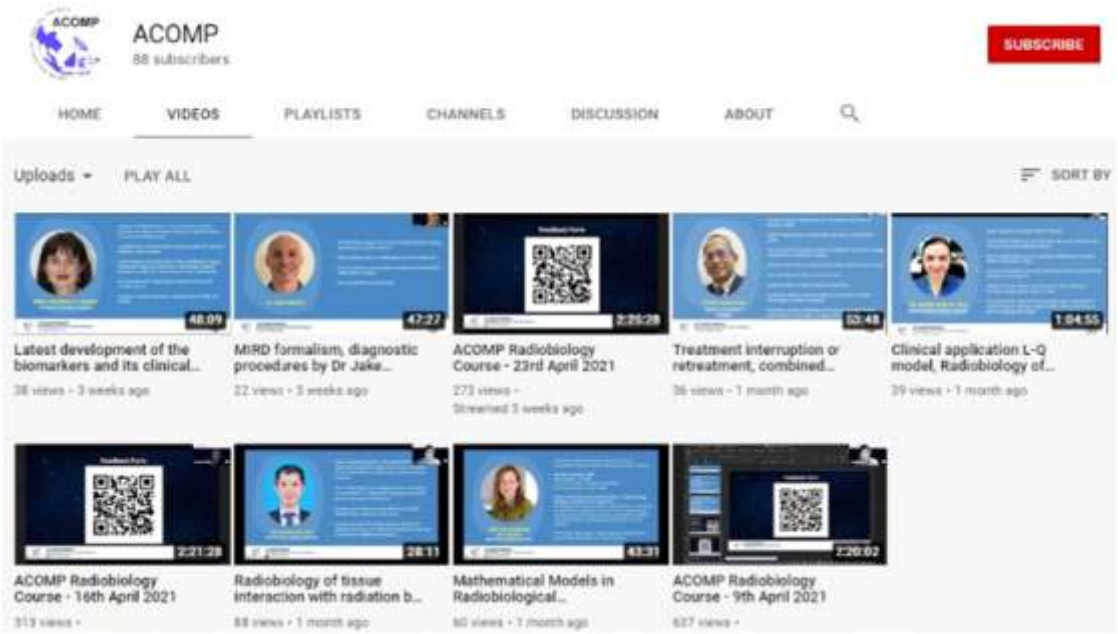

Figure 2: ACOMP YouTube channels with the recorded lectures of the course.

In conclusion, we believe that the course has provided a new platform to the medical physicists and other related healthcare professionals to advance their knowledge and experiencein radiobiology. These key points might be useful and practical in their clinical routine while bridges the gap for the application of radiobiology principles in state-of-art nuclear medicine procedures.

Acknowledgment:

We thank the support of the Taylors' University and the postgraduate students – Miss Asseel Hisham and Miss Hun Yee Tan for hosting the webinar. Special thanks to all the speakers.

Medical physicists during COVID-19 pandemic

Xiance Jin,[1,2] PhD,
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1) Director of Radiotherapy Center, Wenzhou Medical University First Affiliated Hospital; 2) Vice Dean of School of Basic Medical Science, Wenzhou Medical University

Almost one and half year past since the outbreak of Covid-19 in Wuhan, Hubei Province, China, in December 2019. As the first country to detect the epidemic, China controlled the epidemic successfully in a short period of time with strong measures and has extended a helping hand to other countries to help other countries fight the epidemic. Currently, the life is back to normal, and epidemic prevention and control has become a “normal” work without careless and lax from all parts of work in China. During the just past May Day Holiday (From May 1st to 5th, 2021), 230 million Chinese traveled domestically and contributed a domestic tourism income of as much as 113.23 billion Yuan. No new local Covid-19 case was reported in the past few weeks in China.

On the contrary, starting from the end of April of 2021, the number of COVID-19 cases globally remains at the highest levels since the beginning of the pandemic with over 5.7 million new weekly cases, following nine consecutive weeks of increases. New deaths continue to increase for the seven consecutive weeks, with over 93 000 deaths (May 8th 2021). The South-East Asia Region continues to report marked increases in both case and death incidences. According to world health organization (WHO) covid-19 dashboard, globally, as of 3:42pm CEST, 13 May 2021, there have been 160,074,267 confirmed cases of COVID-19, including 3,325,260 deaths [1]. What's worse, this number may not fully represent the true extent of infection with the SARS-COV-2 virus. This is because current surveillance strategies and testing capacities often do not typically include infected individuals who were asymptomatic, often miss mildly symptomatic cases, those who do not have access to testing.

Globally, it is still a long way to battle against the pandemic. The current rapid surge of COVID-19 cases has put immense pressure on the health systems, which has already been over burdened since the start of the pandemic. Health workforces of all kinds have worked round the clock and under extreme pressure for several months already with a risk of their own lives in order to save many others. The evolution of the COVID-19 pandemic has demonstrated the unpredictable nature of the virus, with new variants shifting the epicenter of the disease and countries experiencing multiple waves of infections and economic impact. It seems achieving high vaccination coverage in all countries is the only way to disrupt the pandemic globally and win the race against the virus. Health care workers should be protected with proper personal protective equipment and gave priority in vaccination in the battle against COVID-19 and to halt the current COVID-19 surge.

Medical physicists are a very small part of the medical staff group. Due to their professional characteristics, medical physicists are not going to the front line in the battle of COVID-19. However, medical physicist is core strength in the Department of Radiation Therapy. They had also contributed greatly during this pandemic along with their comrades-in-arms, doctors, technicians and engineers. Besides their original job, such as treatment planning and quality assurance, helping physicians to adjust the treatment strategies for patients whose treatment had been interrupted by COVID-19, medical physicists are the core strength in the participating epidemic prevention and control training, preparing protective equipment, and implementing prevention and control measures. The experiences of Chinese medical physicists and other fellow medical physicists across the Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) regions and the world

demonstrated that our fellow medical physicists established safety measures to protect patients and staffs, and contributed greatly to the diagnosis and containment of coronavirus.

Medical physicists from China established and implemented strict measures under the leadership of department leaders in the Department of Radiation Oncology to slow down and stop the spread of COVID-19. In the presence of the pandemic, the first critical task is to raise the awareness of epidemic prevention. Provide information and education of staffs, patients and their families on ventilation, wearing masks and good hand hygiene, etc. The clinic areas in the department of radiation oncology were usually divided into different infection control zones according to different levels of protection purpose; infection protection education was strengthened for both patients and medical staffs in the department; special rotating schedules among medical physicists and technicians were implemented; special cleaning and disinfection policies and procedures were designed and executed, etc.

It is also critical to separate the tasks into several categories base on priority of clinical physics practice and availability of medical physics resources. If necessary, non-urgent tasks could be considered delaying and postponing (e.g., annual QA). With proper IT support, several tasks such as treatment planning (3D-CRT, UMRT, VMAT, SRS, and SBRT), chart review, and quality assurance analyses can be efficiently performed and managed by remote control access. Most of interactions between other members in the department were also accomplished through virtual meetings and shared screens.

Detailed measures for general department, staff and patients, control area division, protective equipment and protection levels, as well as disinfection could be found and followed in the guideline: “Guideline on Radiation Oncology Operation during COVID-19”, which was developed by the Education and Training Committee of Asia-oceania Federation of Organizations for Medical Physics (AFOMP) with a particular perspective of medical physics in order to help and guide regional battle against this pandemic in radiotherapy [2].The guideline was delivered on early April 2020 and circulated through 25 AFOMP member countries, as well as member countries of international organization for medical physics (IOMP). Medical physics for world benefits (MPWB) held an international webinar on “International Medical Physics Guidelines for COVID-19” specifically to further spread the guideline internationally on later April 2020 [3].

Education of all levels, primary, secondary, and tertiary, has been disrupted by COVID-19 on an unprecedented scale across the globe. More than 1.58 billion students across 191 countries were affected. It was until May 2020, schools in China started to reopen when the outbreak became largely controlled within China. Nearly 200 million primary and secondary students in China started their new semesters via the Internet in 2020. The COVID-19 pandemic has led to a global boom in online education technology as schools shifted from physical to virtual classrooms. When the education authorities realized that the pandemic may last for 1-2 years, education has changed dramatically in the digital platform using the incorporation e-learning system to which most of the teachers are not so much familiar.

Medical physicists play a key role in the safe use of radiation for diagnosing and treating and have both a sound theoretical understanding of the medical physics as swell as clinical training in its application. With the expansion of technically sophisticated radiotherapy services and the strengthening of safety requirements, continuous professional development (CPD) through education and training has become an essential component of the professionalism of medical physicists. Attending conferences, symposia, courses and workshops is essential measures of CPD to keep professional knowledge and skills up to date. Due to the thread of covid19, all the education and training activities have been moved to online in the radiation oncology community.

In order to promote the education and training for the medical physicists during pandemic, the Education and Training Committee of Asia-oceania Federation of Organizations for Medical Physics (AFOMP) scheduled monthly webinar from June to December 2020 and offered CPD points with a joint endorsement from Australasian College of Physical Scientists & Engineers in Medicine (ACPSEM). Topics covered total body irradiation, radiobiology, proton therapy, small field dosimetry, nuclear medicine, brachytherapy, etc. At each webinar, more than 200 participants from Asian Pacific region medical physicists attended. People can review the recorded video of the webinar if he missed it or want to hear it again on the website of AFOMP [4].

With the spreading of Coronavirus disease 2019 (COVID-19) globally, increased demand for testing, diagnosis, and treatment has caused medical resources become insufficient in many regions. Currently, reverse transcription polymerase chain reaction (RT-PCR) is used as the gold truth and the definitive test for diagnosing COVID-19. However, the limited sensitivity of RT-PCR and the shortage of testing kits in epidemic areas increase the screening burden, and many infected people are thereby not isolated immediately. This accelerates the spread of COVID-19. On the other hand, due to the lack of medical resources, many infected patients cannot receive immediate treatment.

In this situation, finding high-risk patients with worse prognosis for prior treatment and early prevention is important. Consequently, fast diagnosis, finding high-risk patients with worse prognosis are very helpful for the control and management of COVID-19. With the introduction of artificial intelligence techniques, many researches, especially many medical physicists in the radiology field contributed great in the developing of fast, effective, and affordable test to identify the potential high-risk patients who are more likely to become severe and need urgent medical resources. Medical physicists from Asian pacific regions are involving in the new diagnosing tools with AI. We are expecting more collaborative researches within the area among medical physicists.

In summary, the outbreak of COVID-19 pandemic in later 2019 is a disaster to the world, and has unmasked its great impact in the Asian pacific region both in economic development and health crisis. By stressing every one of the countries it touches, COVID-19 has the potential to create devastating social, economic and political crises that will leave deep scars. Despite significant responses by governments and the heroic efforts of medical staffs and other key workers, this global societal emergency has taught us several costly lessons. Our medical physicist fellows should also use this opportunity to strengthen self-construction, enhance cooperation to serve cancer patients better in this unprecedented era of great change.

References

[1] https://covid19.who.int/

[2] Jin, X. 2020. Guideline on Radiation Oncology Operation during COVID-19. April 2020, https://afomp.org/covid-19-information-resources/

[3] https://mpwb.org/CoronaVirusResources

[4]https://afomp.org/

Accreditation of Medical Physics Education and certification of Medical Physicists- special reference to AFOMP region

Prof. Arun Chougule, President AFOMP, Chair ETC IOMP,Chairman IOMP Accreditation Board and Member Board of Directors IMPCB
arunchougule11@gmail.com

Medical Physics is one of the most challenging and rewarding application of physics to human health care programme and is mainly concerned with use of ionizing radiation in diagnosis, therapy, and research in health care. Medical physicists working in clinical environment should have required competency and therefore undergo structured education program and residency under experienced medical physicist from recognized institution. Various institutes/universities are running medical physics education programmes, however, to access the minimum standards of the education and provide credibility of the program the medical physics education programs needs to be accredited. Accreditation is important because it helps determine if an institution meets or exceeds minimum standards of quality and helps students determine acceptable institutions for enrollment in addition employers often require evidence that applicants have received a degree from an accredited school or program. For the public, accreditation promotes the health, safety, and welfare of society by assuring competency of public health professionals. IOMP is dedicated to improving medical physics worldwide by disseminating systemized knowledge through education and training of medical physicists, to advance the practice of physics in medicine by fostering the education, training, and professional development of medical physicists.

Medical Physicists work in many health-related areas, such as:

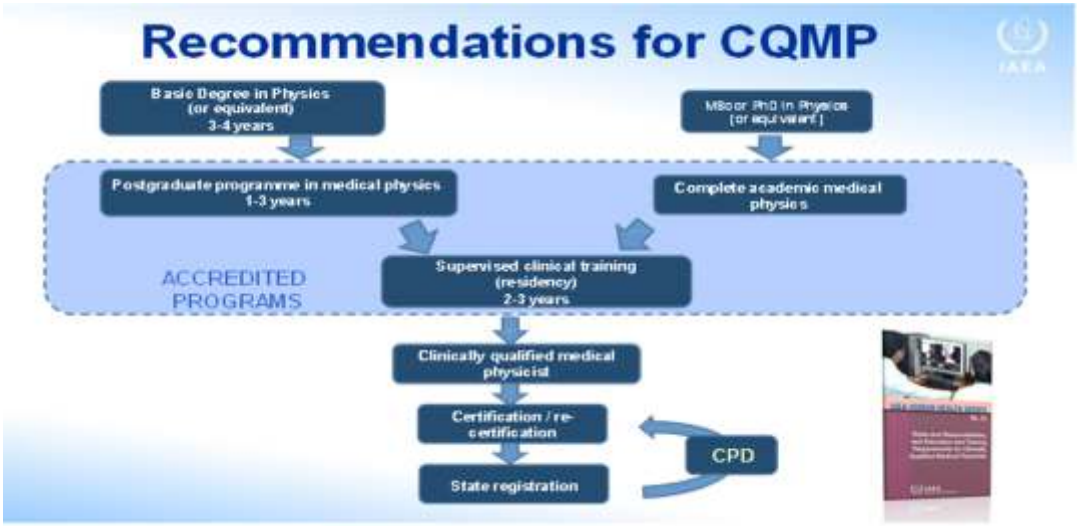
1. Clinical settings.
2. Academia (teaching and research),
3. Industry (technology development),
4. National and local government regulatory agencies,
5. Accreditation agencies,
6. Standards' organizations,
7. Calibration and dosimetry laboratories.

Clinical medical physicists are professionals working in healthcare. Part of their work consists in ensuring quality and effective diagnosis and treatment of patients in areas such as radiotherapy, nuclear medicine, diagnostic and interventional radiology as well as other clinical areas where ionizing and non-ionizing radiation are used. Clinically qualified medical physicists (CQMPs) therefore have a direct influence on patient management in the health sector.

What do patients and society expect from their medical physicist as Health Professional

- Professional Competence
- Educational qualifications/Certification
- Problem solving - finding solutions
- Independence of decision and execution
- Practical skills, Clarity in communication, Integrity, confidentiality
- Humanity- compassion
- **Therefore Certification is required.**
  - Medical physicists should have appropriate education and training
  - Medical physics education and training programs and events should meet appropriate standards
  - Medical physics certification boards should be capable of deciding if examinees have the required education, training and experience to safely practice independently

According to IAEA [HHS25] https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1610_web.pdf



For harmonization of medical physics education program as per the IOMP Policy Statement No. 2 [https://www.iomp.org/iomp-policy-statements-no-2/] which provides general guidelines for member organizations in defining the basic requirements for education and training of medical physicists. It aims to serve as a reference for medical physics organizations, education institutions and health care providers and authorities in planning and development of their national infrastructures for education, training, and certification of medical physicists and for maintenance of standards of practice.

Certification, Accreditation, Registration, Licensure

- Certification
  - Demonstration that an individual medical physicist is qualified to act independently without supervision
- Accreditation
  - Demonstration that either educational programs, events where attendees will be offered Continuing Professional Development (CPD) points, or certification boards, meet certain standards
  - Registration- registered in certain regulations
  - Licensure- Similar to licensure of physicians, nurses.....professionals

To accomplish the goals, IOMP Accreditation Board [AB] has been set up to ensure that accredited medical physics programs satisfy the highest standards established by IOMP in collaboration with other international organizations.

The IOMP accreditation board accredits medical physics degree/Post graduate programs, medical physics education and training institutions/centers and education and training events.[https://www.iomp.org/accreditation/]

Benefits of IOMP accreditation:

- Reputation of accredited programs and courses which will result in more demand for these education and training activities.
- Provision of an international dimension to an education event that will attract participants from other countries.

- Evidence of highest teaching standards and best preparation of medical physicists for the work environment
- Publication of accredited programs and courses on the IOMP website

The IOMP Accreditation Board accredits Medical Physics degree/Postgraduate programs, Medical Physics education and training institutions/centers, Medical Physics residency program and education and training events.

- Started with accreditation of postgraduate degree courses.
- Accreditation Continuing Professional Development (CPD) courses
- Accreditation of Residency programmes in MP

For accreditation of Medical Physics education programme

1. Status of the institution
2. Governance & administration
3. Vision, mission, objectives
4. Courses/programmes, curriculum & graduate outcomes
5. Approach to teaching & learning
6. Planning, programme review & quality assurance mechanism
7. Level of internationalisation
8. Physical resources and facilities
9. Student support services
10. Industry advisory board
11. Staffing resources
12. Financial resources
13. Membership, partnership and community engagement

14 Areas of Excellence
- Essential
- Desirable

Following the stakeholders and benificiaries of accrediation of medical physics education programs

1. **Society** – Accreditation improves educational programs and graduates from these programs provide better quality health care.
2. **Students**- they can expect their institution to meet a level of quality that is worthy of their money, time, and efforts.
3. **Educational institutions** - competitive in today's student recruitment market. Accreditation also means that institutions, especially when accepting undergraduate students as transfer students, or when giving advance credit to graduate students, can place reliance on the integrity of the originating institution. **Many accrediting programs in health care education, including medical physics, require that the program be in an institution that has an institutional accreditation status.**
4. The health care **employers** can assume that **graduates of accredited programs have similar skills and that they have met requirements expected of all entry-level practitioners.**

Accreditation offers many positive features to disciplines and occupations. The presence of **accreditation adds validity to the profession's claims to quality, increasing consumer confidence at all levels.**

IOMP has accredited following medical physics education program till date.

1. Master's in medical physics [MMP] of ICTP & Trieste University, Italy
2. Catholic University of Korea, Seoul, S Korea
3. Yonsei University, Wonju, S Korea
4. KAIST, Daejeon, S. Korea

Many requests and application are pending and in process, delayed due to Covid pandemic.
The educational programs CPD accredited by IOMP are:

1. CPD: Dosimetry of Small Fields in External Beam Therapy: Reference and Relative Dose Determination 2nd – 4th October 2019, SCMPCR Training Room and National Institute of Cancer Research and Hospital (NICRH), Dhaka, Bangladesh
2. ICMP 2019 (ALFIM)
3. CPD: Hands-on Workshop: Commissioning, Planning and Quality Control for the IMRT/VMAT Treatment Techniques. 25th – 27th April 2020, University of Colombo, Sri Lanka and National Cancer , Institute, Maharagama, Sri Lanka
4. Universität Heidelberg (Germany) Online Teaching Course: Particle Therapy, 2020
5. CPD: SCMPCR E-learning Program (ELP-03): Basic Principles and Advanced Clinical Applications Brachytherapy (webinar platform) 5-26 February 2021

The details of IOMP accreditations, the manual, and forms available on IOMP website
https://www.iomp.org/accreditation/

International Medical Physics Certification Board (IMPCB) Established May 23, 2010 with the goal was to improve the quality of clinical medical physicists and the profession [www.IMPCB.org]
The individual medical physicists need to certified as CQMP by the certification authority so as to work in healthcare. Certification is one of the essential components for recognition of an individual to practice a profession. International

Medical Physics Certification Board [IMPCB] was established to accredit the national certification board and individual medical physicists. https://www.impcbdb.org/

- International accreditation is a validation process on the standards and status of national certification boards. The international medical physicist certification board (IMPCB) was established to:
- Serve as competent authority in accreditation of national certification boards.
- Set standards and procedures of professionals' certification.
- Help countries to establish their own national certification systems.
- Conduct certification on medical physicist in countries where establishing certification board is not practical.

IMPCB board certification is open to medical physicist in countries where certification board do not exist.
Certification Boards so far accredited by IMPCB.
1. The Korean Medical Physics Certification Board
2. The Hong Kong Institution of Physicists in Medicine Certification Board
3. The Hong Kong Association of Medical Physics Certification Board

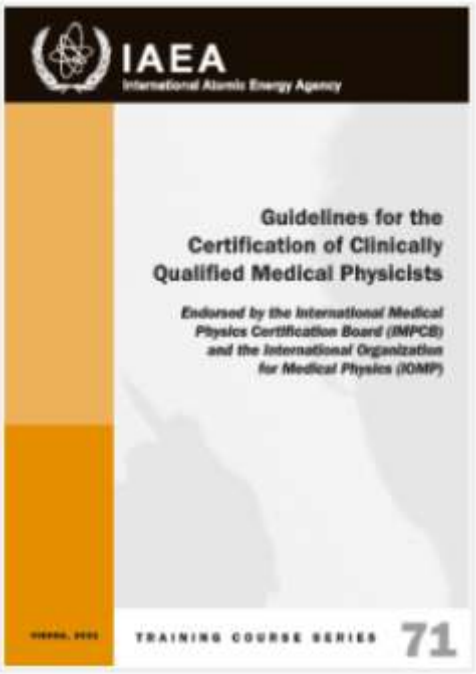
Being evaluated for accreditation by IMPCB:
1. College of Medical Physics of India
2. Chinese Society of Medical Physics – Taipei

Expressed an interest in accreditation:
1. Bangladesh Medical Physics Certification Board

IMPCB Certification of Individual Medical Physicists. The certification examinations began in 2017.
So far exams have been held in Trieste (at the ICTP, several times), Dhaka, Prague, Mexico City,

Riyadh, Amman, Vienna, Santiago, and Doha and over 150 candidates have started into the exam process, 37 have completed all parts and become IMPCB certified and an additional 51 have passed Parts I and II and are now eligible to sit the Part III oral exam

Recently IAEA has brought out guidelines for the certification of clinically qualified medical physicists which is endorsed by IMPCB and IOMP [TCS71]
https://www.iaea.org/publications/14746/guidelines-for-the-certification-of-clinically-qualified medical-physicists



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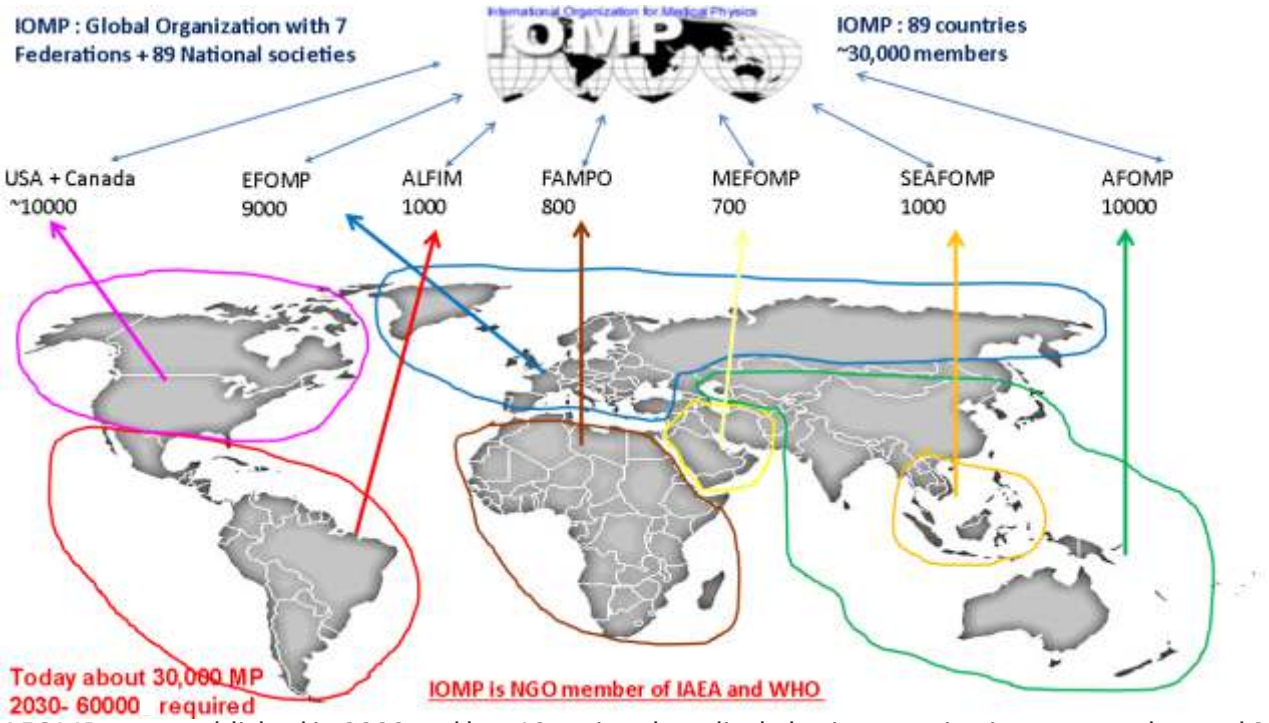
These guidelines endorsed by IMPCB and IOMP are circulated to all the member countries of IAEA for implementaion. The guidelines are the handy document to establish the certification & registration body in the countries where such mechanism do not exist at present. Till such authorities are established in country one can use the existing IOMP international body certification and acrediation of the medical physicists and the medical physics education programm.

Situation in the AFOMP regions

Asia Oceania Federation of Organisations for Medical Physics [AFOMP] is one of the largest regional organisation of IOMP.



AFOMP was established in 2000 and has 19 national medical physics organizations as member and 2 as affiliate member, represents over 11000 medical physicists, one of largest regional organization of IOMP. In AFOMP region 106 Medical Physics Education [MPE] programs in 16 countries with annual capacity of about 800 are being conducted. Out of 16 countries only 8 countries have MPE accreditation in place. Further in 5 countries only the structured residency program is functional and only in 9 countries the medical physicists are registered as health professionals. On analysis of the data, we found that very few MPE are accredited and similarly only 3 certification boards are accredited by IMPCB. Lot needs to be done in this direction so as improve the status of medical physics profession in this region.

- In summary, it is important that:
- Medical physicists become certified.
- Medical physics education and training programs become accredited.
- Medical physicists in countries that do not currently have certification/accreditation programs develop their own national programs.
- The IOMP and the IMPCB continue to develop and expand their certification/accreditation activities.

I wish more and more countries get their MPE programs accredited, the certifying bodies are established and accredited by IMPCB and each one of the CQMP gets certified, registered as health professionals.

GPU Computing in Medical Physics

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Introduction:
Medical Physics field (MP) has experienced rapid developments over the past a few decades. With the increased sophistication of medical imaging and treatment machines, the amount of data processed in MP is humongous. A graphic processing unit (GPU) is a processor that is an efficient way to handle specialized computations in contrast to the Central Processing Unit (CPU), which is great at handling general computations. GPU can be faster at completing tasks than CPU. The performance hugely depends on the type of computation being performed. The GPU has emerged as a competitive platform for computing massively parallel problems. Many computing applications in MP can be formulated as data-parallel tasks that exploit the capabilities of the GPU for reducing processing times [ ].

Emergence of GPU and its use in Medical Physics
In MP, the ability to perform general-purpose computation on the GPU was first demonstrated in 1994 when a research group at SGI, USA implemented image reconstruction on an Onyx workstation using the RealityEngine2 [ ].Throughout the 1990s, doubling of single-core processor performance was every 18 months. Until 2004, a single-core processor could perform image reconstruction 100 times faster than in 1994, and as fast as SGIs 1994 graphics-hardware implementation.

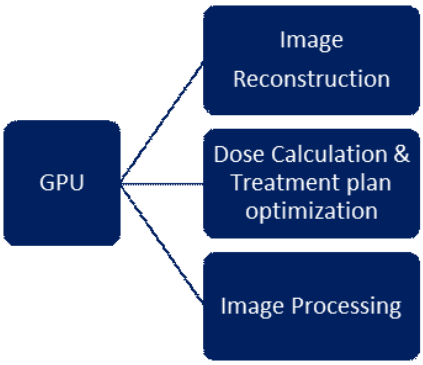

Figure 1a: Application of GPU in Medical Physics.

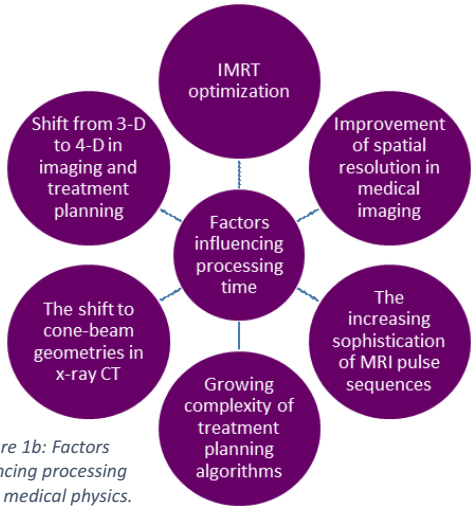

Figure 1b: Factors influencing processing time in medical physics.

In 2006 it was demonstrated that the performance of a single-core processor's doubling period might be 5 years. As a result, vendors have switched to multi-core architectures to keep improving the performance of their CPUs, a transformation that has given a strong incentive for users to consider parallelizing their computations [ ]. Around the same time, the programmable GPU was introduced. Unlike previous graphics processors, which were limited to running a fixed-function pipeline with 8-bit integer arithmetic, these new GPUs could run custom programs (called shaders) in parallel, with floating-point precision [ ]. The shift away from single-core processors and the increasing programmability of the GPU created favorable conditions for the emergence of GPU computing. With the advancement of technology in MP, plethora of processing data involved in imaging and treatment planning; and computation time is pivotal for deciding treatment strategy outcome. GPU addresses these problems and gives the solutions for using their features such as, high computation throughput, high memory bandwidth, support for floating-point arithmetic and

low cost. Figure 2 show the various applications of GPU and factors influencing image

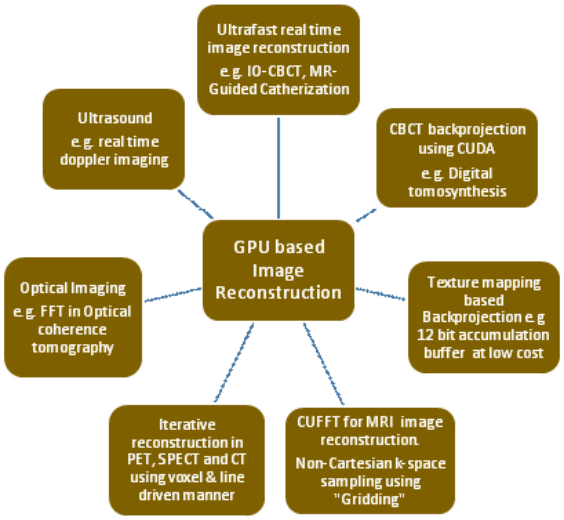

Figure 2a: GPU application in image Reconstruction. Some examples.

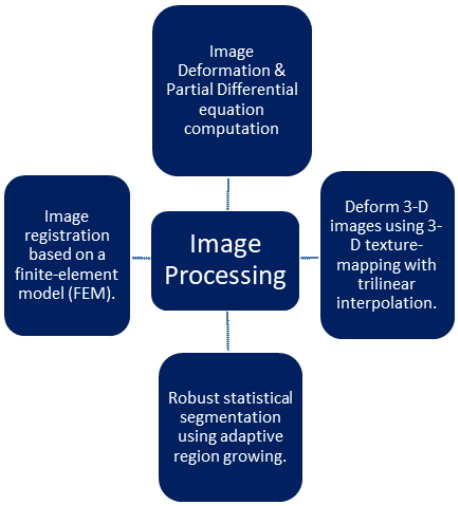

Figure 1b: GPU application in image Processing. Some examples.

processing in MP. GPU helps in accelerating dose calculation and IMRT optimization in radiation therapy. Implementing computationally efficient Monte Carlo methods (MC) on GPU hardware is extremely challenging. The main obstacle to efficient MC simulation on the GPU is that SIMD architectures cannot compute diverging particle histories in parallel. In high-energy MC, particles can be electrons, positrons, or photons and can undergo a wide range of physical processes. Secondary particles can be created as a result of these processes. On the GPU, MC is implemented by assigning one thread per particle. Requires threads within a warp to compute different physical processes, and, as a result, these divergent threads are serialized by the scheduler. GPU might compute only a few particle histories in parallel. Several solutions have been proposed, such as creating a global queue of particles to be processed, placing newly created secondary particles in such queue and processing electrons and photons sequentially rather than concurrently.

Table :Application of GPU in Dose calculation and treatment plan optimization.

Application	Methodology	Implementation
Aperture-based optimization methods	Derive MLC segment weights/shapes directly within IMRT optimization	CUDA
Direct aperture optimization method	Gantry rotation discretized into 180 beam angles and apertures generated one by one in a sequential way	VMAT treatment planning optimization
Non-voxel based broad-beam(NVBB)framework	Objective function in a continuous manner rather than using discrete voxels	Diverging pyramids
GPU based convolution superposition (CS) methods	Combine Monte Carlo (MC) and CS	Algorithm 900 times faster than original CS code.
Adaptive full dose correction methods	Plan optimization	Treatment planning
Siddon's algorithm parallelized on the GPU	Assigning each thread a line to ray trace	Computing radiological distance
Iterative gradient projection& PB dose calculation model	IMRT optimization	CUDA

Evolution of GPU:
Over the years, the GPU has evolved from a highly specialized pixel processor to a versatile and highly programmable architecture that can perform a wide range of data parallel operations (Figure 3).

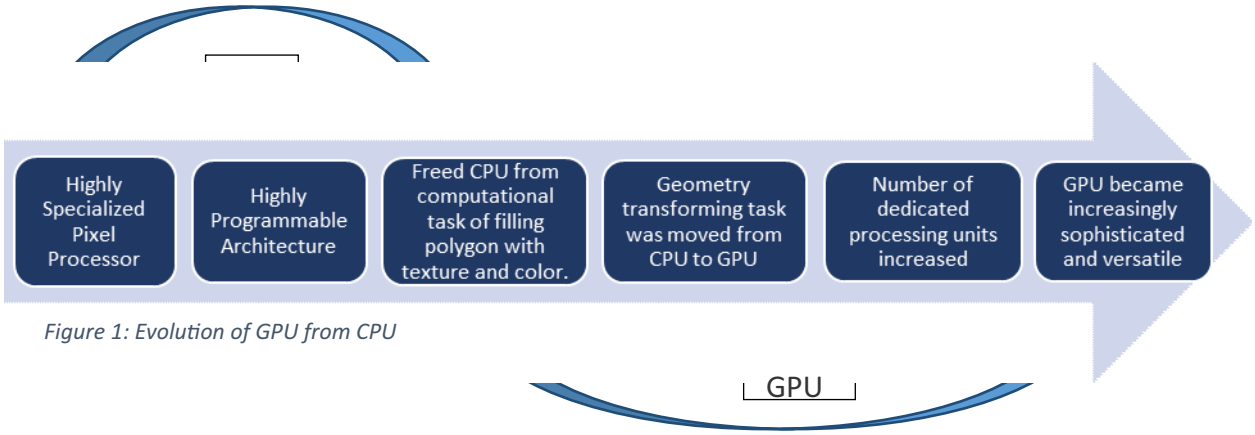

Figure 1: Evolution of GPU from CPU

Parallel Computing and CUDA Model
Parallel computing is a type of computation where many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time (Figure 4b). Compute unified device architecture (CUDA) is a popular GPU programming model introduced in 2006 by NVIDIA for parallel computing [ ]. CUDA is an open source and extension of the C programming language. CUDA program contains two phases that are executed in either host CPU or device GPU (Figure 5).

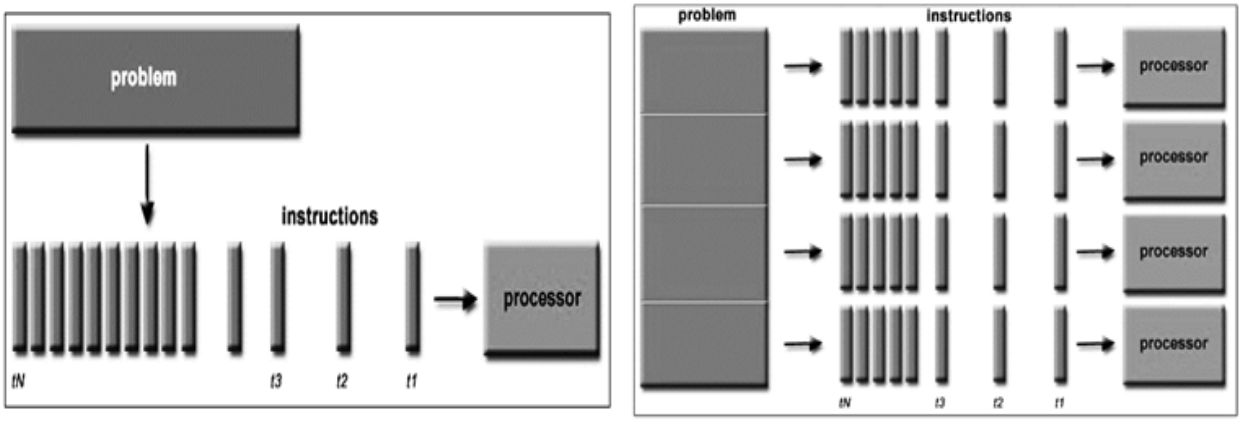

Figure 4a: Serial computing. 4b. Parallel computing.

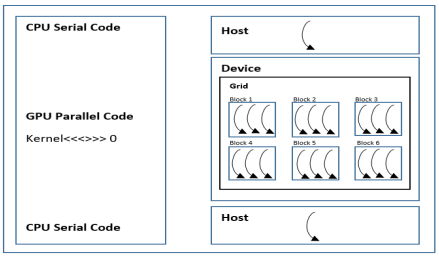

Figure 5: CUDA workflow

A thread on the GPU is a basic element of the data to be processed. Unlike CPU threads, CUDA threads are extremely "lightweight," meaning that a context change between two threads is not a costly operation. The GPU-CUDA model contains three types of architecture hierarchy. They are **programming model, memory model** and **CUDA work flow.** The grids, blocks and threads build the CUDA architecture. In GPU thread and memory hierarchy, the threads are organized as a grid of thread blocks. Threads within a block are executed on the same multi-threaded program (MTP) and have access to on-chip private registers (R) and shared memory. Additional global and local memories (LM) are available off-chip to supplement limited on-chip resources (Figure 6).Within one

thread block; threads are further divided in groups called warps. Each warp executes in a SIMD fashion, with the MTP broadcasting the same instruction to all its cores repeatedly until the entire warp is processed. The CUDA program starts with host execution. The kernel function generates the large amount of threads to execute data parallelism. Before starting the kernel, all the necessary data is transferred from host to allocated device memory. CPU kick starts the kernel function then execution flow is moved to device. Resultant data will transfer back to host for further processing. CUDA supports NVIDIA GPU's only and

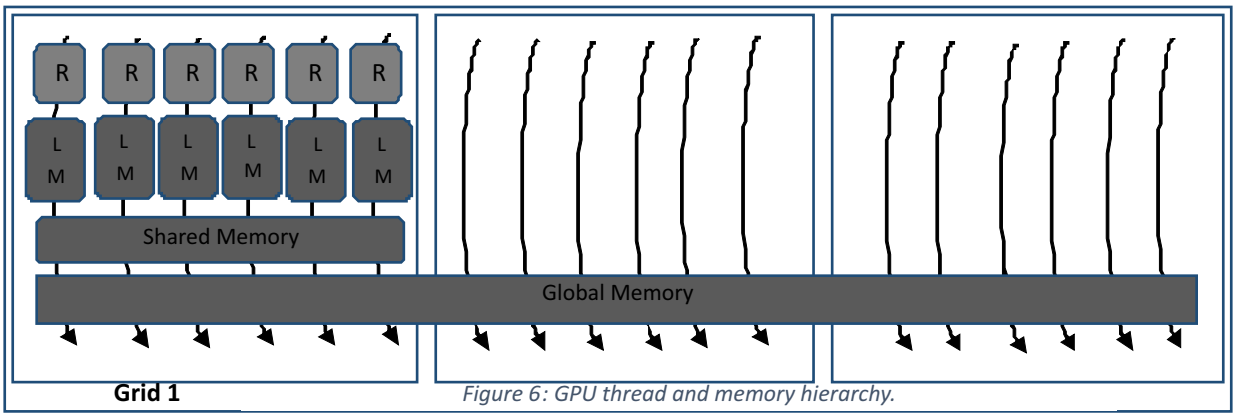

Figure 6: GPU thread and memory hierarchy.

little hard to understand and debug the errors (Figure 5).

GPU implementation challenges:

In medical physics, there are two aspects to a single sophisticated problem. On one hand, the problem is associated with large data sets and/or complicated numerical algorithms. On the other, it is highly desirable to solve the problem in a timely fashion, e.g. in minutes or sometimes even in (near) real time, to meet the clinical demands of a high throughput or to facilitate new treatment modalities such as on-line adaptive radiation therapy. The conflicts between these two aspects have clearly posted great challenges to the time-critical and resource-limited clinical environment and thus there exists a high demand on computation powers for which GPU plays a vital role. [ ].On the other hand, GPU also holds several disadvantages compared to CPU. First, the hardware architecture of the GPU makes it extremely suitable for data parallel problems, but not so for task parallel problems. Depending on the problems of interest, careful design of the algorithm considering the nature of GPU architecture is needed to achieve a high performance. Second, GPU is a relatively new platform. Most convenient libraries used extensively for CPU computing do not have GPU counterparts yet. Hence, it requires a large amount of work to code almost everything from scratch, increasing the difficulty to maintain code optimality and the chances of making errors. These issues have posed a significant amount of challenges for the developers and researchers who are actively seeking for GPU solutions

Summary:.

GPU is highly parallel, multithread, multiple core processors and has high memory bandwidth to give the solution to the computational problems in MP. It is establishing as one of the standard tools in high-performance computing, and is being adopted throughout industry and academia. The emergence of GPUs as a novel technological option mainly due to its low cost and high computation capability has been revolutionary.

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Modelling on Blood Flow Rate of Carotid Artery Associate with Human Emotion

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Introduction

The surge in heart beat rate lead the rise in the cardiac output and resulting a reduction in the time interval of the cardiac cycle subsequently intensifies the blood pressure. Different emotional state either pleasant or unpleasant might potentially triggers on varies pulse rate which a review has been reported that the heart rate variability is agreeable to be an accessible research tool enhances the understanding the emotion in social and psychopathological process. Another related report shows that the anger and forgiveness were associated with systolic blood pressure, heart rate and rate-pressure product. On the other hand, study also indicates that the hostile participants presented greater and long-lasting blood pressure responded to anger. Similar study has investigated on employing imagery in college students for their different emotional state related different in systolic, diastolic blood pressure and heart rate. Even a recent study shows that the heart rate of dogs on positive emotion had been assessed. The studies have indicated the heart rate weighs in emotional state. However, the impacts of the negative emotion on health are yet to be explored in fine point.

Kitayama and Park stated that the risk of illness and death will rise under negative emotions such as depression, nervousness and anger. The risk of people suffering from coronary heart disease (CHD) will increase if people are exposed to negative emotional state such as misery, anger and nervousness over a long time period. Carotid arteries are one part of the significant artery where it connected between the human brain and ascending aorta of the heart via the neck. The afferent arteries (inflow of blood) of the carotid arteries are left or right common carotid arteries (CCA) while the efferent arteries (outflow of blood) include the left or right internal carotid arteries (ICA) and left or right external carotid arteries (ECA) as shown in the Figure 1 . An ICA branch feeds the blood to the anterior and middle region of the Circle of Willis (CoW), whereas an ECA branch supplies the blood to the rest of the head where is the neck and face regions. In this study, human emotion blood flow at Carotid artery was simulated with 60 bpm (normal) and 100 bpm (anger).

Table 1: The heart pulse rate for various types of emotional states.

Types	Heart pulse rate, bpm
Excited (happy)	70-100
Sad	80-100
Relaxed (normal)	60-80
Anger	95-120

Nonlinear one dimensional (1-D) numerical equation mathematical model defines the flow wave in a blood vessel and its relations with the wall displacement. The equation 1 and 2 is the outcome of the mass conservation (continuity) and momentum adopted to a 1-D impervious surface and

deformable tubular control volume for incompressible Newtonian fluid.

$$\text{Continuity equation: } \frac{\partial A}{\partial t} + \frac{\partial (AU)}{\partial x} = 0 \qquad (1)$$

$$\text{Momentum equation: } \frac{\partial U}{\partial t} + U\frac{\partial (AU)}{\partial x} = -\frac{1}{\rho}\frac{\partial p}{\partial x} + \frac{f}{\rho A} \qquad (2)$$

where

$$x = longitudinal\ length\ along\ vessel$$

$$t = time$$

$$A(x,t) = cross\ sectional\ area\ of\ the\ vessel$$

$$U(x,t) = average\ longitudinal\ velocity$$

$$p(x,t) = average\ internal\ pressure\ along\ the\ cross\ section$$

$$\rho = blood\ density$$

$$f(x,t) = friction\ force\ per\ unit\ length$$

Geometry

The carotid artery geometry model was built by using the Comsol Multiphysic® (Trial version). The dimension of the carotid artery that used was based on a healthy adult where the CCA length was made enough long to ensure the full mixing of fluid .

Blood Flow Simulation

The blood flow math calculation is expressed in Equation 1 and 2. The ρ, u and μ are denoted density, velocity and dynamic viscosity respectively. In fact, blood is an unsteady, incompressible, non-Newtonian fluid with the laminar flow but to simplify the simulation, the blood is presumed as a Newtonian fluid in this study. Newtonian fluid is exhibiting a linear relationship between the stress tensor and strain tensor and have a constant dynamic viscosity [11]. An incompressible flow is referring to the blood density does not vary across the flow field. In the simulation, the blood is assumed to be Newtonian and incompressible laminar flow with a density and a dynamic viscosity equal to 1060 kg/m3 and 0.0035 Pa.s respectively[9]. The blood can be presumed to be Newtonian if only if the shear rate value is larger than 100 s-1 or the diameter of the artery is larger than 1 mm. Such circumstance will arise in bigger arteries where in this case the carotid artery is considered as a large artery (which have larger than 1 mm)[12]. Besides, the rigid and no–slip condition is assumed for entirely vascular walls[13]

Results and Discussions

Figure 1 and Figure 2 demonstrates the velocity distribution in the bifurcation of carotid artery at 60 bpm and 100 bpm respectively.

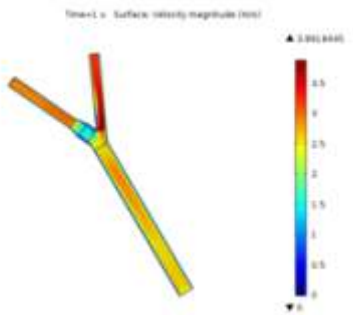

Figure 1: Result for Carotid artery at 60 bpm

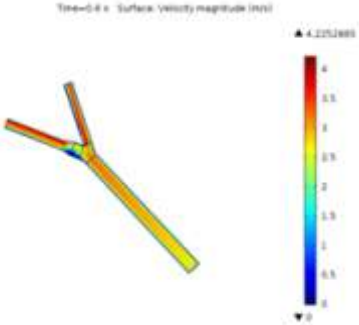

Figure 2: Result for Carotid artery at 100 bpm

Figure 1 shows the result for the simulation of blood flow velocity in the carotid artery for 60 bpm. The colour legend indicates the velocity of the blood flow where the blue colour represents slower flow while the red legend indicates faster flow. From the result, the lowest velocity has shown in the wall of carotid artery. Table 4 shows the flow velocity in CCA was lower than ICA and ECA.

Figure 2 shows the result for the simulation of blood flow velocity in the carotid artery for 100 bpm. Table 4 shows result on the flow velocity in CCA was lower than ICA and ECA. The lowest velocity shows in the wall of the carotid artery and lower velocity is observed in the carotid sinus. The outcome of result for CCA, the wall of carotid artery and carotid sinus are same as the 60 bpm. According to Nakayama et al.[14], the inlet and outlet boundary condition (B.C) in the bifurcation artery considered as an essential criterion to produce a real flow bifurcation. The authors had gone through various of simulation by varying the inlet and outlet boundary condition for the carotid artery and subsequently found out that every different boundary condition had given different outcomes.

Comparison of Normal and Anger emotional state

Table 2 shows the velocity of the inlet and outlet of the carotid artery that extracted from the Comsol Multiphysic®.

Table 2: The velocity for each parts of carotid artery as shown in the result section.

Carotid artery	Velocity (m/s)	
	60 bpm	100 bpm
CCA inlet	2.34114	2.39860
ICA outlet	3.28615	4.22417
ECA outlet	3.35765	3.96785

Table 2 shows that the velocity in carotid artery for heartbeat rate 100 bpm (anger state) is higher than the 60 bpm (normal state). This means that people with anger emotional state would predict to be higher in blood flow velocity than in a relaxed (normal) state. According to Jha et. al. [9], the anger would cause the blood flow rate stay elevated. The blood flow rate increase could result the increased in the velocity as shown in the Equation 4

$$Q = A \times V \qquad (4)$$

where Q indicates the volumetric flow rate (blood flow rate), A indicates area while V indicates the velocity. During anger state, the facial blood flow stay elevated and peripheral vascular resistance is minimized[9].

IV Summary

In conclusion, the highest velocity shows in the ECA, subsequently is ICA, the last one is CCA in the normal state. This is due to the ECA has the lowest diameter, follow by ICA then is CCA. The relationship between radius and velocity is inversely proportional. The similar outcome obtains from anger emotional state is CCA gives the lowest velocity as compared to ICA and ECA. For anger emotional state, the velocity for ICA branch is slightly higher than ECA branch, this might be due to the boundary condition. Therefore, the wall shear stress can consider for future work as low shear stress tend to form plaque, which potentially develops into atherosclerosis as compared to the larger wall shear stress site.

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SCMPCR E-Learning Program-03:
Brachytherapy Basic Principles and Advanced Clinical Applications

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South Asia Centre for Medical Physics and Cancer Research (SCMPCR)

South Asia Centre for Medical Physics and Cancer Research (SCMPCR) has established at 2018 and constantly trying to create skilled manpower for the cancer treatment through different categories of programs along with national and international collaborative approach. SCMPCR arranges meetings, seminar, workshop, hands on training, in-service training, e-learning and awareness program with the national and international experts for the mass people as well as relevant personal of the different fields in health sectors for different communicable and non-communicable diseases, especially for the cancer patients.

The COVID-19 crisis brings new openings to the online based distance learning. To meet the challenge of the next industrial revolution and digitalization of health care technologies SCMPCR has introduce e-learning program (ELP) during this corona Pandemic from June 2020, for the first time in Bangladesh for medical physicists.These ELP usually covered all the branches of Medical Physics. SCMPCR arranged accredited ELP-3 titled **"Brachytherapy Basic Principles and Advanced Clinical Applications"** in the month of February (February 5 - February 26) which cover all the aspects of BT: Introduction, Dosimetry, QA, TPS, Protection etc.

Brachytherapy is an important tool in the treatment of cancer. The equipment and procedures have evolved since the first brachytherapy procedure was performed soon after the discovery of radium by Pierre and Marie Curie in 1898. Brachytherapy has been a part of the curative management of cervical and prostate cancer patients for more than 100 years.

To demonstrate the theoretical knowledge and latest clinical experience on Brachytherapy the program included the topics related to the clinical practice of medical physicists in brachytherapy. The course was designed with series of lectures, group discussions, practical demonstration of TPS and online examination where the participants has gone through step-by-step demonstration of various aspects unique to brachytherapy.

Selection Process
A circular is given to different media for applying the accredited course on brachytherapy. An overwhelming response of around 200 applications was received by the organizing committee. SCMPCR e-learning committee has selected 70 efficient participants to enroll into the course. The selection committee has given the priority to the medical physicists from developing countries, woman and young physicists and post graduate students. Out of 70 selected participants 48 participants regularly attended all the lectures and examination in this e-learning programs.

Management
For the effective management of the course module, SCMPCR IT experts develop a Moodle-based website to provide a well-equipped learning platform for the participants. The user id and password unique for each participant has given to join the course. In the platform day to day attendance was taken by the organizer.

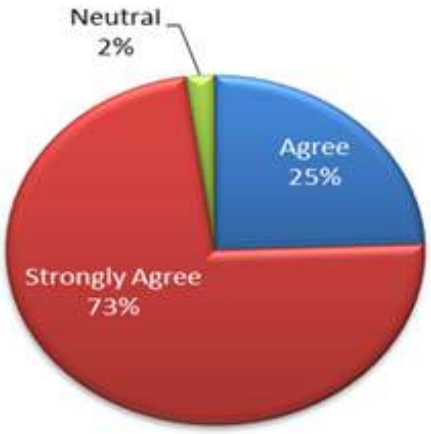
Accredited by:
The e-learning program was accredited by International Organization for Medical Physics (IOMP) as a CPD event for Medical Physicists with 22 CPD credit points.

Trainers/Speakers: This course consisted of eight lectures by the international well-known experts.

There were 5 qualified Speakers and 3 Moderators from different countriesas follows whose remarkable support and contribution had made this program very effective for the participants.

Evaluation on Course quality and Materials: In the post-webinar survey, the feedback from participants regarding the course was very positive.

Evaluation on supplied Materials



Evaluation on supplied Materials

Feedback from the Speakers

Dr. Frank W. Hensley
Former Medical Physicist
Department of Radiation Oncology
University Hospital Heidelberg, Germany

Many thanks to SCMPCR for arranging these excellent seminars on important topics in Medical Physics. The new format of electronic workshops that we have been forced to learn by the Many thanks to SCMPCR for arranging these excellent seminars on important topics in Medical Physics. The new format of electronic workshops that we have been forced to learn by the pandemic opens a multitude of possibilities to communicate and share knowledge in an efficient and sustainable manner. Virtual

meetings can focus on the needs of physicists in different settings and in different parts of the world and in the same effort save travelling time and expenses. Let us continue developing this powerful tool to provide focused basic and continuing education and to expand the network of medical professionals. pandemic opens a multitude of possibilities to communicate and share knowledge in an efficient and sustainable manner. Virtual meetings can focus on the needsof physicists in different settings and in different parts of the world and in the same effort save travelling time and expenses. Let us continue developing this powerful tool to provide focused basic and continuing education and to expand the network of medical professionals.

Dipl. Eng. Renate Walter
Medical Physicist and Radiation Protection Commissioner

I was surprised to see that participants from Australia to Mexico enrolled for the course. It was organized well and I enjoyed lecturing with a kind and smart moderator at my side. The interested questions from the audience showed how active and keenly the participants listened. Of course I missed to see the participants face to face but as a virtual event it received far more international attention and eventually participation. So for post pandemic times hybrid courses could an interesting option. It was a great pleasure to contribute to this course and I thank the organizers for inviting me.

Dr. Georg Schwickert
Manager Applications Specialist,
Varian Medical Systems, Haan GmbH, Germany

It has been a pleasure for me to be part of this course. It is so important and valuable to present the techniques and benefits of Brachytherapy to an international group of engaged physicists and to increase their knowledge in this area. Ultimately, these teaching courses will improve the quality of treatments and help patients in their fight against cancer. This way we will come closer to our goal of a world without the fear of cancer.

Dr. Mamun Haque
Nuclear and Medical Radiation Physicist Sydney, Australia

It was a pleasure for me to be invited as a speaker and involved in the E-learning program (ELP-03) of SCMPCR. During my last 23+ years activity as Medical Physicist, Radiation Safety Advisor and Educator, it was always my utmost effort to create passion and enthusiasm among students and trainees, for Radiation Physics applied to interdisciplinary disciplines, -specially in Medicine. I went beyond the usual lecture topics in order to create a fascination for Medical Physics & technology and followed the career paths of the students as a “Mentor” too.It will also be my intention to do the same in future.

My overall impression about ELP-03 is quite positive. It was well organized, the other panel colleagues are well selected and have dedicated their time and expertise, for the maximum benefits of the participants. The organizing committee members and moderators have shown their dedication to the noble cause, and everyone deserves heartfelt thanks for this. The overall enthusiasm among the participants was great, and their positive feedback and final exam results reflect this. I am happy to be of further assistance to the participants, if contacted personally by

email, also beyond the scope of the course. I will also be happy and am available for any future noble E-learning Program of the SCMPCR, both as a speaker as well as a Mentor.

Feedback from the Moderators

Ms. Jannat Ara Tahamina
Trainee Documentation Officer
South Asia Centre for Medical Physics and Cancer Research (SCMPCR)
Dhaka, Bangladesh

Besides studying BSc in medical physics, I am working as a part time officer at SCMPCR. Since the beginning of my career, I have been working as one of the entire team of various Hands-on training, programs organized by SCMPCR. This is the first time I had got the opportunity to moderate in an E-learning program (ELP-03) organized by SCMPCR. For all this I will be grateful to our Chairman Prof. Dr. Golam Abu Zakaria forever who has always given newcomers the opportunity to do something. And I am more grateful to the CEO Prof. Dr. HasinAnupamaAzhari and Program Management Officer Mr. Mohammad UllahShemanto whose tireless effort prepared me for the moderation.

The whole program was a new experience for me, through which I enjoyed a lot and learned a lot about the brachytherapy treatment procedure. Through the program, I have captured a learning experience to interact with the international experts and national experts of Medical Physics like Dr. Frank Hensley, Diplo Eng. Renate Walter, Dr. Jamema Swamidas, Dr. Georg Schwickert and Dr. MamunHaque. Their every speech was very knowledgeable for all the participant. I wish SCMPCR to succeed in their mission very soon.

Ms. Mandvi Dixit
Radiation Safety Officer
Shree Jagannath Charitable Cancer Hospital Ghaziabad, India

It was an insightful experience as a Moderator to interact with participants on the e-learning program (ELP-03) and be a part of the South Asia Centre for Medical Physics and Cancer Research (SCMPCR) in February 2021 under the guidance of Prof. Golam Abu Zakaria and Prof. Hasin Anupama Azhari. It was a good exposure to interact with International Professionals like Dr. Jamema Swamidas, Dr. Frank Hensley, Diplo Eng. Renate Walter, Dr. Georg Schwickert and Dr. Mamun Haque. They covered all basics and advanced aspects related to treatment procedures of Brachy therapy. I thank SCMPCR for giving me this opportunity to be part of their program and would be keen to participate in such endeavor in near future. I take this opportunity to give my best regards and wish SCMPCR organizing team greater success in their e-learning program series.

Feedback from the Participants

Mr. SubhasHaldar
Medical Physicist and RSO
Saroj Gupta Cancer Centre and Research Institute Kolkata, West Bengal (India)

I would like express my sincere gratitude towards the chairman of SCMPCR Prof. Dr. Golam Abu Zakaria Sir and Dr. AnupamaAzhari for organizing the E-Learning Program (ELP-03). The topicof ELP-03 was on Brachytherapy Basic Principles and Advanced Clinical Applications. I appreciate the efforts of the organizer for choosing interesting

topic for the E- learning program. Brachytherapy plays a vital role in managing locally advanced cervical cancer, but its use has been in decline since the widespread adoption of advanced EBRT techniques. I hope the several such events, training and lecture series on Brachytherapy will encourage the radiation workers to practice the same. I have attended all the topics of the lecture series which includes introduction to Brachytherapy, source calibration, dose calculation in brachytherapy, treatment planning and QA programs. Personally, I have acquired good knowledge about brachytherapy techniques, treatment planning and its execution as well as radiation protection and safety aspects. Over all, it was a great E- learning experience for the medical physicist students and beginners. Also, this E-learning program of SCMPCR provides immense confidence to the medical physicists who are planning to start the brachytherapy setup in the department.On my behalf, I extend a very hearty vote of thanks to all renewed speakers across the academics and industries for their excellent teaching, gracing of important work, sharing your valuable findings and opinions.I am very much thankful to SCMPCR organizing committee for giving me this wonderful opportunity to be a part of this E learning program. Wishing all the success and best wishes to the SCMPCR members and volunteers.

Maha Hassan Mokhtar
Medical physicist
National Cancer Institute, Cairo University Egypt

It was so much pleasure to participate with this beneficial course. I benefited much concerning the new knowledge I acquired beside understanding new technology and techniques practiced in Brachytherapy, 3d Brachytherapy technology introduces amazing results compared to conventional techniques. Information introduced presented much benefit and value. Thanks to SCMPCR for their efforts.

Lorena Lopez Beltran
Medical Physicist
National Institute of Pediatrics, Mexico

I am pleased having opportunity to attend the SCMPCR E-learning program (all of them), I want to express my gratitude and thanks to the organizers and speakers. The program was extremely well organized by SCMPCR and covering the topics comprehensively specially (ELP-3) was amazing and informative about brachytherapy. Totally I enjoyed and learned a lot in a comfortable environment. I would like to thank you very much for giving me this opportunity to participate this E-learning program and hope to join the rest of E-learning program in this year.

Conclusion:

Since 2018, SCMPCR has started its journey with a great motto “Quality Education And Health Science For Patient Benefit,” especially to develop the cancer treatment. To implement its goals, SCMPCR organize different categories of programs like workshop, hands on training, in-service training, e-learning and awareness program with the national and international well-known experts along with national and international collaborative approach. All these programs have received lots of positive response nationally and internationally in a very short time. If international organization like AFOMP, IOMP, EBAMP and many more collaborate with us, we move forward to success indomitable.

CRC Book review 2021

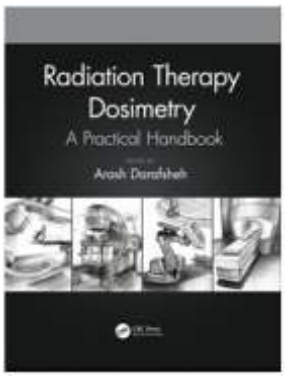
Dr R K Bisht

Nanoparticle-aided Radiation Therapy; Principles, Methods, and Applications (Ist edition)
Edited By: Wilfred F. Ngwa, Erno Sajo, Piotr Zygmanski

Wilfred Ngwa, PhD, is an Assistant Professor of Radiation Oncology at Harvard Medical School and University of Massachusetts Lowell. He received his PhD in Physics from the University of Leipzig, Germany. He has received various awards in cancer nanomedicine by AAPM, COMP and United States National Cancer Institute. **Professor Erno Sajo, PhD,** is Director of CAMPEP approved graduate Medical Physics Program in Massachusetts based at the University of Massachusetts Lowell. His research is focused on the fundamental interactions between radiation and biological matter. **Piotr Zygmanski, PhD,** is an Assistant Professor at the Brigham and Women's Hospital, Dana Farber Cancer Institute, Harvard Medical School. He has major research expertise in nanoscale dosimetry for gold nanoparticle radiotherapy and radiobiology.

The first edition of ***Nanoparticle-aided Radiation Therapy; Principles, Methods, and Applications,*** is a summary of cancer nanomedicine. The book is specifically written on nanoparticle-aided radiation therapy. This 320-page book begins with an introduction to the fundamentals of radiation therapy, usage, potential and limitations in the treatment of cancer. The book is aiming students and research learner in nanoparticles. The basics of nanoparticle design and fabrication, effective nanoparticle delivery methods, clinical applications, dosimetry considerations, treatment planning, and quality assurance issues are discussed in the book with FAQs. Nanoparticle aided radiotherapy and evidence-based solutions are detailed in the book for easy reference. The chapters provide detail on different nanoparticles, radiobiology and theranostics for future research.
ISBN 9781138197473, Published January 1, 2021 by CRC Press

Radiation Therapy Dosimetry; A Practical Handbook (Ist edition)
Edited By: Arash Darafsheh

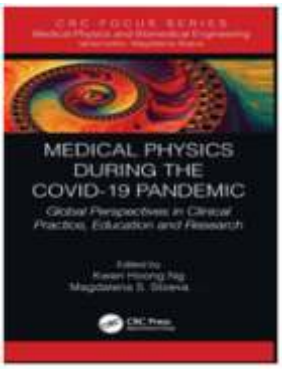


Arash Darafsheh, Ph.D., is an Associate Professor of Radiation Oncology and a certified ABR medical physicist. His fields of research interest are detector development for radiotherapy, optical methods in medical physics, photodynamic therapy, FLASH radiotherapy, and super-resolution microscopy. He has published over 90 journal and conference papers and several book chapters in radiation therapy.

Radiation Therapy Dosimetry; A Practical Handbook, focuses practical guidance using radiation detectors in the radiotherapy department. The book is useful for the clinical medical physicists and radiation oncology residents. It comprised of 30 chapters authored by leading experts in the medical physics community. The book is written in 4 stand-alone parts i.e. (i) Radiation dosimeters and dosimetry techniques (ii) Brachytherapy (iii) External beam radiation therapy and (iv) Imaging modalities, which provides an up-to-date reference of current modalities with emphasis on practical know-how in full range. In the beginning of the book, fundamentals of radiation physics, ionization chambers, calorimetry, semiconductor detectors, film detectors, thermoluminescence dosimetry, EPID based dosimetry, scintillation fiber optic dosimetry and optically stimulated luminescence dosimetry are discussed with their apposite use in clinical practice. The state of art in radiotherapy, SRS, SRT, SBRT, and MR guided systems are argued in chapters of this book with all-inclusive details. The dosimetry from kv X-ray beam to modern LINACs, conventional photons to electron beams, tomotherapy to cyber knife, ZAP-X,

Gamma Knife and from proton radiography to proton computed tomography dosimetry are exceptionally interesting articles in the book.

ISBN 9781138543973, Published March 9, 2021 by CRC Press



Medical Physics During the COVID-19 Pandemic Global Perspectives in Clinical Practice, Education and Research (1st Edition)

Edited By: Kwan Hoong Ng, Magdalena S. Stoeva

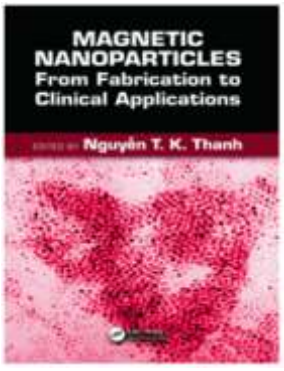
Kwan Hoong Ng PhD, is a Professor of Medical Physics at the University of Malaya. He is an expert in the field of breast imaging, radiological protection, radiation dosimetry and related risk communication. Dr Hoong is a medical physics educationalist and received the IOMP Marie Skłodowska Curie Award at the WC2018, Prague. **Dr. Magdalena Stoeva** has expertise in medical physics, engineering and computer systems at academic and research level. He received various prestigious awards on her credit in medical physics. Currently, he is an elected member of the governing bodies of the IOMP and the IUPESM.

The book is written during current COVID-19 pandemic situation on medical physics and probably is the first book to cover the impact of COVID-19 on the subject. The book is edited by two experts in the field of medical physics, with 17 exclusive chapters from the subject specialists around the world. ***Medical Physics during the COVID-19 Pandemic Global Perspectives in Clinical Practice, Education and Research (1st Edition),*** explores the lession learned in the clinical practice, education, training and research in radiotherapy, nuclear medicine and radiology during COVID-19 pandemic situations. The book gives an idea to tackle such unpredictable and unprecedented situations in a busy radiation therapy clinic. Certainly, the book aware the medical physics department to strategic responds of these situations effectively in future. The articles on role of medical physicist in scientific research and global perspective by the experts from Asia Pacific, Middle East, Europe, Africa, North America and Latin America are informative and very helpful in dealing the pandemic situation. Over 91 regional medical physicists and associate contributors from 39 countries shared their experience on the pandemic effect in clinical practice education and research and the way out with effective future strategies. The book is not only ideal reference for clinical medical physicists but also helps the hospital administrators, regulators, and healthcare professionals to prepare the work force during such undesirable future situations.

ISBN 9780367693756, Published March 11, 2021 by CRC Press

Magnetic Nanoparticles (1st edition), From Fabrication to Clinical Applications

Edited By Nguyen TK Thanh

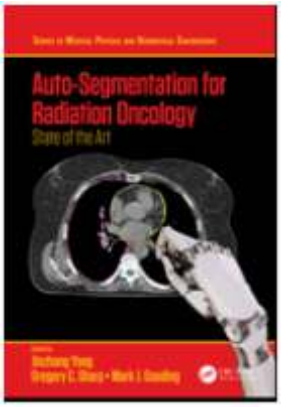


Nguyen TK Thanh PhD, is an Associate Professor in Nanotechnology, Royal Society University Research Fellow, The Davy-Faraday Research Laboratory, The Royal Institution of Great Britain and Department of Physics and Astronomy, University College London (UCL), UK. Her research work is focused on the design, synthesis and study of the physical properties of nanomaterials and their applications in biomedicine. Currently she is a member of Editorial Board of Advances in Natural Sciences: Nanoscience and Nanotechnology, also a committee member of Royal Society of Chemistry Colloid & Interface Science Group and Society of Chemical Industry Colloid & Surface Chemistry Group.

The first edition of ***Magnetic Nanoparticles: From Fabrication to Clinical Applications*** provides the

latest information in the field of magnetic nanoparticle research. The book is a comprehensive review on synthesis, characterization, and bio-functionalization of magnetic nanoparticles and its applications in clinics. The book describes the use of magnetic nanoparticles in the diagnosis and treatment of various cancers. Fabrication and characterization of magnetic nanoparticles, biofunctionalisation of magnetic nanoparticles for biomedical application, Ex-Vivo application of magnetic nanoparticles and In-Vivo application of magnetic nanoparticles are four main sections of this book. The structure and magnetism in magnetic nanoparticles with historical overview is described and argued in an introduction section of the book. This book is written by some of the most qualified experts in the field from various research areas. The book supplies a toolbox of solutions for the young researchers interested in the translational research on tailored magnetic nanoparticles for biomedical applications in variety of disciplines.

ISBN 9780367507923, Published March 31, 2021 by CRC Press



Auto-Segmentation for Radiation Oncology (1st edition) State of the Art

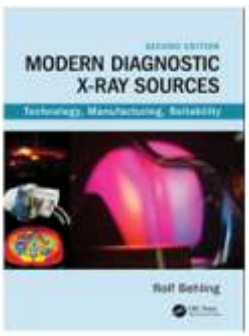
Edited By: Jinzhong Yang, Gregory C. Sharp, Mark J. Gooding

Jinzhong Yang PhD, is working as an Assistant Professor of Radiation Physics in the University of Texas MD Anderson Cancer Center. His research interest focuses on deformable image registration and image segmentation for radiation treatment planning, image-guided adaptive radiotherapy, radiomics for radiation treatment outcome modeling and prediction, and novel imaging methodologies and applications in radiotherapy. **Greg Sharp PhD**, is an Associate Professor in Radiation Oncology at Massachusetts General Hospital and Harvard Medical School. His primary research interests are in medical image processing and image-guided radiation therapy. **Mark Gooding,** earned his Meng, D Phil in Medical Imaging from the University of Oxford and working on improving image segmentation in clinical applications.

This book explores auto segmentations, atlas selection, multi-atlas segmentation, deep learning-based auto-contouring for radiotherapy, 2D and 3D U-nets for organ segmentation, organ-specific segmentation and artificial intelligence in 15 organized chapters. Predominantly, ***Auto-Segmentation for Radiation Oncology (1st edition) State of the Art***, provides an introduction to state-of-the-art auto-segmentation approaches used for auto-delineation of organs-of-risk for thoracic radiotherapy planning. The book explores deep-learning methods, multi-atlas-based methods and model-based methods that are currently being developed for clinical radiation oncology applications. The book features an up-to-date latest technology in the field and is an ideal guide for learning and using potential auto-segmentation tools in the clinic for precise radiation treatment planning.

ISBN 9780367336004, Published April 19, 2021 by CRC Press

Modern Diagnostic X-Ray Sources, Technology, Manufacturing, Reliability (2nd edition)



Author: Rolf Behling

Rolf Behling, is heading the Philips group for advanced development of X-ray tubes and X-ray generators at Philips HealthTech in Hamburg. He has written numerous patents and publications in vacuum technology and medical imaging. The first spiral-groove-bearing X-ray tube was developed under his leadership. Rolf Behling, is the owner of the consulting firm XtrainingX, Germany. He holds numerous patents in his credit and is continuously publishing, consulting and

training this subject of interest to the learners..

The second edition of ***Modern Diagnostic X-Ray Sources: Technology, Manufacturing, Reliability,*** covers physics of generation of bremsstrahlung, X-ray source technology, interaction of X-ray with matter, Imaging modalities, challenges and design for applications in modern diagnostic medical imaging. The book is useful for the education and advanced training in the physics of X-ray production and its use in medcine. The historical overview of X-ray tubes and generator development with key achievements leading up to the current technological is discussed in the beginning chapters of this book. The book is written in ten stand- alone chapters, which can be read in selection or in sequence. The detailed description of diagnostic X-ray tubes, design, specific functions and metrics for validation made easy to understand the phenomenon and the technology by the author. The detailed presentation of X-ray, X-ray production, X-ray tube designing, functions and its use in medical imaging enables readers to understand how to operate the tube and optimize the X-ray tube efficiency in clinics.

ISBN 9780367546922, Published April 19, 2021 by CRC Press

Computer-aided Design and Diagnosis Methods for Biomedical Applications (1st Edition)

Edited By: Varun Bajaj, G R Sinha

Varun Bajaj PhD, has been working as a faculty of Electronics and Communication Engineering, at Indian Institute of Information Technology, Design and Manufacturing (IIITDM) Jabalpur, India. He has authored more than 90 research papers in various reputed international journals/conferences like IEEE transactions, Elsevier, Springer etc. His research interests include biomedical signal processing, image processing, time-frequency analysis, and computer-aided medical diagnosis. **G R Sinha PhD,** is Adjunct Professor at International Institute of Information Technology Bangalore (IIITB) and currently deputed as Professor at Myanmar Institute of Information Technology (MIIT) Mandalay Myanmar. He has published 254 research papers, book chapters and books at International and National level. He is active reviewer and editorial member of more than 12 Reputed International Journals.

This Ist edition of ***Computer-aided Design and Diagnosis Methods for Biomedical Applications,*** proposes computer aided design (CAD) for the study of biomedical signals to understand physiology and to improve healthcare systems' ability to diagnose and identify health disorders. The book presents the concepts of CAD for biomedical modalities in different disorders and may give various solutions to improve the biomedical systems in the applications like help in the predication, identification, detection, analysis, and classification of various diseases in the management of acute to chronic clinical conditions in healthcare services. The topic CAD and diagnosis method for cancer detection may extraordinarily sensible for the medical students in research. The articles in the book are capable of illustrating bio-potential signals and their appropriate use in studying different disorders. The book discusses the design of case studies and the research simulation results using CAD. The chapters of this edition describe the fundamentals, principles, behaviors, concepts, case studies, and future directions for clinical research. An automated detection of COVIS-19 from CT Images using deep learning is an interesting article for the researchers during recent pandemic situation. The book aimed the researchers, graduate students in image processing, biomedical engineering, medical imaging, biomedical technology, and health informatics.

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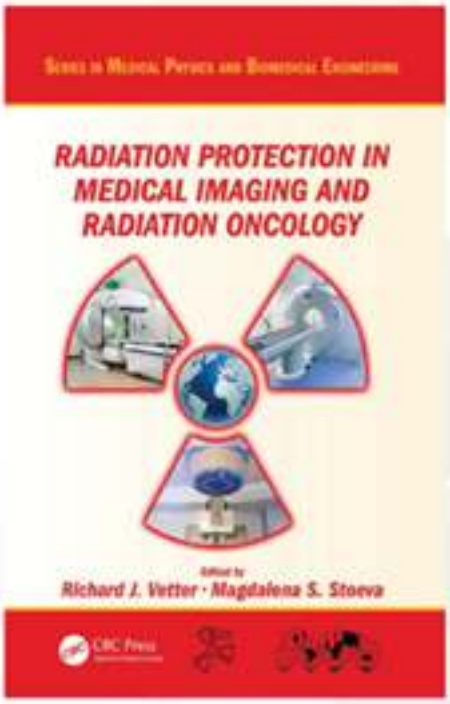

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