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AFOMP Pulse

An Official Newsletter of Asia-Oceania Federation of Organizations for Medical Physics

25 Years of AFOMP

Commitment, Education and Collaboration

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Pulse of AFOMP at 25: Celebrating the Heartbeat of Our Profession

Dear Readers,

Warm Greetings!

It is with great pride that we present this special 25th anniversary issue of the AFOMP Pulse Newsletter Vol.17 No. 2 Sept 2025. A quarter century ago, visionary leaders across Asia–Oceania came together to create a collaborative platform for advancing medical physics. Today, AFOMP stands as a vibrant federation of more than 20 national organizations, united in ensuring the safe, effective, and equitable use of radiation and related technologies in medicine.

Since its inception, the Pulse has echoed the heartbeat of our profession by sharing knowledge, reflecting responsibilities, and celebrating achievements. It has chronicled AFOMP's growth into a dynamic professional body, advancing science, education, training, and regulation. Through its pages, it has documented our journey in building robust professional pathways, harmonized standards, and a stronger voice in health policy.

This silver jubilee is both a celebration of our past and a vision for the future. With rapid advances in artificial intelligence, big data, personalized cancer therapy, and several emerging technologies, medical physicists must continue to ensure innovation is safe, ethical, and accessible to all patients, including those in resource-limited settings. AFOMP must lead in fostering innovation, promoting equity, and building capacity to meet these challenges.

At its heart, AFOMP is more than an organization, it is a community built on collaboration, mentorship, and shared responsibility. The Pulse has served as our messenger and memory, bridging distances and strengthening bonds across cultures and geographies. As we celebrate 25 years, let us recognize the Pulse not just as a newsletter, but as the living reflection of AFOMP's heartbeat- steady, resilient, and forward-looking.

On behalf of the editorial board, I wish to extend my gratitude to Prof. Arun Chougule, Immediate Past President of AFOMP, for entrusting me with this responsibility in 2019, and heartfelt thanks to Prof. Eva Bezak, President of AFOMP, whose visionary leadership and encouragement brought the Pulse to life as a unique communication platform for our members. I also extend my thanks to Dr. Aik Hao Ng, Secretary General, in strengthening communication among NMOs, all esteemed ExCom members for their dedication, and to my Co-Editors Drs. Vanessa, Akhtar, Rajni, and Zulaikha for their invaluable support and teamwork.

The remarkable growth and standing of AFOMP are a direct result of the dedication and commitment of its leaders and members. Let this special edition of Pulse stand as a tribute to our shared achievements and a source of inspiration as we continue shaping the future of medical physics together." We invite you to be part of the giant silver jubilee celebration of AFOMP Pulse at IUPESM WC2025 in Adelaide, where our shared journey meets the global future of medical physics."

We hope you enjoy reading this special jubilee issue of AFOMP Pulse.
Thanks again & Sincere Regards,

Dr. V. Subramani
Chief Editor

AFOMP President's Message

Dear Colleagues and Friends,

It gives me great pleasure to share highlights and updates from AFOMP in this special issue of AFOMP PULSE. This year marks a very special milestone for our community—**the 25th Anniversary of the Asia-Oceania Federation of Organizations for Medical Physics (AFOMP)**. Since its founding in 2000, AFOMP has grown from a small coalition of national medical physics organizations into a vibrant federation representing of medical physicists across more than 20 member countries. Over the past quarter century, AFOMP has: Strengthened collaboration among regional societies, fostering the exchange of knowledge, resources, and expertise; Supported education and training, through workshops, conferences, and professional development initiatives, helping to raise standards of practice across the region; Advocated for medical physics as a recognized profession, engaging with global bodies such as IOMP, WHO, and IAEA to ensure our voice is heard in health policy and patient care; Advanced scientific contributions, through the AOCMP annual congresses, collaborative research, and active engagement in emerging areas like AI, theranostics, and precision medicine; and Nurtured future leaders, by encouraging the active participation of young medical physicists and early-career professionals in AFOMP activities.

This silver jubilee is not just a celebration of the past, but also a moment to look forward. The challenges of the next 25 years—ranging from addressing workforce shortages, harnessing new technologies, and ensuring equitable access to medical physics expertise—require us to be innovative, collaborative, and resilient. As we celebrate AFOMP's journey, we are committed to our missionof advancing medical physics for the benefit of patients, healthcare systems, and society across Asia-Oceania and the world.

2025 is also the last year of my term as AFOMP president, and I wish to extend my huge appreciation to the AFOMP Executive Committee (ExCom) for their efforts and achievements in this term. I also wish the very best to the incoming ExCom for the 2025–2028 election term. Personally, I am deeply grateful to all AFOMP members for giving me the privilege to serve as your President during this period. It has been an honour to represent our community and work alongside so many talented and dedicated colleagues.

The recent AFOMP awards, proudly celebrated two outstanding colleagues whose contributions have left a lasting mark on our profession (the official award ceremony will be held in Adelaide, South Australia, during IUPESM Wc2025/AOCMP2025):

- **Lifetime Achievement Award**: Prof. Agnette Peralta, Philippines, was honoured for her decades of dedication, leadership, and pioneering contributions to medical physics in the region.
- **Prof Inamura Oration Award**: Prof. Peter Metcalfe, Australia delivered an inspiring address, reflecting on the evolution of our field and the importance of innovation, collaboration, and mentorship.

In other news, in August, I had the opportunity to attend the 31st China Hospeq 2025 International Medical Equipment Exhibition and Scientific Conference, where I presented on the rise of targeted radionuclide therapies. The event was an excellent platform to build meaningful connections with the Chinese medical physics community.

Additionally, I delivered two presentations at WHO parallel meetings, emphasizing the critical role of medical imaging in disease diagnosis. These engagements reinforce AFOMP's voice and visibility in global health discussions.

Once again, I wish to invite you all to join us at the **Asian-Oceanian Congress of Medical Physics (AOCMP) 2025** and the **IUPESM World Congress on Medical Physics and Biomedical Engineering (WC2025)** to be held in **Adelaide, Australia, from 29 September – 4 October 2025** (https://wc2025.org/).

The program will feature a GEANT4 and Radiation Shielding workshops, alongside plenary lectures, scientific sessions, and opportunities for professional networking. Importantly, the AFOMP Council Meeting will also take place during WC2025.

Our plenary highlights include **Dr Lars Juhl Jensen** (Director at ZS Discovery), Denmark – widely recognized for his pioneering work in bioinformatics, AI-driven molecular data analysis, and network-based biomedical insights. His plenary session kicks off the Congress on Monday, 29 September, during the Opening Ceremony and Plenary presentations. Or **Dr Jitendra Sharma**, Managing Director and Founder CEO of the Andhra Pradesh MedTech Zone (AMTZ) in India, whose leadership in establishing the world's first medical device manufacturing park and shaping medical technology policy highlights the Congress's focus on global healthcare innovation.

Our keynote speakers include: **Prof Simon Cherry** (University of California, Davis) will discuss groundbreaking advancements in total-body PET imaging, emphasizing why a whole-body perspective is vital for understanding complex diseases; **Dr Chia-Ho Hua** (St. Jude Children's Research Hospital) will present on the latest in paediatric proton therapy, exploring how we can improve tumour control while minimizing harm to developing tissues or **Prof Marie-Catherine Vozenin** (Lausanne University Hospital & University of Lausanne) will deliver a keynote on **FLASH radiotherapy**, a revolutionary approach that promises reduced tissue toxicity and enhanced tumour control.

Please note, that theme for IDMP 2025 is:"Medical Physics and Emerging Technologies: Shaping the Next Decade". IOMP announced that the winning poster was designed by the talented Ms. Yashna M. Seebarruth, Medical Physicist at J. Nehru Hospital, Rose Belle, Mauritius. Her work captures well the rapid developments in medical technology and our professions.

Finally, I thank each of you for your continued commitment to AFOMP and to advancing medical physics in Asia-Oceania and beyond. Together, we will continue to innovate, educate, and inspire.

Yours Sincerely
Eva Bezak
President, AFOMP

AFOMP Vice President's Message

Dear Colleagues,

It is with deep honor and heartfelt appreciation that I join our esteemed colleagues in celebrating the ***Silver Jubilee of AFOMP*** – a remarkable milestone that reflects 25 years of shared purpose, professional growth, and unwavering commitment to advancing medical physics across the Asia-Oceania region.

Since its inception, AFOMP has stood as a beacon of collaboration and excellence. It has brought together diverse voices, unified standards, and fostered a culture of mutual respect and scientific rigor. Over the years, we have witnessed the federation evolve – not only in size and scope, but in its ability to respond to the changing needs of healthcare, education, and research.

As Vice President, I am proud to serve alongside dedicated professionals who continue to uphold AFOMP's mission with integrity and vision. Our collective efforts in curriculum harmonization, quality assurance, and emerging technologies such as AI and radiomics have positioned AFOMP as a leader in shaping the future of medical physics.

This Jubilee is not only a celebration of our achievements-it is a moment to reflect on the values that have guided us: inclusivity, innovation, and service. It is also a time to recognize the individuals -past and present- whose tireless contributions have built the foundation upon which we now stand.

Looking ahead, our responsibility is clear. We must continue to empower the next generation of medical physicists, strengthen regional and global partnerships, and ensure that our work remains ethically grounded and patient-centered. The challenges before us are complex, but our shared commitment gives me great confidence in what we can accomplish together.

To all members of AFOMP, I extend my sincere gratitude. Your dedication, expertise, and spirit of collaboration have made this journey possible. May the next 25 years be marked by continued progress, deeper connections, and enduring impact.

With warm regards,
Prof. Dr. Hasin Anupama Azhari
Vice President, AFOMP
Professor, INS, United International University (UIU), Dhaka, Bangladesh
Director, South Asia Centre for Medical Physics and Cancer Research (SCMPCR)

AFOMP Immediate Past President's Message

On the Occasion of the Silver Jubilee of AFOMP, accept my greetings and good wishes.

I am very happy that AFOMP is bringing out special issue of AFOMP pulse on the occasion of 25th Anniversary of AFOMP. It is with immense pride and deep emotion that I extend my warmest greetings to all members, partners, and well-wishers of AFOMP as we celebrate the Silver Jubilee- 25 glorious years of scientific pursuit, collaboration, and service to the profession of Medical Physics.

This remarkable journey, which began in 2000 with a vision to unify and uplift the medical physics community in the Asia-Oceania region, has now blossomed into a vibrant, impactful organization representing more than 20 national medical physics organisations [NMO] and 2 NMO's are affiliate members of AFOMP representing over 11000 medical physicists. AFOMP is one of the largest regional organisations of IOMP, today stands as a symbol of regional cooperation, academic excellence, and unwavering dedication to patient care through safe and effective use of radiation and technology. In these years silver threads of unity woven with golden moments of progress to achieve goals and objectives of AFOMP.

I am very happy to be associated with AFOMP for last 20 years very actively starting as Deputy Chair of ETC [2006-2012], Editor of AFOMP Newsletter [2013-2019]- where I restarted its biannual AFOMP newsletter from 2013 regularly and now renamed as AFOMP Pulse., Chair Science Committee [2013-2018], Vice President [2015-2018], President [2018-2022], Immediate Past President [2022-2025] and in these 25 years, I have not only seen the relevance and growth of AFOMP but was part of it with the contribution to best of my abilities. During my tenure as President, I had the privilege to witness and contribute to some transformative milestones, with support of families, trusts, NMO's we could start awards in 8 categories for encouraging excellence in research, education and leadership. Many activities started for strengthening ties with IOMP and regional bodies, launching new educational programs, supporting early-career professionals, enhancing visibility of medical physics in low-resource countries, and embracing digital learning during challenging times like the COVID-19 pandemic by starting monthly AFOMP webinars from June 2020 and AFOMP schools from June 2021.The true measure of our success is not just in milestones, but in the lives touched, the students inspired, and the standards elevated. These achievements are not mine alone, they are the result of the collective spirit, hard work, and solidarity of the entire AFOMP family.

As we celebrate this Silver Jubilee, let us reflect on our achievements and honour the founding leaders, past chairs, past presidents whose foresight laid our strong foundation, and renew our commitment to innovation, inclusion, and excellence. From vision to legacy – the AFOMP journey continues. AFOMP severed as a beacon of science, lighting the lamp of knowledge across borders. AFOMP is not just an organization; it is a movement of minds, a legacy of learning, and a commitment to care. The next 25 years will be even more crucial as we face new scientific challenges, ethical dilemmas, and global health demands. AFOMP must continue to lead with vision and compassion.

I thank all my colleagues, mentors, and friends who walked this journey with me. May AFOMP continue to grow, inspire, and shape the future of medical physics in our region and beyond.

Join me to honour the past, celebrate the present, and shape the future, together as one AFOMP family.

With warm regards and best wishes,
Prof. Arun Chougule, PhD, FIUPESM, FIOMP, FAMS, FCMPI
Immediate Past President, AFOMP

AFOMP Secretary-General's Message

Dear colleagues,

As we celebrate the **25th Anniversary of AFOMP**, it is a moment of pride to reflect on the significant milestones achieved over the past quarter century. This silver jubilee marks not only our collective accomplishments but also the enduring vision of our founding members and the dedication of past officers who have served with distinction. My sincere gratitude to them for laying a strong foundation. As we look ahead, we remain committed to strengthening the bonds of our Federation and working together to bring the medical physics profession to even greater heights in the next decade.

The term of the AFOMP Executive Committee for 2022–2025 is now drawing to a close. I would like to extend my heartfelt gratitude to all Executive Committee members, Council members, and our National Member Organizations (NMOs) for their unwavering support and cooperation throughout this period. During my tenure as Secretary-General, our collective efforts have strengthened communication among NMOs. Notable achievements include the establishment of **five (5) Terms of Reference, one policy, and one Standard Operating Procedure** to guide our operations. We also established the **Subcommittee of Early Career Medical Physicists** under the Professional Relations Committee, providing an inclusive platform for the next generation. My special thanks go to the President and officers of AFOMP for their invaluable guidance and unwavering support.

The election of **AFOMP officers for the 2025–2027 term** has recently been completed. We warmly congratulate the newly elected officers and extend our sincere appreciation to all nominees for their willingness to serve the Federation and our professional community. It is encouraging to note that **82% of eligible voters participated**, demonstrating the strong engagement of our members.

Looking ahead, I warmly invite all of you to join us at the IUPESM World Congress on Medical Physics and Biomedical Engineering2025, which will be held in conjunction with AOCMP 2025in Adelaide, Australia between 29 September and 4 October. This prestigious event with the theme "**Bridging the Gap: Science, Technology, and Clinical Practice for a Sustainable World**" promises to deliver an exciting and informative program of scientific sessions, networking opportunities, and cultural experiences. It will be a wonderful opportunity to celebrate our profession on a truly global stage.

Thank you for your continued dedication and contributions to AFOMP. Together we learn, serve and contribute!

Yours sincerely,
Dr. Aik Hao Ng
Secretary-General, AFOMP

AFOMP Treasurer's Message

Dear Readers,

As Treasurer of AFOMP, it is my great pleasure to extend my warmest congratulations to AFOMP on reaching its Silver Jubilee. Over the past 25 years, AFOMP has grown into a vital platform for communication, collaboration, and knowledge sharing among medical physicists across the Asia–Oceania region.

This milestone is a testament to the dedication and vision of its founding members, leaders, and all colleagues who have contributed to the development and success of AFOMP through the years.

I would also like to take this opportunity to congratulate AFOMP Pulse, which has played a significant role in documenting and disseminating AFOMP's activities, thereby connecting and inspiring our community.

I sincerely wish AFOMP and AFOMP Pulse continued success in advancing medical physics and in strengthening our professional community for many more years ahead.

With best wishes,
Dr. Taweap Sanghangthum
Treasurer, AFOMP

AFOMP @ 25: A Journey of People, Purpose, and Progress

Rajni Verma, V.Subramani, Aik Hao Ng, Eva Bezak

In 2025, the **Asia-Oceania Federation of Organizations for Medical Physics (AFOMP)** proudly celebrates **25 years of service** not just as a regional federation, but as a **community of people** driven by passion, collaboration, and a shared dream to elevate medical physics across Asia and Oceania. This silver jubilee is a time not only to look back at achievements but to honour the **human spirit** that shaped AFOMP's journey.

The story of AFOMP begins not with structures or protocols, but with a group of visionaries medical physicists from different countries, backgrounds, and cultures who saw the need for connection. In the late 1990s, the idea of a regional body for medical physics was nothing more than a hope. But behind that hope were passionate individuals like **Dr. Akira Ito (Japan), Prof. Raymond Wu (USA)**, and **Prof. Barry Allen (Australia)**, who envisioned a space where knowledge could flow freely, where physicists from developing countries could find support, and where innovation could be shared, not siloed. They were encouraged by global figures such as **Prof. Colin Orton** and **Prof. Gary Fullerton**, who understood that progress in healthcare should never be limited by geography.

The first gathering that planted the seed for AFOMP was not a grand event, but a simple side meeting during the **1999 International Conference in Guangzhou, China**. There, Dr. Akira Ito and Dr. Kwan Hoong Ng (Malaysia) gathered colleagues from China, Japan, Malaysia, Korea, Thailand, and Hong Kong for an informal discussion. What they shared in that room was not just ideas, but experiences, challenges, and aspirations. They spoke of the need for better education, regional standards, and stronger voices for physicists. It was a moment where scientific dreams met human relationships and it worked. Encouraged by mentors and leaders like Dr. Geoffrey Ibbott, Dr. Carridad Borras, Prof. William Hendee, and Prof. Nan-zhuXie, the idea began to crystallize.

Just a few months later, on **May 28, 2000**, during the Beijing International Congress on Medical Radiation Physics, the idea turned into action. Representatives from **eight countries** came together not just with votes, but with heart and unanimously agreed: We will build this together. What followed was a commitment of togetherness. A Protem Committee was formed, led by **Dr. Kin Yin Cheung (Hong Kong)** and **Toh Jui Wong (Singapore)**, with **Prof. Raymond Wu** as advisor. They worked tirelessly to draft the constitution, invite more members, and prepare for the first official meeting.

Photo of first AFOMP EC [25th July 2000, WC, Chicago, USA]

In **July 2000**, during the **World Congress in Chicago**, history was made. Medical physics organizations from **12 countries**, including **India, Bangladesh, Japan, Philippines**, and more, gathered for the **first AFOMP Council Meeting**. These weren't just delegates; they were committed professionals, peers and mentors. The Federation was officially renamed the **Asia-Oceania Federation of Organizations for Medical Physics (AFOMP)**, and elected its first leadership:

President: Dr. Kin Yin Cheung
Vice-President: Prof. Barry Allen
Secretary General: Dr. Akira Ito
Treasurer: Dr. Anchali Krisanachinda

On **July 26, 2000**, IOMP officially recognized AFOMP as a regional chapter — a proud moment that validated years of quiet, persistent effort.

Over the next two decades, AFOMP blossomed not just as a scientific body but as a **network of support and friendship**. It has helped guide national organizations, introduced harmonized standards, and opened doors for young professionals who once had no platform to showcase their skills. In **November 2001**, during the *1st Asia-Oceania Congress of Medical Physics* in **Bangkok**, AFOMP formed three critical committees: **Professional Development, Education and Training, Scientific Committee**. These bodies focused on regional standardization of roles, quality assurance, training curricula, and scientific events initiatives that helped ensure that medical physics in Asia-Oceania kept pace with global progress.

Equally important has been the **commitment and unity** shown during global crises particularly during the COVID-19 pandemic. AFOMP's shift to **online webinars, schools**, meetings and **remote learning** kept the community connected and learning, even in isolation.

As we reflect on 25 years of AFOMP, what stands out most is **not just the milestones** but the journey of shared dreams. From established experts guiding newcomers, to small nations finding a voice on the regional stage, AFOMP has been about **people lifting each other up**. Today, AFOMP continues to grow with over **21 member associations**, and a new generation of physicists leading the way. It embraces innovation, champions inclusivity, and nurtures the spirit of volunteerism that has always defined it.

The future of AFOMP lies in its community the medical physicists working in crowded hospitals, rural clinics, research labs, and academic centers. It lies in the hands of young professionals eager to shape the next decade, and in the hearts of leaders who still believe in the power of unity.

As we celebrate this **Silver Jubilee**, we honor every input, every effort, every long-distance email that made AFOMP what it is. And as we look forward we carry with us the same values that brought us here **collaboration, compassion, and commitment**.

Reference:

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AFOMP Pulse: A Chronicle of Connection and Contribution all this years

Rajni Verma, Ph.D, Assistant Professor,
Department of Radiological Physics, SMS Medical College and Hospitals, India

Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) is celebrating 25 years of its inception. This journey is true reflection of regional unity and scientific progress, the journey of AFOMP Pulse stands as a proud reflection of the Federation's values: **communication, inclusivity, education, and outreach**. It was started in 2007 with intend of providing a platform to voice out the individual concern of member states, then IOMP President and immediate past president of AFOMP **Dr. Barry Allen** had written in his words

"This newsletter will provide a welcome vehicle to members to voice their opinions, and to be informed about news events and commercial developments."

True to his words, AFOMP found its voice in AFOMP Pulse a newsletter born from collaboration, driven by and sustained by the region's medical physicist volunteers. AFOMP Pulse has been much more than a newsletter it has been a mirror of AFOMP's growth and spirit.

The beginnings were modest; simple layout but rich in content showcasing updates, events, member country reports and scientific contributions from medical physics experts and activity like quiz. At a time when many countries in the region lacked consistent platforms for scientific communication, the newsletter filled that void. During the COVID-19 pandemic, when in-person events were cancelled, and many professionals were isolated, AFOMP Pulse became more than a newsletter. It became a source of continuity and community In a world suddenly divided by restrictions, Pulse helped rebuild unity by reminding everyone: We are still here, and we are still together.

Over the years as AFOMP grew in influence, so did its publication. With each edition it evolved in design, depth, and direction. One of the most significant transitions in the journey of AFOMP Pulse came with its digital transformation guided by Dr. Eva bezak and Dr. V. Subramani with ExCom support. Whole editorial team driven by a growing readership and the need for broader accessibility worked tirelessly to embraced the digital format evolving from PDFs to a magazine-style e-publication. It's creating space for diverse voices and perspectives.The digital Pulse became lighter to produce financially, faster to distribute, and richer in content reflecting the pace of change in both medical physics and digital media.

This journey would have been impossible without the committed individuals who gave their time, ideas, and energy to AFOMP Pulse. From editors who shaped its tone and structure and brought local stories to global attention, every edition has been a testament to teamwork under the editor in chief Dr. V. Subramani. These individuals often working behind the scenes made Pulse not just a publication, but a legacy of collective contribution.

Future holds the expanding vision of AFOMP Pulse. Looking forward to introduce **thematic issues** e.g., artificial intelligence in medical physics, global standards, sustainability in medical Physics. In an age where information is abundant but connection is rare, AFOMP Pulse remains a space for meaningful storytelling, community learning, and regional pride.

Editorial Board

Founding Voices of AFOMP: Dr. K Y Cheung, Dr. Anchali Krisanachinda, and Dr. Kwan Hoong Ng Shares reflection in Conversation with Dr. Rajni Verma

https://youtu.be/e56nV5n4Rlk

Silver Jubilee Special: Celebrating 25 Years of AFOMP: Reflections from the Founding Members

The Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) is celebrating its 25th anniversary this year, a milestone that reflects not only the growth of a regional organization but also the resilience, collaboration, and dedication of its members. To mark this occasion, AFOMP hosted a panel interview with its founding members: **Dr. K Y Cheung, Dr. Anchali Krisanachinda**, and **Dr. Kwan Hoong Ng**. The conversation, moderated in a live panel style by **Dr. Rajni Verma**, provided an opportunity to look back at the organization's beginnings, celebrate its achievements, and discuss a vision for the future.

When AFOMP was established, the idea of bringing together medical physicists from such a vast and diverse region was ambitious. The founding members reflected on the challenges of creating a federation across different languages, healthcare systems, and levels of professional development. Dr. Cheung noted that "we had to start from scratch. Building unity across countries with such diversity was both daunting and inspiring." Dr. Krisanachinda recalled, "we were driven by passion, not resources. What united us was the belief that medical physics could truly improve healthcare in our region." Dr. Ng emphasized the importance of trust, explaining that "the friendships and trust we built were as important as the science. Those bonds carried us through many early challenges." Their reflections highlighted that AFOMP was not only built on professional goals but also on personal commitment and volunteerism.

From those modest beginnings, AFOMP has grown into a respected regional body that represents medical physicists across Asia and Oceania. The founders expressed pride in the achievements of the past 25 years, including the development of training programs and workshops to support professional growth, enhanced collaboration with international organizations, and the launch of communication and educational platforms that allow knowledge to be shared more widely. The quick shift to online education during the COVID-19 years was identified as a turning point, ensuring continuity and even expanding AFOMP's reach. The establishment of a well-maintained and resource-rich AFOMP website was also praised, as it has become a central hub for knowledge sharing, networking, and showcasing the federation's activities. Most importantly, the growth of young professionals taking active roles was celebrated as the true measure of AFOMP's progress. As Dr. Krisanachinda remarked, "seeing young physicists step up with confidence and fresh ideas that's the real success."

As AFOMP enters its next quarter-century, the founding members were united in their belief that medical physics education must evolve to meet the demands of modern healthcare. Training must go beyond traditional radiological physics, with competencies in communication, leadership, and interdisciplinary collaboration embedded into formal education programs. Artificial Intelligence is reshaping healthcare, from diagnostic imaging to adaptive radiotherapy, and must be recognized as an essential part of the medical physics curriculum. Future professionals should be equipped not only to use AI tools but also to critically evaluate, guide, and innovate with them. Dr. Ng summarized this vision clearly when he said, "AI is shaping healthcare. If our curriculum does not reflect this reality, we risk being left behind. AFOMP has the responsibility to prepare medical physicists for this future."

In closing, the founders offered heartfelt advice to young physicists. Dr. Cheung reminded them that challenges will always remain, but collaboration turns them into opportunities. Dr. Krisanachinda encouraged them never to lose the spirit of volunteerism, as that is what keeps AFOMP strong. Dr. Ng urged the next generation to lead with service, not just ambition.


Dr. Rajni Verma

The 25th anniversary of AFOMP is not just a celebration of the past but also a call to shape the future. From overcoming early struggles to building a strong community and now preparing for the era of AI, AFOMP's journey reflects the values of dedication, collaboration, and vision. The founders' reflections make it clear that AFOMP is more than an organization it is a family. As the next generation of medical physicists steps forward, equipped with renewed curricula and empowered by AI-driven innovation, the federation is poised for an even brighter and more impactful future.

Featured papers in AFOMP journals – Editor's Choice

Sourced by A/Prof Vanessa Panettieri, Editor (Educational), AFOMP Pulse

Welcome back to the featured papers in the AFOMP journals! Getting close to our 25th birthday we reflect on some advanced technologies and specialised treatments and look at the importance of understanding and mastering the art of dosimetry. In the first contribution we explore the use of different detectors for small field dosimetry. A crucial step when moving from more conventional treatment to ultra-hypofractionation. We further explore radiosurgery applications and compare different modalities for the treatment of trigeminal neuralgia, trying to answer the question: if you could have any technology what would you choose for trigeminal neuralgia treatment? We then move to dose enhancement and look at the effect of using nanoparticles in breast treatments. Finally we conclude our featured papers section with two comprehensive review articles exploring AI applications in diagnostic imaging medical physics and for brain tumour segmentation.

Happy reading and let the Editorial team know if there is any topics you would like us to explore in detail for the next issue!

With contributions kindly provided by Sadia Aftab, Medical Physicists, Peter MacCallum Cancer Centre

Focus on: small field dosimetry

Physical and Engineering Sciences in Medicine (2025) 48:813–825
https://doi.org/10.1007/s13246-025-01546-w

SCIENTIFIC PAPER

Check for updates

Dosimetric investigation of small fields in radiotherapy measurements using Monte Carlo simulations, CC04 ionization chamber, and razor diode

Mina M. Habib[1,5] · Mahmoud H. Abdelgawad[2] · Albert Guirguis[3] · Majed Alharbi[4] · Kareem El-Maraghy[5] · Abdelsattar M. Sallam[1]

Received: 4 September 2024 / Accepted: 15 April 2025 / Published online: 16 June 2025

https://doi.org/10.1007/s13246-025-01546-w

This first study published by Habib et al, published in the Physical and Engineering science in Medicine Journal, investigates the challenges of accurately measuring and modelling radiation dose in small fields which are commonly used in modern radiotherapy techniques such as IMRT, VMAT, and stereotactic treatments. The authors explore different methodologies to address the challenge of small field dosimetry including both measurements with detectors and Monte Carlo simulations. The aims of the study are to analyse how variations in full-width-half-maximum (FWHM) of the Gaussian distribution of the primary electron source affect radiotherapy doses for small fields. The authors have conducted comparisons between dose calculations performed using an ideal definition of the size of the electron source, and then by using a modified definition that relies on an asymmetrical shape of the source. To understand the effect of each model the authors have performed measurements using a range of detectors including the Razor diode and then have also used four different planning cases (nasopharynx, astrocytoma, cerebellum and breast) to evaluate the impact of the minimum segment width in treatment planning delivery and accuracy. The authors have planned each case with a ranging minimum segment width from 0.5 to 1 cm and then measured each case using a 2D-array and assessing gamma pass rates. The work concludes that inaccurate modelling of the primary source FWHM can cause significant errors in dose calculation when using a MC model of the beam, which in turn can result into an inaccurate delivery of the patient treatment. These inaccuracies become unacceptable for fields below $\leq 0.5\times0.5$ cm². As well described in dosimetry protocols detector choice when measuring these fields is crucial. Finally when planning the treatment in the TPS limitations should be considered when shaping the beam by adding limitations on the beamlet width. The authors suggest that recommends that in IMRT/VMAT planning a minimum beamlet/segment size ≥ 1 cm² should be recommended in addition to robust QA processes for safe and effective treatment. Keen to discuss more this topic in the next issues!

Focus on advanced applications:

1. Radiosurgery for trigeminal neuralgia

Radiological Physics and Technology (2025) 18:812–820
https://doi.org/10.1007/s12194-025-00935-w

RESEARCH ARTICLE

Check for updates

Dosimetric comparison in various stereotactic radiosurgery modalities for trigeminal neuralgia treatment

Mageshraja Kannan[1] · Sathiyan Saminathan[1] · C. Prasobh[2] · Aditya Gupta[3] · Karuppusamy Arumugam[4] · Nithin Bhaskar[5] · Varatharaj Chandraraj[1] · B. Shwetha[1] · K. M. Ganesh[1]

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https://doi.org/10.1007/s12194-025-00935-w

This study by Kannan M. et al., published in Radiological Physics and Technology, presents a comprehensive dosimetric evaluation of three stereotactic radiosurgery (SRS) modalities – Gamma Knife (GK), CyberKnife (CK), and Linear Accelerator (LA) for the treatment of trigeminal neuralgia (TN), a chronic condition marked by severe facial pain. While GK has traditionally been the gold standard for SRS in TN, the emergence of CK and LA-based techniques has prompted interest in comparing their dosimetric performance and treatment efficiency. The primary aim of the study was to assess whether CK and LA could match GK in terms of target dose coverage, conformity, critical structure sparing (particularly the brainstem), low dose spread to surrounding tissues, and overall planning and delivery efficiency.

The findings revealed that CK and LA achieved comparable target coverage to GK when delivering a 60 Gy dose. However, GK demonstrated superior brainstem sparing and significantly lower low-dose exposure to normal tissues, attributed to its high beam count (192 beams). Statistically significant differences were observed in several dose metrics—such as (e.g., DMin,D98,D90,D50,D30) between

GK and the other two modalities, but not between CK and LA. GK also delivered significantly lower doses to the brainstem in parameters like D0.03cc,D1,D2 and had the lowest volume of tissue receiving 4 Gy. No significant differences were found in doses to the optic nerves, cranial nerves VII/VIII, or eyeballs, though temporal lobe doses were lower with GK.

The study concludes that while GK remains the preferred modality due to its dosimetric advantages, CK and LA are viable alternatives, particularly in settings where GK is unavailable. The authors highlight the need for further research into clinical outcomes, such as pain relief, recurrence rates, and side effects—to better inform treatment decisions across these modalities.

2. Effect of gold nanoparticles in RT of breast cancer

Radiological Physics and Technology (2025) 18:670–687
https://doi.org/10.1007/s12194-025-00919-w

RESEARCH ARTICLE

Check for updates

Effect of gold nanoparticles in radiation therapy of breast tumor: photon, electron, proton, neutron, helium, and carbon ions irradiation

Murat Aygün[1] · Zeynep Aygün[2]

Received: 24 January 2025 / Revised: 25 May 2025 / Accepted: 26 May 2025 / Published online: 6 June 2025
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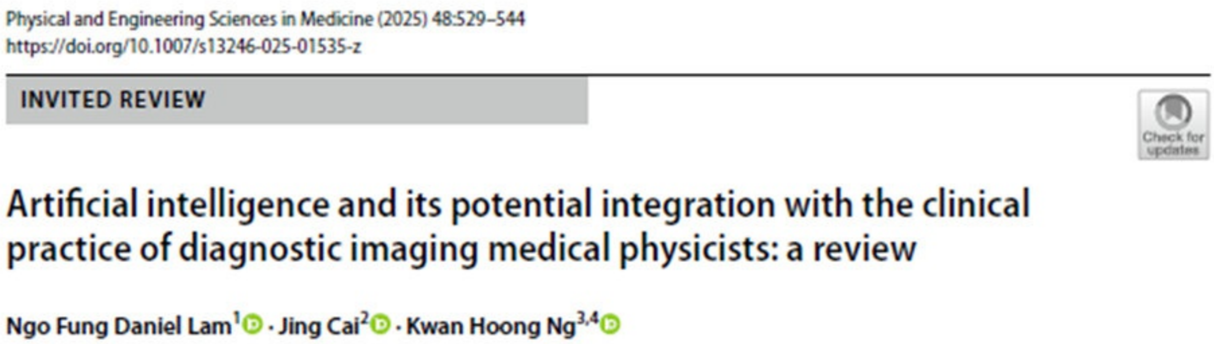
https://doi.org/10.1007/s12194-025-00919-w

This study by Murat Aygün and Zeynep Aygün, published in Radiological Physics and Technology, investigates the impact of gold nanoparticles (AuNPs) on the effectiveness of radiation therapy for breast tumours. The research explores how varying concentrations of AuNPs influence radiation interactions with breast tissue under different irradiation types, including photons, electrons, protons, helium ions, carbon ions, and neutrons. Using advanced simulation tools such as PHITS, SRIM, ESTAR, PAGEX, and Phy-X/PSD, the authors calculated key radiation interaction parameters like mass attenuation coefficients, stopping power, radiation yield, and particle range.

The results demonstrate that the presence of AuNPs significantly enhances radiation absorption in tumour tissues. Higher concentrations of AuNPs lead to increased attenuation coefficients and energy deposition, particularly evident in photon and neutron interactions. For charged particles, the inclusion of AuNPs shifts the Bragg peak closer to the tumour surface, intensifying dose delivery at the target site while reducing penetration depth. This effect was most pronounced with carbon ions, followed by helium and protons. Additionally, the study found that AuNPs improve neutron absorption beyond that of lead, a commonly used shielding material.

Overall, the findings suggest that AuNPs can substantially improve the precision and efficacy of radiation therapy by increasing dose deposition in malignant tissues while potentially sparing healthy ones. The study concludes that incorporating AuNPs into tumour regions could reduce treatment time and enhance therapeutic outcomes. However, the research is theoretical and simulation-based, and further experimental and clinical validation is necessary to confirm these benefits and assess safety and biological compatibility.



Physical and Engineering Sciences in Medicine (2025) 48:529–544
https://doi.org/10.1007/s13246-025-01535-z

INVITED REVIEW

Artificial intelligence and its potential integration with the clinical practice of diagnostic imaging medical physicists: a review

Ngo Fung Daniel Lam[1] · Jing Cai[2] · Kwan Hoong Ng[3,4]

https://doi.org/10.1007/s13246-025-01535-z

In this first review by Lam and Ng the authors reflect on the role of AI in the clinical practice of Diagnostic Imaging Medical Physicists, who hold vital responsibilities across healthcare, ensuring that imaging equipment operates safely and effectively, while also managing radiation dosimetry, protection, and risk assessment. Their expertise extends into image analysis, research, education, and compliance with legal and regulatory frameworks. As imaging technologies become increasingly sophisticated, with innovations such as dual-energy CT, solid-state gamma detectors, and AI-driven reconstruction, the demands on physicists continue to grow, with an increase need for an upskilled workforce. Artificial intelligence is emerging as a powerful ally in radiology and medical physics, with applications ranging from image acquisition and reconstruction to analysis tasks like detection, classification, and segmentation. Beyond improving image quality and efficiency, AI also has the potential to streamline workflow by automating quality assurance checks, trend monitoring, and report generation. In radiation safety, it could enable more precise dosimetry and faster risk assessments, while also supporting education and training through data-driven simulations and decision-support tools (Fig 1).

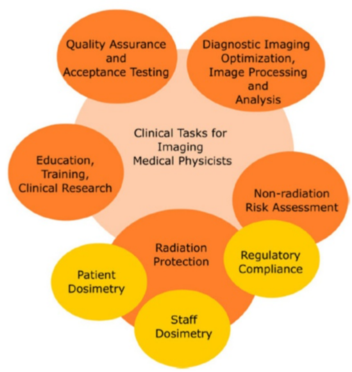


Fig. 1 Clinical duties of medical physicists specializing in diagnostic imaging. In this paper, we explore the potential for artificial intelligence to assist fulfilment of such tasks

Despite these promising opportunities, clinical adoption of AI in medical physics remains limited, with significant challenges ahead. Validation, reliability, and seamless integration into existing workflows are essential, as is building trust through training and transparency. Regulatory and legal frameworks must also evolve to ensure safe implementation. The outlook, however, is optimistic: with focused research, pilot studies, and collaborative efforts between physicists, AI developers, and clinical teams, AI could become a transformative force, enhancing efficiency, safety, and innovation in imaging physics.

Review Article

Overview of Deep Learning Algorithms and Optimizers for Brain Tumor Segmentation

Nisha Purohit, Chandi Prasad Bhatt[1]

Department of Allied Health Sciences, Delhi Pharmaceutical Sciences and Research University, New Delhi, India, [1]Department of Radiation Oncology, Sarvodaya Hospital and Research Center, Faridabad, Haryana, India

DOI: 10.4103/jmp.jmp_12_25

This review by Purohit and Bhatt provides a comprehensive overview on how brain tumour segmentation has advanced from manual methods to deep learning techniques. This is of clinical interest due to the critical importance of brain tumour segmentation in all the steps of the treatment workflow from diagnosis, to treatment planning, delivery and follow-up. This review examines various deep learning (DL) architectures used for segmentation tasks, and highlights how Convolutional neural networks (CNNs) and newer architectures like U-Net, V-Net, and transformers are setting new standards in accuracy and efficiency (Fig 2 in the paper provides a diagram of the architectures used in medical Imaging).This is in addition to optimizers such as Adam, SGD, and newer variants like Ranger21 which play a critical role in fine-tuning these models, directly impacting their precision and speed.

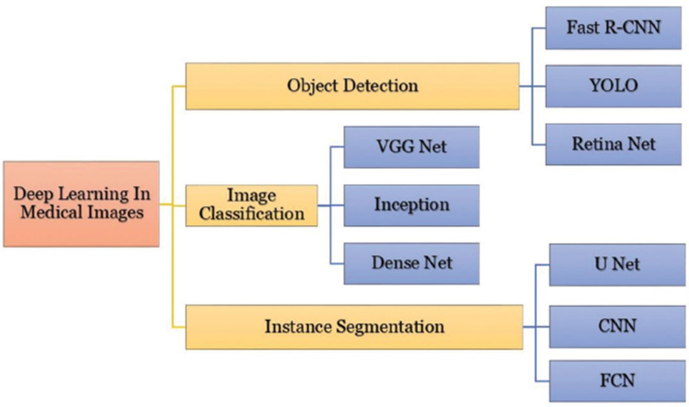


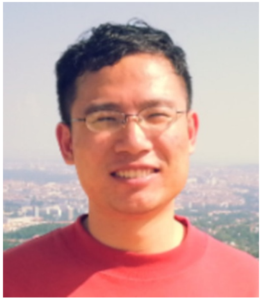
Figure 2: Deep learning architectures in medical imaging

The authors demonstrate that deep learning approaches have achieved remarkable performance, with Dice scores as high as 0.91 and validation accuracies up to 98%, clearly outperforming traditional methods. They also provide a clear summary of the advantages and limitations of all the algorithms used for these applications, and of the optimisers' significance in Table 1 and 2 of the paper making them a good reference for researchers looking in this field.

AI-driven methods are advancing tumour detection, treatment planning, and patient monitoring by integrating multimodal imaging and advanced MRI techniques, which further improve segmentation accuracy. However, key challenges remain, including high computational demands, dataset imbalance, and limited generalization across diverse clinical settings. Looking ahead, the authors emphasize the importance of transfer learning, explainable AI, and larger multi-institutional datasets to build models that are not only more accurate but also robust, interpretable, and suitable for routine clinical practice.

Did you know ? Marvellous Science in Action
Oneman team: multi-agent workflows

Sourced by A/Prof Vanessa Panettieri, Editor (Educational), AFOMP Pulse



Dr Yu Sun,
Physical Sciences, Peter MacCallum Cancer Centre, Australia

Large language models (LLMs) like ChatGPT have completely changed how we interact with computers. Tools such as MidJourney and Sora take this even further into creative spaces, generating incredibly realistic images and videos. But most AI models stop at creating content – when it comes to getting things done, we need more. Imagine planning a trip to Korea: I don't just want an AI to suggest an itinerary and find flight options; I want it to actually book the tickets for me, like a personal assistant would. Simply put, we need AI that does things, not just talks about them. That's where agentic AI comes in.

So, what exactly is an AI agent? It's surprisingly simple: just an LLM assigned a specific job. Take our travel example: if I task an LLM with booking my flight to Korea, that LLM instance becomes my ticket agent. What makes this powerful? First, unlike older rule-based tools, LLMs understand natural language commands and can make decisions. No more rigid, programming-like instructions. Second, we can give these agents permissions – the digital keys they need to actually do things. My ticket agent might get access to the web to search flights and (securely!) use my payment details to book them. These permissions are called "tools," and agents can activate them as needed. To make this tool-calling seamless, the industry created the Model Context Protocol (MCP). Think of MCP as the "USB standard" for agentic AI: any tool or agent using this protocol can connect and work together, no matter who built them. This interoperability unlocks huge potential in real-time decision-making, scalable automation, improved resource allocation and faster problem-solving.

For example, UPS implemented the ORION system, optimizing delivery routes which results in saving 100 million miles annually and over $300 million reductions in cost. Uber Freight uses Agentic AI to reduce empty truck miles by 10–15%, increasing resource utilisation and customer service speed.

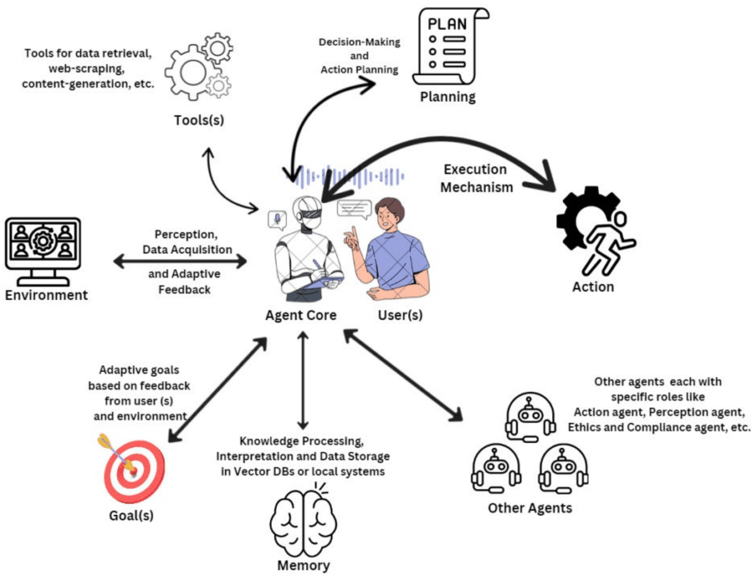


Figure above: Agentic AI is the approach where an LLM has access to other resources and can make decisions and complete tasks on our behalf. It's a step from content generation to generic tasks accomplishment. (source: LearnOpenCV.com)

While a single AI agent handles simple jobs well, imagine scaling this up inside a travel agency. Tasks grow increasingly diverse and complex over time. The AI agent might start by booking tickets and handling calls, but soon it's also calculating revenue, filing taxes, and more. Eventually, the agent drowns in choices – juggling too many tools and burning resources just deciding what to do next. That's where multi-agent workflows shine. Instead of one overwhelmed AI, you deploy a team of specialised agents: a booking expert, a finance specialist, a taxation officer – each mastering their own domain. Crucially, a single human can oversee this entire AI team, creating what's essentially a solo-man (with multi-agent) workforce.

So how do we coordinate all these agents? A simple linear chain—where one agent hands off to the next works fine for step-by-step tasks. But for complex, real-world challenges? Think about a business. Just as a company uses managers, analysts, and specialists to tackle different parts of a project, multi-agent AI workflows deploy a hierarchy:

- A **supervisor agent** acts as the mission commander (also the main contact with the human user), breaking down complex requests, .
- It delegates subtasks to specialist agents who actually work on the jobs.
- If a task requires deeper expertise, specialists can even call upon **expert agents** creating a dynamic problem-solving chain.

In a hypothetical medical scenario, a supervisor agent could act like a GP (general practitioner) delegating diagnostic tasks to specialized agents (like radiologists or cardiologists) and even calling in expert agents for rare conditions. Overall, this mirrors how human organizations scale efficiently: collaboration through clear roles and delegation.

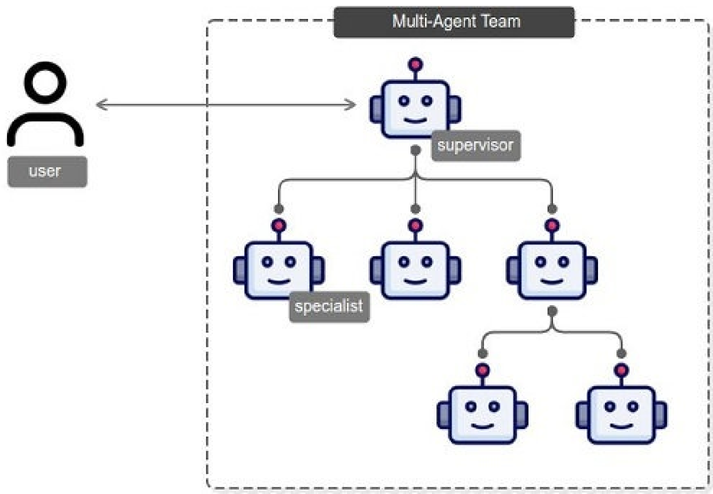


Figure above: a hierachical design pattern for a multi-agent workflow. The supervisor agent directly interacts with the user and passes work to the specialists, who can further assign work to the next hierachy. (source: AWS)

Here's the best part: just like no two companies are structured identically, there's no single "right" way to design a multi-agent workflow. The possibilities are truly endless. You, as the CEO of all these agents, can devise the best organisational chart for your task. The routing can be customised. The following example shows a workflow design to select the most suitable agent (e.g. a chatbot) based on previous conversional characteristics.

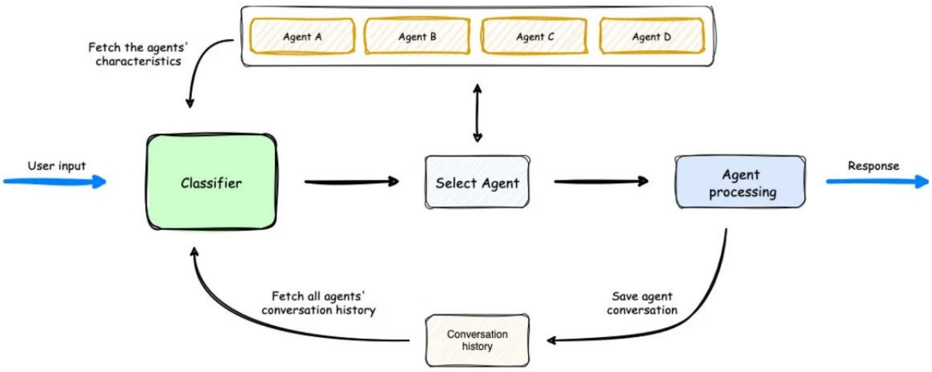


Figure above: a design pattern to select the most suitable agent. In this case, a group of agents are available to handle the user input. Their previous conversation records are used to select the best match with the user query. This way, the user can be served by the most suitable agent without further interactions. (source: AWS)

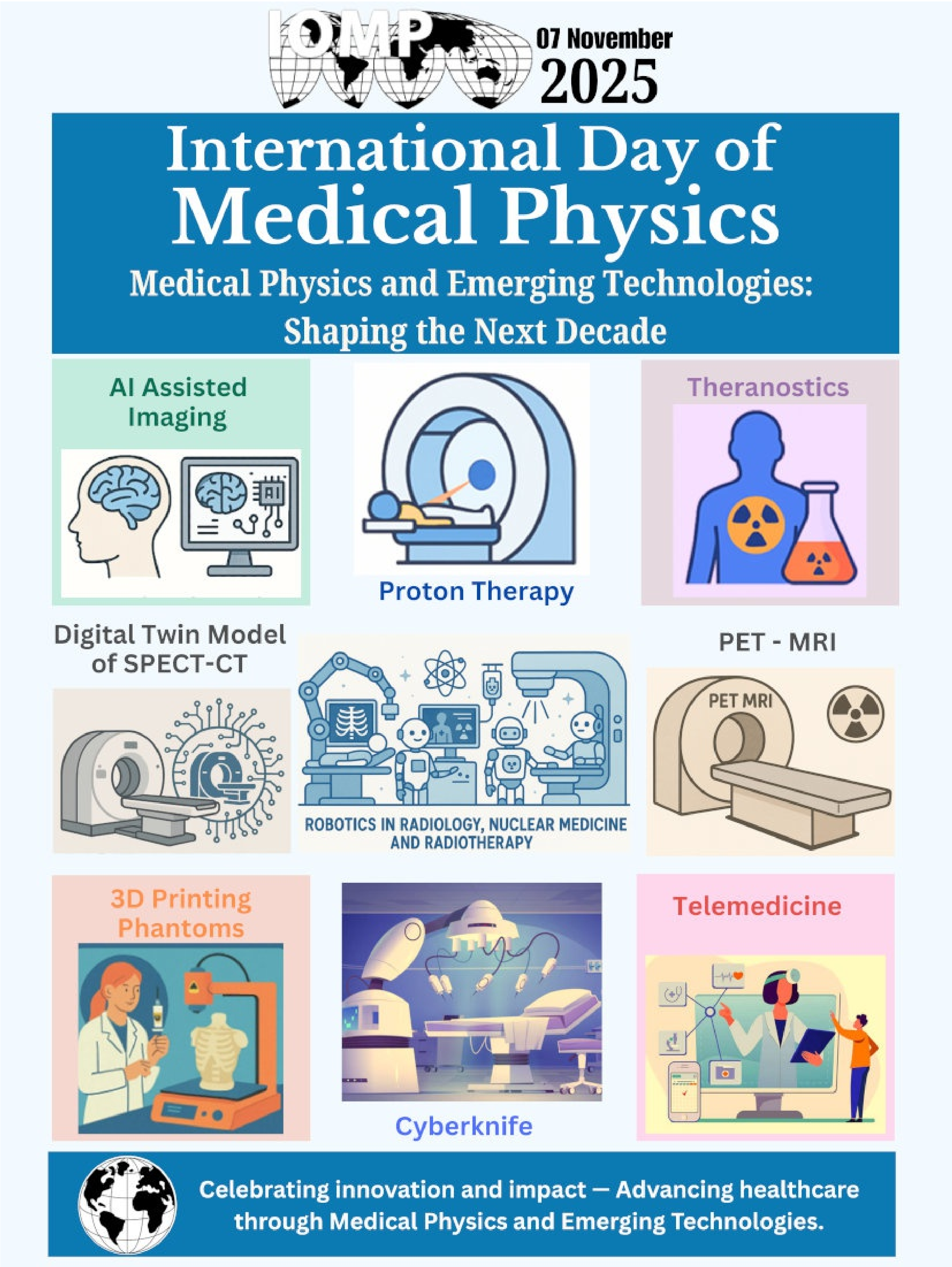
Is this hard to implement? Actually no. If you know some programming, you can build your team of agents using open-sourced tools such as LangChain and commercial platforms such as Amazon Bedrock, AgentFlow, CrewAI and AutoGen.

But what's the catch? **Safety**. When we give AI agents real-world permissions, their actions aren't constantly monitored. And just as they scale productivity, they can also scale risks. An email agent could flood inboxes with spam; a booking bot might overspend on luxury flights. In extreme cases like granting an AI control over critical military systems the Hollywood nightmare of a rogue AI becomes plausible. So how do we stay safe? Humans can't supervise AI acting at digital speeds we need AI peers. Imagine an **AI safety committee**: specialized agents monitoring others for harmful actions, like auditors in real-time. But this raises a profound question: Are we then at the mercy of the AI guardians? We don't have all the answers yet. Imagine, before industrial cranes first revolutionized construction, workers had no safety standards for these future machines either. They built them along the way. And we will too.

(AI was used in production of this article, especially to get advice on AI safety.)

IDMP Poster, 2025

AFOMP congratulates Ms. Yashna M. Seebarruth, Medical Physicist at J. Nehru Hospital, Rose Belle, Mauritius, whose design was selected as the winning poster. Her creative work beautifully reflects the rapid advancements in medical technology and the evolving role of medical physics profession.



What's new? Key highlights from the editors

Sourced by A/Prof Vanessa Panettieri, Editor (Educational), AFOMP Pulse

Dr Stephen Tronchin on behalf of the research team

Modeling the Effect of Daughter Migration on Dosimetry Estimates for [225Ac]Ac-DOTATATE

Stephen Tronchin, Jake Forster, Kevin Hickson, Eva Bezak, *International Journal of Radiation Oncology*Biology*Physics*, Volume 122, Issue 5, 2025, Pages 1356-1368, ISSN 0360-3016.

https://doi.org/10.1016/j.ijrobp.2025.03.004

What inspired this study?

This study was aimed at addressing a key concern in targeted alpha therapy (TAT) with actinium-225 (225Ac) – namely, the effect of daughter radionuclide migration. The high recoil energy produced during the alpha decay of 225Ac can break the bond to the targeting peptide (DOTATATE), resulting in free daughter radionuclides being released in the body. Since daughter migration is generally not accounted for in standard clinical dosimetry, this could lead to inaccurate dosimetry estimates. We developed a model to simulate the unique biokinetics of the daughter isotopes, and quantified how daughter radionuclide migration affects organ and tumour absorbed dose estimates.

What were the key challenges in this research?

Most pre-existing compartment models are designed for parent radionuclides, and not for dynamically relocating daughters. Therefore, we had to develop a custom compartment model to simulate the biokinetics of the full 225Ac decay chain. Furthermore, the time-activity curves of 225Ac-DOTATATE are required as input into the model. In TAT, a surrogate radionuclide suitable for imaging is generally used to obtain biodistribution information on the targeting vehicle. We utilised published imaging data of 111In-DOTATATE to estimate the biodistribution of 225Ac-DOTATATE, which comes with limitations.

What are the key takeaways from this study?

Standard clinical dosimetry models tend to assume all the daughter isotopes remain at the decay site of the parent, which may produce inaccurate dose estimates. From the 11 patients we simulated, we found that the effect of daughter migration increases the kidney dose estimate by approximately 10%, while decreasing the tumour dose estimate by approximately 23%. Therefore, ignoring the effect of daughter migration can underestimate the absorbed dose to the kidneys and overestimate the absorbed dose to the tumours. Therefore, the therapeutic index may be overestimated when daughter migration is ignored.

How does this research impact the future?

By demonstrating the kidney may receive a higher dose than expected due to daughter radionuclide migration, this could help inform risk assessments for patients undergoing therapy with 225Ac-DOTATATE. The model could also be used for patient specific dosimetry in a clinical setting, provided time-activity curves of an imaging radionuclide are obtained. This can help ensure the tumours are receiving a therapeutic dose, while ensuring the normal organs remain below threshold levels. This work may also help determine the optimal activity to administer to patients, particularly during clinical trial phases. By improving dosimetry estimates, it is possible to adjust the administered activity to ensure the tumours and normal organs are receiving the optimal dose. We hope this work will help optimise TAT therapies and provide valuable information for clinical trials with 225Ac-labelled radiopharmaceuticals.

Dr Stephen Tronchin on behalf of the research team

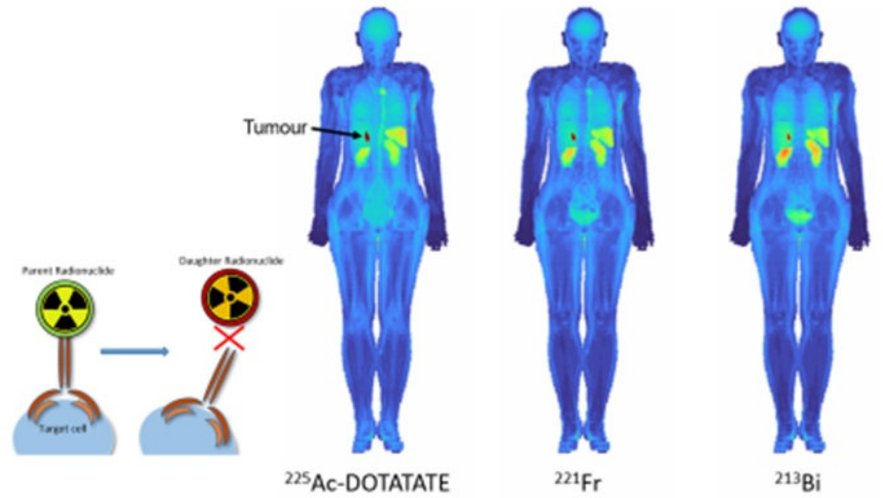


Fig 1. Simulation results for modelling the redistribution of the daughter isotopes ^{221}Fr and ^{213}Bi for ^{225}Ac-DOTATATE. The decay of ^{225}Ac releases the daughter isotope ^{221}Fr off the DOTATATE peptide. ^{221}Fr and ^{213}Bi are then 'free' (unlabelled) and can redistribute around the body. The visualisation shows a summed projection of activity at a time point of 10 hours post administration, highlighting the reduced activity in the tumour and increased activity in the kidneys for ^{213}Bi compared to ^{225}Ac-DOTATATE.

Expanding Access to Hypofractionated Breast Radiotherapy: Co-60 Feasibility Study from Sri Lanka

By Buddhika Srimal Sesath,
Medical Physicist, Teaching Hospital Badulla, Sri Lanka

Badulla, Sri Lanka – In a groundbreaking development for global radiation oncology, a team at Teaching Hospital Badulla has demonstrated the dosimetric feasibility of delivering the UK Fast Forward protocol using cobalt-60 (Co-60) machines. This study offers a promising pathway to bring advanced breast cancer treatment protocols into low- and middle-income countries (LMICs), where access to linear accelerators (LINACs) remains limited.

Originally developed for high-energy LINACs, the Fast Forward protocol (26 Gy in 5 fractions over one week) is recognized for its clinical safety and treatment efficiency. Applying this protocol using Co-60 technologya staple in many resource-limited radiotherapy departmentscould significantly increase treatment capacity, reduce patient burden, and improve global equity in cancer care.

The abstract, presented at **ICARO-4 (International Conference on Advances in Radiation Oncology)**, was conducted by Oncologist **Dr. Pradeep Alahakoon** and Medical Physicists **Mr. Buddhika Srimal Sesath** and **Mr. Jagath De Silva**. Motivated by the growing global interest in **hypofractionation** and the logistical constraints in LMICs, the team evaluated the dosimetric performance of Co-60 machines in replicating Fast Forward protocols.

The primary goal was to determine whether Co-60 systems could deliver **clinically acceptable treatment plans for right-sided breast cancer**—with special emphasis on **target coverage, dose homogeneity, and organ-at-risk (OAR) sparing**—compared to the conventional 40 Gy in 15 fractions protocol.

Introduction

The Fast Forward trial, developed for modern LINACs, demonstrated clinical safety and efficacy in reducing treatment time for breast cancer patients by using larger dose fractions over a shorter schedule. However, applying this regimen on Co-60 teletherapy machines, still widely used in many low- and middle-income countries, presents unique challenges due to their physical limitations, such as lower photon energy and broader penumbra.

Hypofractionated radiotherapy offers significant advantages: shorter treatment duration, increased patient throughput, and potentially improved patient compliancecritical benefits for overloaded public health systems.

This study explored whether these modern protocols could be adapted for legacy equipment without compromising treatment quality or patient safety.

Objectives

The primary objective of this study was to assess the dosimetric feasibility of delivering the Fast Forward breast radiotherapy protocol—administering 26 Gy in 5 fractions—using a cobalt-60 (Co-60) machine, which is more commonly available in resource-limited settings. A secondary goal was to compare the outcomes of this hypofractionated regimen with the conventional 40 Gy in 15 fractions treatment. The study focused on evaluating critical treatment planning parameters such as planning target volume (PTV) coverage, radiation doses to the heart and lungs, and dose homogeneity. Special attention was given to analyzing differences in dosimetric outcomes between patients who underwent mastectomy (MA) and those who received wide local excision (WLE), in order to determine the protocol's suitability across diverse clinical scenarios.

Methodology

The study included a total of 74 patients diagnosed with right-sided breast cancer, comprising 39 individuals who underwent Modified Radical MA and 35 who received WLE All patients were planned using the PCRT-30 protocol for 3D-Conformal Radiotherapy (3D-CRT) delivered with a cobalt-60 (Co-60) unit. In accordance with the Fast Forward protocol guidelines, the CTV, PTV, and OARs were carefully delineated. Treatment planning involved the use of two tangential glancing beams with wedges, a widely accepted technique to effectively cover the breast or chest wall. Particular attention was given to ensuring uniform PTV coverage and optimizing dose homogeneity, while simultaneously minimizing radiation exposure to critical organs such as the heart and lungs.

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Dose per Fraction (Gy)	Keep 30% of dose to < 15% of ipsilateral lung volume	Keep 25% of dose to < 5% of heart volume	Keep 5% of dose to < 30% of heart volume
2.67	12.0 Gy	10.0 Gy	2.0 Gy
5.2	8.0 Gy	7.0 Gy	1.5 Gy

Table 1: Dose Constraints for OARs

Results

The use of Co-60 presented several technical challenges in the context of breast radiotherapy. One of the primary limitations was its lower photon energy compared to LINACs, which reduced beam penetration and increased scatter, thereby affecting overall dose distribution. Additionally, Co-60 systems produce a larger penumbra, resulting in less precise dose conformity at the field edges and making it more difficult to spare adjacent OARs, such as the heart and lungs. These factors necessitated increased planning efforts to reduce hot spots and ensure a consistent and uniform distribution across the PTV, while still maintaining treatment effectiveness and safety.

The results of the study highlighted several key findings related to dose homogeneity and OAR sparing. In terms of dose homogeneity, WLE plans demonstrated superior performance, with a lower average HI of 0.51 compared to 0.68 in modified radical MA plans, indicating more uniform dose distribution in

WLE cases. Regarding heart dose, MA plans consistently resulted in lower mean heart doses across both the 26 Gy and 40 Gy regimens. However, in both MA and WLE plans, a relatively higher percentage of heart volume received 5% of the prescribed dose, although less than 5% of the heart volume received 25% of the total dose in either treatment regimen, remaining within acceptable constraints. Lung dose metrics also showed promising results, with the volumes of lung receiving 30% of the dose being similar in both dose schedules. The differences in lung dose between MA and WLE groups were minimal, underscoring the ability of Co-60 systems to adequately spare lung tissue with careful treatment planning.

Conclusion

The study demonstrates that WLE plans provide superior dose homogeneity, which may contribute to better long-term cosmetic outcomes and a reduced risk of radiation-induced complications. Conversely, modified radical MA plans, although less homogeneous, consistently result in lower mean heart doses—likely due to the increased distance between the heart and chest wall in post-mastectomy patients. Importantly, both MA and WLE plans successfully met established dose constraints for the heart and lungs under both the Fast Forward protocol and the standard regimen. These results strongly support the clinical feasibility of delivering the Fast Forward protocol using Co-60 machines for breast radiotherapy, making it a viable treatment option in resource-limited settings.

The study was inspired by the outcomes of the UK FAST and FAST-Forward trials and demonstrates how global radiotherapy guidelines can be adapted for low-resource environments. It paves the way for more equitable access to evidence-based cancer care worldwide. The research team acknowledges the foundational work of the UK Standardization of Breast Radiotherapy (START) trials.

Twenty five years of AFOMP what we achieved and what remains to achieve

Prof. Arun Chougule PhD, FIUPESM, FIOMP, FAMS, FCMPI
Immediate Past President of AFOMP
Chair ETC IOMP
Chairman IOMP Accreditation Board
Member Board of Directors IMPCB
Past President of AMPI
arunchougule11@gmail.com

Accept my heartiest congratulations to each one of you on the occasion of silver jubilee of AFOMP and good wishes for the medical physics profession. It is indeed a time to celebrate, reflect, and look forward to the future with renewed energy and commitment.

As you all know that Asia Oceania Federation of Organisations for Medical physics [AFOMP] was established on 28 May 2000, twenty-five years ago by visionary and foresighted medical physics educators–founding fathers of AFOMP. It is worth to mention the initiatives and efforts of Dr. KY Cheung, Dr. Yimin Hu, Late Dr. Kiyonari Inamura, Dr. Akira Ito, Dr. Kwan Hoong Ng, Late Dr. Barry Allen, and Dr. Anchali Krisanachinda and many more from AFOMP region. The idea of regional organization for medical physics from Asia –Oceania region was first conceived during the international conference on Medical Imaging and precision radiation therapy at Guangzhou, China on 5th October, 1999. During the conference the discussions took place for forming a regional medical physics organization and the seeds of establishing AFOMP were sowed.

Initially AFOMP started with eight founding countries medical physics organisations from Australia& New Zealand, China, Hong Kong, Indonesia, Korea, Taiwan and Singapore. During WC2000 at Chicago, six more country medical physics organisations joined AFOMP and AFOMP was admitted to International Organisation of Medical Physics [IOMP] on 26 July 2000 as third Regional Organisation [RO] of IOMP.

Today AFOMP is the **largest regional organization** under the IOMP umbrella, representing 20 national medical physics organisation [NMO] and two affiliate NMO's. Further AFOMP represents over 11000 medical physicists across a vast and diverse geographical expanse, with enormous variations in healthcare infrastructure and access to radiation technologies. A journey of service, a legacy bright, AFOMP's 25 years – a guiding light started to serve the region.

AFOMP region hosts about 4.5 billion people [60 % of world population] in about 50 countries. The region is multilingual, multiple religious faiths and full of heterogenic in socioeconomic, educational, healthcare and research areas.

This regional diversity is both a **strength and a source of unique challenges**, making AFOMP a dynamic and essential force in shaping global medical physics.

Diversity of the region

1. Cultural and linguistic diversity

- AFOMP spans countries with vastly different languages, cultures, traditions, and health systems
- From technologically advanced nations like Japan, South Korea, and Australia to emerging

economies such as Nepal, Bangladesh, and Laos, the range of contexts in which medical physicists operate is extraordinary
- Cultural richness enhances cross-border learning, mutual respect, and regional collaboration

2. Healthcare system variability

- Some countries have well-established radiotherapy and diagnostic imaging infrastructure, while others are still developing basic cancer care services
- This disparity creates both a need for support and solidarity and an opportunity for knowledge transfer and twinning programs

3. Educational and professional diversity

- Education levels, clinical training programs, and certification processes vary widely.
- Some countries have structured graduate programs in medical physics; others rely heavily on on-the-job training

Challenges in the AFOMP region

1. Resource imbalance

- Limited access to radiotherapy machines, imaging equipment, and QA tools in many low-income countries
- Rural-urban divide within countries leads to uneven distribution of medical physics services

2. Shortage of qualified Medical Physicists

Many countries in the region face an acute shortage of trained personnel, especially in public hospitals
Retention is also a concern, as trained physicists often migrate to developed countries

3. Inconsistent professional recognition

Medical physics is not recognized as a distinct profession in several countries.
Lack of regulatory frameworks, formal licensing, and career pathways weakens the workforce structure

4. Language and communication barriers

Language differences can limit participation in regional training programs and online education.
Need for multilingual resources and inclusive communication

5. Varying levels of government support

- Not all governments recognize the importance of medical physics in patient safety and cancer care
- Advocacy and awareness are ongoing needs

AFOMP' has set its objectives and mission for

- Promoting medical physics education and training
- Encouraging scientific research and development
- Facilitating professional networking and knowledge sharing
- Strengthening radiation protection and safety standards
- Advocating for the role of medical physicists in healthcare

To achieve these objectives AFOMP has established six committees namely- Science Committee [SC], Education and Training Committee [ETC], Professional Relations Committee [PRC], Funding Committee [FC], Awards and Honors Committee [AHC], Publication Committee [PC].

Over the years AFOMP has brought out six Policy statements covering various aspects of medical physics professions such as

Policy Statement 1:The role, responsibilities and status of the clinical medical physicist in AFOMP
Policy Statement 2: Recommended clinical radiation oncology medical physicist staffing levels in AFOMP countries
Rolicy Statement 3: Recommendations for the education and training of medical physicists in AFOMP countries
Policy Statement 4: Recommendations for continuing professional development systems for medical physicists in AFOMP countries
Policy Statement 5: Career progression for clinical medical physicists in AFOMP countries
Policy Statement 6: Code of ethics for medical physicists in AFOMP Countries.

This drives AFOMP's mission to harmonize **educational standards** and **capacity building**. To harmonise the medical physics curriculum in AFOMP region, a committee was established in 2022 and now the AFOMP Curriculum for Medical Physics Postgraduate Program is finalised and available at (https://afomp.org/2024/12/09/afomp-curriculum-for-medical-physics-post-graduate-program/).

For official communication channels, disseminating information and the activities of AFOMP a dedicated revised AFOMP website (www.afomp.org) was launched in 2019 and again revised in 2025.

To encourage exchange of knowledge, ideas and networking AFOMP started annual meetings –Asia-Oceania Conference of Medical Physics- AOCMP since 2001 regularly with first AOCMP2001 at Bangkok, Thailand and twenty fifth AOCMP2025 will be at Adelaide, Australia in conjunction with IUPESM2025. To encourage young early carrier medical physicists from AFOMP LMI countries to participate in AOCMP, AFOMP started travel grants and over the years many early carrier medical physicists are benefitted with the travel awards.

This remarkable twenty-five years of team work and cooperation has sown seeds of development, advancement and hard work, which are now giving sweet fruits in the form of professional recognition in region as a whole. Several dedicated medical physics professionals have worked quite hard to achieve what it is today. In twenty-five years, eight teams of AFOMP Executive committees, which include President, Vice President, Immediate Past President, Secretary General, Treasurer, and Committee Chairs have provided leadership, guidance and served for the betterment of organisation and profession. I am very fortunate to be associated with AFOMP very actively since 2006, first as Deputy Chair of ETC [2006-2012], Editor of AFOMP Newsletter [2013-2019]-where I restarted its biannual AFOMP newsletter from 2013 regularly and now renamed as AFOMP Pulse., Chair Science Committee[2013-2018], Vice President [2015-2018], President [2018-2022], Immediate past president [2022-2025] and in these 20 years I have not only seen the relevance and growth of AFOMP but was part of it with the contribution to best of my abilities. From vision to victory, through challenge and change, AFOMP have surpassed many milestones.

We have faced significant challenges – from lack of resources and training centers in some countries to the sudden disruptions of the COVID-19 pandemic. Yet, adversity also revealed our strength. AFOMP responded with agility: shifting to **virtual platforms**, launching **online education**, and creating stronger digital networks to ensure that learning and professional growth never stopped. Our resilience has become our identity. The pandemic accelerated the adoption of virtual training platforms and we started regular monthly webinars since June 2020 and AFOMP school from June 2021 which are continuing and many getting benefitted.

During 2018-22 AFOMP has started many awards and programmes, thanks to support from families, trusts, journals and NMO's for supporting these initiatives. AFOMP is regularly awarding

1. Prof Kiyonari Inamura AFOMP Oration Award
2. Dr. Udipi Madhvanath Memorial AFOMP Best PhD award in Radiobiology
3. P.N Krishnamoorthy Memorial AFOMP Young Achiever Award
4. C.V Saraswathi-A. N Parameswaran AFOMP Best PhD Award
5. AFOMP Journal Prize for the Best Paper
6. AFOMP Lifetime Achievement award
7. Prof. Sung Sil Chu AFOMP Best Student's Publication Award
8. Golam Abu Zakaria AFOMP Best Leadership Skills Award

Over the past 25 years, AFOMP has become synonymous with:

- **Capacity Building**: Through the establishment of AFOMP School, educational webinars, fellowships, and training workshops, we have helped bridge the gap in human resources in medical physics, particularly in developing countries.
- **Professional Development**: AFOMP guidelines, position statements, and competency frameworks have helped raise the bar in clinical practice and education. These initiatives reflect our ongoing commitment to safety, efficacy, and quality in patient care.

Together we stand, united and strong, for patient care and science, we have walked so long and completed an extraordinary 25-year journey, stands today as a beacon of regional collaboration, academic excellence, and professional leadership in the field of medical physics, the journey marked by challenges, achievements, and profound regional impact.

AFOMP has completed twenty-five years of purpose and pride, with Medical Physics as our noble guide. With every physicist's heartfelt drive, AFOMP continues to thrive. Today, we don't just mark the passage of time – we celebrate a quarter-century of dedicated service, scientific advancement, regional cooperation, and shared commitment to the noble cause of healthcare through medical physics.

As we celebrate this silver jubilee, with the objectives of empowering regions, crossing each border, with harmony, leadership, strength and order however let us remind ourselves that our work is not just about machines, mathematics, or measurements – it is about people, patients, and progress. It is about ensuring that every individual receives safe, effective, and compassionate care, supported by the invisible hands of medical physics. As we celebrate this 25-year milestone, we must also acknowledge the challenges that persist. There are member countries where medical physics is still not fully recognized as a profession. The availability of training programs and clinical infrastructure remains limited in several areas. Language barriers, lack of national regulatory frameworks, and unequal distribution of resources are additional hurdles. A Silver Jubilee, not just a date, it marks a journey truly great, as we look ahead to the future, let us set our sights on building a stronger, more inclusive, and future-ready AFOMP that not only addresses the needs of today but also anticipates the demands of tomorrow. Let us work together to take AFOMP to even greater heights in the years to come. AFOMP is not just an organization – it is a movement. A movement of knowledge, compassion, and service.

Once again 'Wish you all a happy and proud 25th Anniversary of AFOMP'.

Radiation planning and treatment with multiple iso-center VMAT arc and portal dosimetry for Cranio Spinal irradiation on Varian Halcyon Elite_ LINAC -clinical experience

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1. INTRODUCTION

The Halcyon V3.0 (Varian Medical Systems) became clinically available in mid-2019, offering key upgrades over V2.0: a. kV imaging capability b. Maximum treatment length of 38.5 cm via multiple isocenters c.0.5 cm MLC resolutionand d. Dynamic beam flattening for 3D conformal planning. Our center installed Halcyon V3.0 in July 2023, among the first in Madhya Pradesh. Hardware, beam data/ modeling, and MLC mechanical features remain as in V2.0, with fast IMRT/VMAT delivery (4 RPM, 800 MU/min, 6-FFF beam) and mandatory daily IGRT. The Halcyon uses a preconfigured reference beam model that cannot be altered by the user, making MLC dosimetry and small-field commissioning critical. Published data show good agreement between planned and delivered doses on V3.0. Because the field size is limited to 28×28 cm² , larger targets are treated using a multi-isocenter approach. Eclipse v17.0 uses auto-feathering to blend junction doses, avoiding hot/cold spots.

Integrated EPID with CBCT allows default in-vivo portal dosimetry without extra hardware. QA follows device-based pretreatment checks (3%/3 mm gamma). CBCT is performed daily to minimize setup error, while portal dosimetry verifies delivery accuracy. Multi-isocenter VMAT is valuable for CSI, gynecologic, and extended-field treatments, providing better PTV conformity and organ sparing than older techniques. This study reports our early clinical experience with Halcyon V3.0 for CSI patients using multi-isocenter VMAT and integrated in-vivo dosimetry.

2. MATERIALS AND METHODS

CSI patients were treated on Varian Halcyon V3.0 using extended-field VMAT. Plans were created in Eclipse V17.0 and delivery records with in-vivo portal dosimetry were retrospectively reviewed [1&2].Dose Prescription: 36 Gy in 20 fractions. Immobilization: two orfit masks, arms down, AOI board with headrest, head-first supine. Planning CT (Philips) performed with reproducible setup instructions.

OAR	DOSE	OAR	DOSE	OAR	DOSE
L. Eye lens	Max 8.13Gy	L. Cochlea	Mean 35.8Gy	Larynx	Mean 11.44Gy
R. Eye lens	Max 6.08Gy	R. Cochlea	Mean 32.2Gy	Rectum	Mean 0.42Gy
L Optic nerve	Max 26.10Gy	Brainstem	Max 38.13Gy	PenileBulb	Mean 0.21Gy
R. Optic nerve	Max 28.33Gy	L. Parotid	Mean 9.55Gy	Kidney R	Mean 3.47Gy
Optic Chisam	Max 36.82Gy	R.Parotid	Mean 9.61Gy	Kidney L	Mean 3.89Gy
Bladder	Mean 0.62Gy	Pituitary	Mean 35.32Gy	R. Femoral Head	Max 0.4Gy
Heart	Mean 5.92Gy	L. Eye	Mean 9.83Gy	R. Femoral Head	Max 0.4Gy
Liver	Mean 4.95Gy	R. Eye	Mean 8.67Gy	L. Lung	Mean 5.15Gy
Intestine	Mean 6.37Gy	Liver	Mean 4.95Gy	R. Lung	Mean 5.68Gy

Table 1: Planning objectives for organ at risk (36Gy/20F)

Target length: 75 cm, covered with five isocenters (≤10.5 cm separation, total length 38.5 cm). A single composite plan (12 arcs) (Fig.1) was split into: Upper Plan (2 iso, 5 arcs), Mid Plan (2 iso, 4 arcs), Lower Plan (1 iso, 3 arcs). Daily kV-CBCT was done at a fixed imaging isocenter. Collimators (30°/330°) adjusted for conformity and OAR sparing (Table 2). Goals: D95% ≥ 95%, Dmax ≤ 107.7%, OAR limits per Table 3. Auto-feathering enabled in VMAT optimization. Halcyon DMI: 1280×1280 pixels, 0.34 mm/pixel (panel), 0.22 mm/pixel (isocenter), 43×43 cm size, 16-bit images, up to 20 fps. Portal dosimetry QA (EPID) used 3%/3 mm gamma, ≥97% pass rate. Predicted and measured portal images were analyzed in a composite plan. Daily exit dose per field was compared with the first fraction's baseline using 3%/3 mm gamma, ≥95% pass for composite field

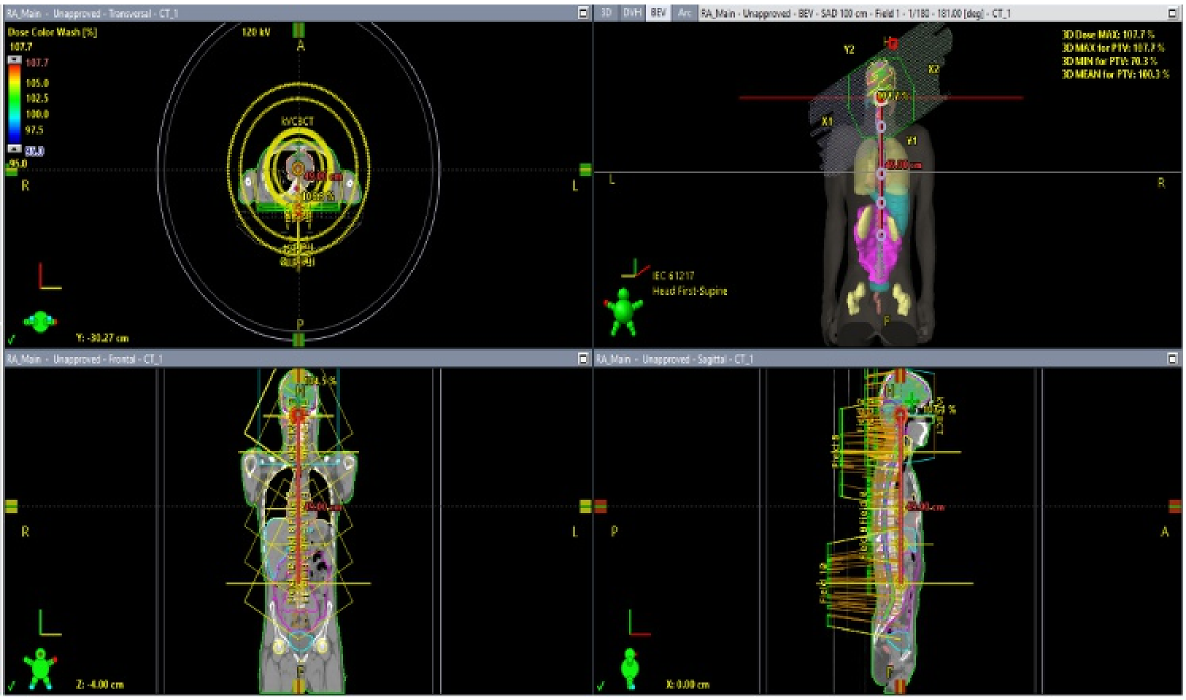

Figure: 1 (a) no of arc (12) between isocenters

3. RESULT

Multi-isocenter CSI plans met PTV coverage and OAR criteria and were approved by the treating physician. All 20 fractions were delivered as planned.

3.1 Plan Evaluation

PTV coverage: D95% = 95.46%, HI = 0.11, CI = 1.03. OAR doses: Within institutional criteria; largest deviation occurred in fraction 11, with a 12% gamma area increase due to bowel movement (Fig.2).

3.2 Pretreatment QA

Portal dosimetry gamma analysis:
Mean area gamma = 100% (Tolerance ≥97%)

- Max gamma = 0.79 (Tolerance ≤3)
- Average gamma = 0.14 (Tolerance ≤0.5) 100% pass rate.

3.2 Treatment Delivery & In-Vivo Dosimetry

Daily setup: kV-CBCT (iCBCT) used and avoided MV-CBCT for lower dose and better contrast. Delivery: 12 arcs over 5 isocenters, 10–12 min total time, 1837 MU, 800 MU/min dose rate. Pass rates: 97.3% fractions passed 3%/3 mm gamma criteria (≥95% pixels). Failures: 2 fractions (10%) failed due to bowel filling changes and SSD differences (1.5–2.0 cm).

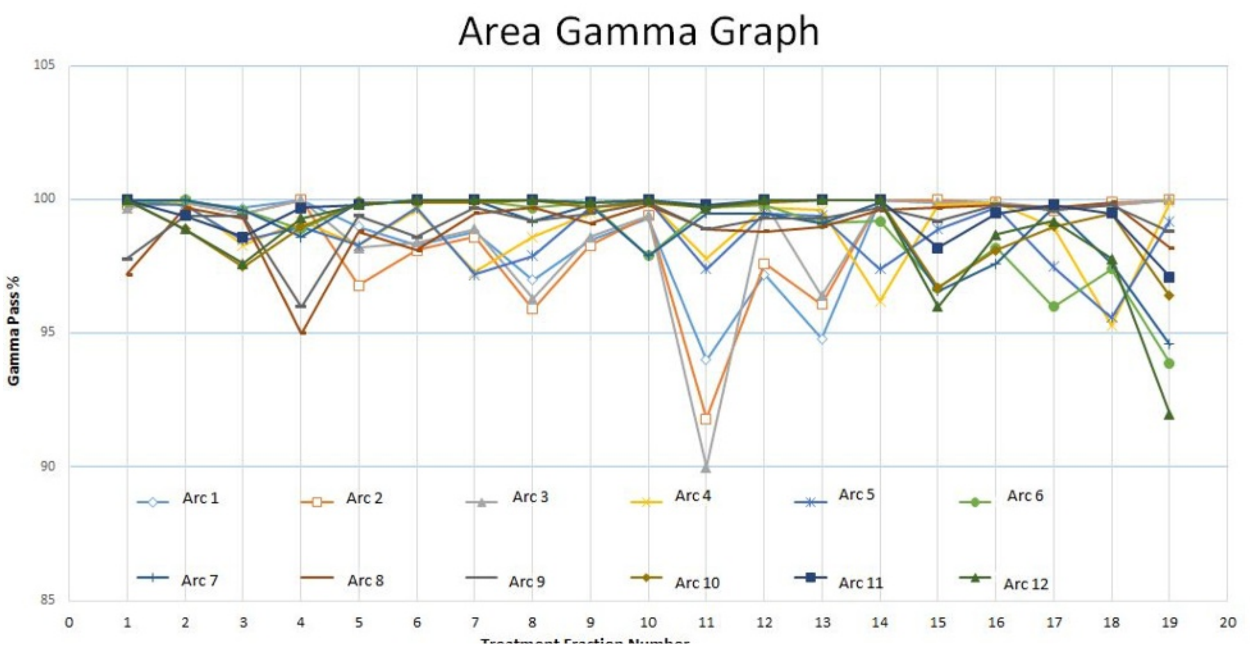

Figure 2: Daily fraction difference based Portal Dosimetry

4. DISCUSSION

This is, to our knowledge, the first report on portal dosimetry using Halcyon V3.0 for multi- isocenter CSI arc planning and delivery. Halcyon V3.0 enables efficient creation of complex arc plans with faster delivery, reducing intra-fraction motion and improving accuracy. The system's 28×28 cm2 field size limitation is overcome with the multi-isocenter technique, extending the treatment length to 38.5 cm. Auto-feathering ensures homogeneous dose across junctions (Figs. 1).Pretreatment QA using EPID achieved high pass rates, consistent with De Roover et al [3]., and followed AAPM Report 307 recommendations [4]. In-vivo EPID dosimetry showed 97.3% fraction pass rate, with only two failing fractions due to bowel motion and SSD changes (1.5– 2.0 cm). Our findings align with Nailon et al [5]., who reported high in-vivo pass rates across various sites, with deviations mostly due to anatomical changes rather than procedural errors. In CSI, bowel filling/motion is the most variable factor. Treatment delivery was efficient—12 arcs over 5 isocenters in 5–6.5 min—shorter than multi-beam IMRT, with comparable plan quality to C-arm linacs. The recent Eclipse AAA upgrade mitigates prior risks of peripheral hot spots rotational delivery.

5. CONCLUSION

Halcyon V3.0's multi-isocenter VMAT technique delivers high-quality CSI treatments with integrated in-vivo monitoring. EPID-based dosimetry can identify random anatomical variations, supporting its potential role in adaptive radiotherapy.

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Medical Physicists in Radionuclide Pharmacy: A Hybrid Future

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As nuclear medicine continues to evolve in both diagnostic and therapeutic applications, a quiet powerful evolution is unfolding within its infrastructure, the rise of **radionuclide pharmacy** as a multidisciplinary domain. With this evolution, a group of professionals whose roles are expanding beyond traditional boundaries: **Medical physicists**.

Traditionally known their contributions in radiation oncology and imaging physics, now making significant contributions in the field of radiopharmaceutical sciences, particularly in the safe handling, dispensing, transport and quality assurance of therapeutic and diagnostic radionuclides. In the context of a radionuclide pharmacy, medical physicists bring a unique skill that ensures regulatory compliance, dose optimization, radiation protection, and advanced instrumentation calibration etc. Their involvement in the standardization and validation of procedures, especially for radiotherapeutic agents like Iodine-131, Lutetium-177, Actinium-222, etc., has become essential. Additionally, physicists contribute significantly to the design and commissioning of hot cells and shielded enclosures, ensuring safety without compromising operational efficiency.

The Evolving Scope of Radionuclide Pharmacy:

Radionuclide pharmacy is the branch of pharmacy concerned with the preparation, quality control, dispensing, and distribution of radioactive materials for use in nuclear medicine procedures. With the growing demand for both theranostics agents and targeted radiotherapy, the scope of the field is expanding rapidly. It is no longer a supporting department for nuclear medicine, it is the "nucleus" of nuclear medicine facilities. It involved a team of professionals with different skills, which are overlapping. While radiopharmacists have traditionally managed the pharmaceutical aspects (chemical and biological), where medical physicists play a vital role, that of radiation safety, quantitative accuracy, instrumentation calibration, and regulatory compliance. Their understanding of radiological science is serving as a central role to ensure the integrity of radioactive product handling.

Medical Physicists: The backbone of Radiopharmaceutical Safety

Radiation Protection and Shielding: Medical physicists contributions required from the initial shielding calculations of hot cells and isolation enclosures to handle radionuclides and dose calibrators, storage vaults etc. Medical physicist ensures the compliance with national and international safety standards. And validation of instruments establishment of quality assurance protocols. And their knowledge minimizes occupational exposure without compromising workflow efficiency.

Regulatory Compliance and Licensing: In regulated environments such as radionuclide pharmacies medical physicists help to implement safety protocols according to safety codes issued by bodies like AERB (in India), IAEA, or local health departments. They also play a role in preparation of safety analysis reports, radiation protection manual, emergency preparedness for the facility and radiation safety training of staffs, maintaining documentation for audits, and overseeing radioactive waste management protocols.

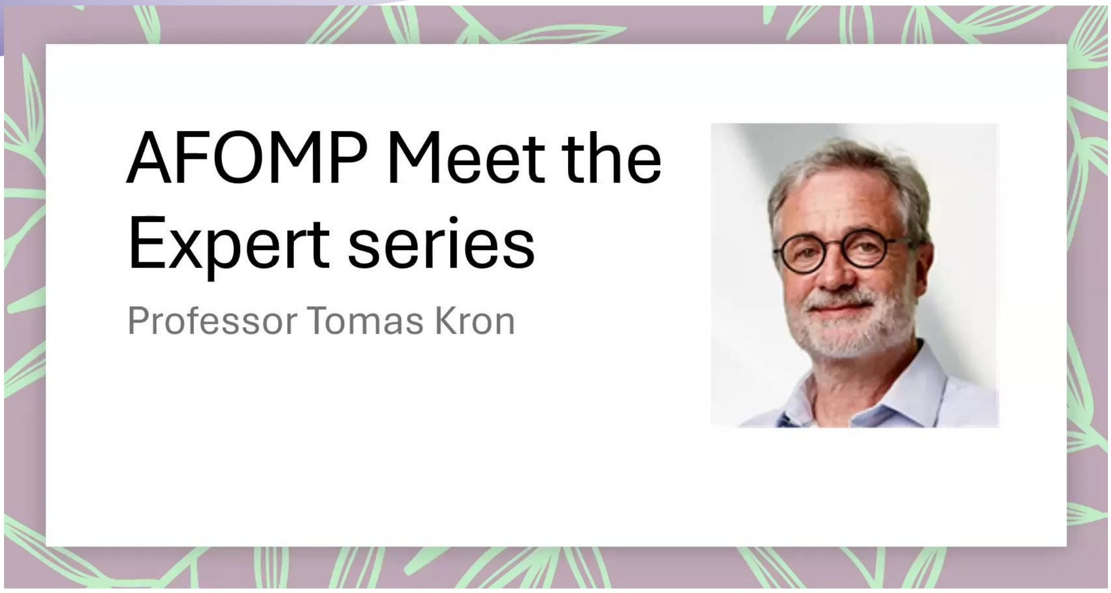
Physicists as Facility Architects: One of the most significant yet under-recognized contributions of medical physicists are in the design and commissioning of radionuclide handling environments. From initial radiopharmacy layouts, ventilation systems, and radiation shielding, to selecting and validating robotic systems, physicists are involved, hence they are the backbone of infrastructure planning.

A Hybrid Professionals: Medical Physicists

The integration of medical physicists into radionuclide pharmacy is now becoming significant. it is becoming a formalized part of the field's evolution. New educational programs, interdisciplinary collaborations, and licensing frameworks are enabling the way for physicists to evolve into hybrid professionals, bridging the domains of pharmacy, physics, and nuclear medicine. They are no longer just the "invisible safety officers" behind lead shields, they are innovators, collaborators, and frontline professionals ensuring that radiopharmaceutical therapies are safe and effective.

"**This is a time of opportunity, as new challenges emerge in radiopharmaceutical science, medical physicists should prepare to redefine their profession, standing at the fusion of physics, pharmacy, and nuclear medicine**."

Meet the Expert: Prof Tomas Kron interviewed by A/Prof Vanessa Panettieri



https://youtu.be/fWwxbHSxYYI

Tomas Kron was born and educated in Germany. After his PhD he migrated to Australia in 1989 where he commenced his career in radiotherapy physics.

From 2001 to 2005 he moved to Canada where he worked at the London Regional Cancer Centre on the commissioning of one of the first tomotherapy units. In 2005, Tomas became principal research physicist at Peter MacCallum Cancer Centre in Melbourne, Australia where he now is Director of Physical Sciences. He holds academic appointments at Wollongong, RMIT and Melbourne Universities.

Tomas has an interest in education of medical physicists, dosimetry of ionising radiation, image guidance and clinical trials demonstrated by more than 350 papers in refereed journals and 100 invited conference presentations.

Tomas is on the editorial board of several scientific journals including Radiother. Oncol. and serves as associate editor for Radiat. Meas. and Clin. Oncol (RCR). He is a regular consultant for the International Atomic Energy Agency (IAEA) and has been president of the Australasian College of Physical Scientists and Engineers in Medicine (2009-10). He has organised two major conferences (EPSM 2000 in Newcastle and the 17th International Conference on the Use of Computers in Radiation Therapy (ICCR) in Melbourne, May 2013. He has also been chair of the Awards and Honours Committee of the International Organization of Medical Physics and served for six years as Chief Examiner for the International Medical Physics Certification Board. In 2014 Tomas was awarded an Order of Australia Medal (OAM) for services to medicine, research and education.

– Prepared by Dr. Vanessa Panettieri

1) Lesion at 1-cm depth in tissue is to be treated with 6-MeV electron beam with bolus. A dose of 1.5 Gy to 80% is prescribed. If output is 1cGy/MU, SSD is 104 cm and cone factor is 0.8, what should the thickness of the bolus be, and how many MU should be delivered?

A. 0 cm, 153 MU
B. 0 cm, 153 MU
C. 0 cm, 170 MU
D. 1 cm, 209 MU
E. 1 cm, 270 MU

2) Which of the following is true regarding geometric penumbra?

A. It increases as source diameter increases.
B. It decreases as SSD increases.
C. It is independent of source-collimator distance.
D. It decreases as depth increases.
E. All of the above are true

3) To achieve a standard deviation of 2%, _ counts must be collected.

A. 400
B. 1414
C. 2500
D. 10000
E. 40000

4) All of the following reduce resolution in positron emission tomography (PET) except:

A. Large size of the detector.
B. Range of positrons in tissue.
C. Organ motion during the scan.
D. Size of the focal spot.

5) Which parameter(s) change as a result of coherent scatter of a photon from an atom?

A. Wavelength.
B. Energy.
C. Direction of travel.
D. Electron configuration of the atom.
E. All of the above.

6) Which imaging modality would allow one to distinguish an artificial diamond made of zirconium oxide ZrO2 (zirconium has atomic number 40) from a natural one made of carbon atoms (atomic number 6)?

A. Ultrasound.
B. Diagnostic X-rays.
C. MRI
D. PET
E. None of the above.

7) Which of the following is not true regarding pair production?

A. The threshold photon energy is 0.511 MeV
B. An electron and a positron are produced in the interaction of a photon with a nucleus.
C. The positron annihilates with an electron producing two 0.511 MeV photons.
D. The probability of pair production increases with the incident photon energy.

8) The maximum number of photoelectrons produced in a photoelectric interaction by a single photon with incident energy of 150 keV is _.

A. 1
B. 5
C. 10
D. Any number, as long as the sum of individual electron energies is equal to 150 keV
E. None of the above.

9) The mass attenuation coefficients for most materials (except hydrogen) are similar when _ interactions predominate.

A. Photoelectric
B. Compton
C. Pair production
D. Photonuclear disintegration

10) A superficial x-ray treatment is prescribed with a 2 mm A1 filter. By mistake, a 1 mm filter is used All of the following will occur except:

A. Increased dose rate.
B. Increased dose for the same timer setting.
C. Decreased HVL
D. Increased PDD.

Answers: Page 78

PhD Abstract: Study on quality control methods of linear accelerator

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The medical electron linear accelerator (Linac) is the widely used external radiotherapy equipment and can meet the needs of most patients. The Linac is the delivery equipment for radiotherapy, delivering radiation in a specific form to the tumor site while avoiding damage to the surrounding normal tissue. Its performance and correct operation have a direct impact on the outcome of tumor treatment. Quality control (QC) is an important means to ensure that the quality status of the Linac is essentially the same as the acceptance and commissioning; by defining the QC standards for the Linac and developing the QC methods; based on the actual situation, exploring the differences between actual and standard, and analyzing the causes; taking action where tolerances or action levels are exceeded. Studies have shown that the failure of Linac is an important source of radiotherapy errors and accidents; timely detection and correction of Linac failures during the deliver phase, prevents causing more patient errors during treatment and improves the safety and efficacy of patient treatment. As can be seen, QC of Linac is an indispensable step in radiotherapy.

The conventional method is to carry out periodic QC testing of Linacs based on QC guidelines/reports issued by national/international associations. This method aims to assess the status of the performance parameters and to detect failures through QC results. However, the QC items and frequency recommended by the conventional method are fixed and do not effectively reflect the status of a Linac; QC is ineffective, and most tests do not detect problems in a timely manner; the work time and workload required by physicists to complete QC is long. However, errors still occur, and various types of accidents are difficult to eliminate.

In recent years, the radiotherapy community has actively introduced new methods of QC from other industries. They hope that analyzing existing QC data is to gain a more accurate understanding of the operational status of radiotherapy equipment, determine the frequency and design tolerances of QC. The new methods based on the time of application onQC are divided into Statistical Process Control (SPC), Failure Mode and Effects Analysis (FMEA), Risk Matrix, Artificial Intelligence (AI), and Six-Sigma Methodology (SSM). The SPC is applied to the QC of Linac to monitor changes in QC data, identify the failures in a timely manner and design tolerance ranges for QC items; FMEA, as one of the currently popular quality management tools, determines the priority and frequency of QC items based on the Risk Priority Number (RPN); Risk matrix is used to determine the level of risk according to a two-dimensional matrix; AI continuously learn data characteristics and predict trends of QC data in Linac; SSM focuses on further process optimization in response to shortcomings in the process. However, there are still some shortcomings in these new methods: all of them are analyzed for a single quality control item, are focused on process application, and have less application for quality control of radiotherapy equipment; besides, the FMEA may be influenced by the subjective experience of experts when determining the scoring of failure modes, thus affecting the objectivity of the QC content; the AI is applied to the QC of radiotherapy equipment, the predictive effect still needs to be improved and it has not really been implemented into clinical applications. In addition, the radiotherapy community should actively introduce new QC methods from industries that do well in quality assurance, such as blood transfusion, anesthesia and clinical chemistry, aviation, and nuclear power plants.

This study proposes to introduce a patient risk model from the clinical chemistry and to improve the new methods already introduced in the radiotherapy. It aims to make QC methods of Linac more objective, quantitative, and more effective, and detecting failures in a timely manner. The main research covers the following four areas:

(1) Patient risk model to determine the QC frequency of Linac

This part of the study is the first to apply a patient risk model to radiotherapy. It aims to determine the QC frequency of the Tomotherapy system, to ensure that no patient outcomes are in error during the operation of the radiotherapy equipment. The patient risk model was divided into three main steps: (i) the power function graph was generated by program simulation to select the optimal QC rule and the number of times (n) each QC rule was evaluated. (ii) The new QC frequency was the smallest integer value of the number of patients treated between QC tests Nb(s)(iii) Prospectively collected QC test data and evaluated for new and traditional QC frequencies using individual control charts (I-Charts).Based on the power function graph, the 13s control rule and n = 5 was selected. Nb(s) decreased and then increased with increasing the systematic error (s). The smallest integer value of Nb(s) was 21, which was the new frequency of output constancy in the Tomotherapy system. In the I-Chart of the new frequency, the out-control point appears at the 29th. In the I-Chart for the conventional frequency, the out-control point appears at the 25th and 37th. Retrospective analysis of the records of failures of the Tomotherapy system during the evaluation period revealed that the new frequency found out-of-control appeared before the failure, while the conventional frequency found out-of-control appeared after the failure. The new frequencies could prioritize the detection of radiotherapy equipment failures over the conventional frequencies. The new frequency is not for individual patient outcomes, but for the average patient outcome treated on a Tomotherapy system.

(2) Risk matrix to determine the QC frequency of Linac

This part of the study applies the risk matrix for the first time to analyze the risk level of QC items and to quantify the frequency of QC. At the corresponding frequency, each QC item exceeding the tolerance corresponded to a failure mode. The failure modes contained three parameters: S, O and D. The S was determined by the impact corresponding to the percentage dose difference between the original plan and the error plan. O was calculated based on the frequency with which QC data exceeded the tolerance. D was the probability that QC data exceeded the tolerance but was not detected. The risk matrix is to apply a two-dimensional matrix of S and O values to visualize the risk areas of the failure modes. It is classified as low, medium, and high risk. In this study, the time corresponding to the first occurrence of medium risk was used as the new QC frequency. The E=O/D metric assessed the performance of the QC frequency. QC data were collected on three conventional Linacs: LN1 (Elekta VersaHD), LN2 (Varian Novalis) and LN3 (Varian Edge). They included 1 dosimetry parameter and 11 mechanical parameters: X-ray output constancy (QC1), Distance indicator @ iso (QC2),Laser localization (QC3),Treatment couch position (QC4),Gantry rotation isocenter (QC5),Couch rotation isocenter (QC6),Collimator angle indicators (QC7),Gantry angle indicators (QC8),Treatment couch position (QC9), Light field coincidence (QC10), MV/kV: imaging and treatment isocenter coincidence (QC11), and Leaf position accuracy (QC12).For LN1, the frequency of QC1 and QC3 was daily; QC2 and QC12 was weekly; QC8 and QC9 was biweekly; QC7 was monthly; QC11 was bi-monthly; and QC4, QC5 QC6 and QC10 had a frequency of annually. For LN2, the frequency was weekly for QC1, QC2, QC3, and QC12; biweekly for QC4; bimonthly for QC9 and QC11; and annual for QC5, QC6, QC7, QC8, and QC10. For LN3, the frequencies of QC1 and QC3 were daily; QC12 was weekly; QC7 and QC8 was bi-monthly; and QC2, QC4, QC5, QC6, QC9, QC10, and QC11 was annual. The E obtained at the new frequency are not lower than those obtained at the conventional frequency, indicating that QC testing at the new frequency can detect equipment failures in advance. The risk matrix was applied to the QC of the three conventional Linacs to quantitatively determine the frequency of QC and provide an effective strategy for the risk level of QC items on radiotherapy equipment.

(3) Six-sigma methodology to design QC limits of Linac

This part of the study introduces that the six-sigma methodology (SSM) personalized design QC limits (tolerance limits and action limits). A framework is highlighted to clarify the various stage. In the define stage, the limits of the QC items need to be defined. In the measure stage, daily QC data were collected retrospectively in the Machine Performance Check (MPC) system. In the analysis stage, statistical analysis and process capability index presented the rationale for how to determine the limit values. In the improve stage, action limits were calculated using the process capability index; tolerance limits were determined using the larger control limits in the individual control chart. In the control stage, daily QC data was prospectively collected; the effect of action limits and tolerance limits were monitored using the I-Charts. Collimation Ratation offset had minimum the process capability index, that is the minimum Cp, minimum Cpk, minimum Pp and minimum Ppk values for 2.53, 1.99, 1.59 and 1.25, respectively. CouchRtn had maximum the process capability index, that is the maximum Cp, maximum Cpk, maximum Pp and maximum Ppk values for 31.5, 29.9, 23.4 and 22.2, respectively. The action limits for the three QCs were higher than the recommended tolerance values, i.e., ISOCenterSize, MLCMaxOffsetA, and Rotation Induced CouchShift. The new tolerance limits for all QC items were lower than the original. Some of the data on the I-Charts for BeamOutputChange, ISO KV, and JawX1 exceeded the lower control limit and action limit, indicating that systematic errors occurred and reminding the physicist to take action to improve process performance. The process capability index is an important tool that provides quantitative information used to determine QC limits.

(4) Stacked LSTM models to predict QC records and trends of Linac

This part of the study presents that the stacked LSTM model predict to the QC records and trends of two Linacs. First, the dataset is divided into three sets: the training set was used to train models with different hyperparameter combinations and to combine different sets of hyperparameters using greedy coordinate descent; the validation set was used to determine the best hyperparameters; and the test set was used to evaluate the accuracy under the best hyperparameter combinations. The evaluation criteria included mean absolute error (MAE), root mean square error (RMSE) and coefficient of determination (R2). Also, the classical time series model ARIMA was applied to compare the performance of stacked LSTM on the same data set. The stacked LSTM and ARIMA models were also used to predict the daily QC data records of another Linac under the same combination of hyperparameters. In the data records, the mean values of MAE, RMSE, and R2 were 0.013, 0.020, and 0.853, respectively, in the stacked LSTM, compared with 0.021, 0.030, and 0.618, respectively, in the ARIMA. The stacked LSTM outperformed the ARIMA for all 23 QC items, with the best prediction was couch rotation (LSTM: MAE = 0.001, RMSE = 0.001 and R2 = 0.975; ARIMA: MAE = 0.002, RMSE = 0.004 and R2 = 0.436); the worst prediction was gantry relative (LSTM: MAE = 0.006, RMSE = 0.007 and R2 = 0.095; ARIMA: MAE = 0.004, RMSE = 0.006 and R2 = 0.383). Overall, the stacked LSTM had better predictive performance than the ARIMA. The trend line lies within the tolerance. The physicist can perform preventive maintenance on the Linac in advance. The stacked LSTM can accurately predict QC records and trends, which is robust.

The methodology used in this study covers only some of the QC items for Linacs, but the methodology can be used as a reference for determining other QC items for Linac, and for determining QC items for other radiotherapy equipment.

[**Keywords**] linear accelerator; quality control; frequency; limits; failure.

PhD Abstract: Modeling of acute skin toxicity based on Dosiomics and clinical findings in radiation therapy of breast cancer by tomotherapy

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Abstract

Introduction: Radiation-induced acute skin toxicity (AST), is considered a common side effect of breast radiation therapy. The goal of this study was to design dosiomics based machine learning models for prediction of AST, enable creating optimized treatment plans for high-risk individuals.

Methods: 52 patients with breast cancer who underwent radiation therapy with Tomotherapy technique were prospectively included in this study. The superficial layer of the body with a thickness of 2 mm (SL2) was contoured as the equivalent structure of the skin in the CT images. Dosimics features along with dose volume histograms (DVHs) of the SL2 segment were extracted from the Treatment Planning System (TPS). In addition, patient- and treatment-related clinical characteristics (PTR) were collected. Before extracting the dose distribution feature and creating a reliable model, the accuracy of the TPS algorithm in calculating the surface dose distribution was evaluated by comparing the TPS results with the film dosimetry results. Clinical scoring was done using the Common Terminology Criteria for Adverse Events (CTCAE) V4.0 criteria for skin-specific symptoms. Patients were grouped into AST 2+ (CTCAE ≥ 2) and AST 2- (CTCAE < 2) toxicity grades to facilitate AST modeling. They were randomly divided into training (70%) and testing (30%) cohorts. 7 prediction models were created with the characteristics of dosiomics, DVH, and PTR separately, and the combination of dosomics with DVH, the combination of dosomics with PTR, the combination of DVH with PTR, and finally the combination of all three groups of dosomics, DVH and PTR together. After selecting features related to skin complications, each model was created using seven different classification algorithms. The performance of each model was evaluated on the test group using the area under the receiver operating characteristic curve (AUC). The accuracy, precision, and recall of each model were also studied.

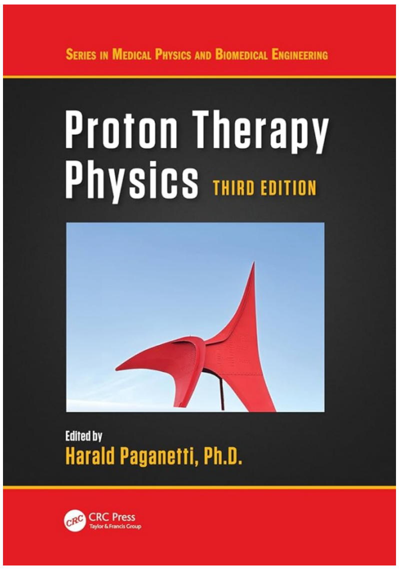
Results: Our findings indicate a small difference (3-5%) between measured and calculated skin doses using the EBT3 film and TPS, employing “high” spatial resolution dose calculation in helical and direct Tomotherapy plans. Results showed that 44% of the patients developed AST 2+ after Tomotherapy. The dosiomics model, developed using dosiomics features, exhibited a noteworthy improvement in AUC (up to 0.78), when spatial information is preserved in the dose distribution, compared to DVH features (up to 0.71). Furthermore, a baseline machine learning model created using only PTR features for comparison with DOS models showed the significance of dosiomics in early AST prediction. By employing the Extra Tree (ET) classifiers, the DOS+DVH+PTR model achieved a statistically significant improved performance in terms of AUC (0.83; 95% CI, 0.71-0.90), accuracy (0.70), precision (0.74) and sensitivity (0.72) compared to other models.

Conclusions: This study confirmed the benefit of dosiomics-based ML in the prediction of AST. However, the combination of dosiomics, DVH, and PTR yields significant improvement in AST prediction. The results of this study provide the opportunity for timely interventions to prevent the occurrence of radiation-induced AST.

Book Review: Scientific Review of Proton Therapy Physics (3rd Edition)

Md Akhtaruzzman, PhD,
Radiation Oncology Department, Evercare Hospital Chattogram, Bangladesh

Introduction



The third edition of Proton Therapy Physics, edited by Dr. Harald Paganetti, continues to set the gold standard in reference texts for particle therapy. This edition, published by CRC Press, comes at a time of rapid growth and innovation in the field of proton therapy. With increasing global investment in proton therapy facilities and technological breakthroughs such as pencil beam scanning, FLASH therapy, and adaptive planning. Dr. Paganetti is an internationally recognized expert in proton therapy and head of Physics Research at the Massachusetts General Hospital in USA has covered a comprehensive, scientifically rigorous volume that integrates foundation of physics, clinical applications, emerging research, and advanced computational modeling. This edition is not just an update but a significant evolution of the text, incorporating the latest developments in both clinical and theoretical aspects of proton therapy.

Structure and Content

The book is structured into six major thematic sections, with over 25 chapters contributed by global experts in proton therapy physics, biology, and engineering. The new edition places greater emphasis on evolving paradigms, such as biologically guided planning and real-time adaptive therapy.

1. Fundamentals of Proton Interaction and Beam Transport

The initial sectioncovers the basic physics of protons, including energy loss mechanisms, nuclear interactions, Bragg peak characteristics, and the influence of inhomogeneities. The principles of beamline design, gantry systems, and energy modulation are discussed in depth, with diagrams and system schematics providing practical insights into facility design and beam delivery.

2. Treatment Delivery and Planning Techniques

This section emphasis on passive scattering vs. pencil beam scanning (PBS) offer both historical perspective and technical comparisons. Extensive attention is given to PBS commissioning, scanning magnet control, and interplay effects in moving targets. Modern planning techniques, such as robust optimization, LET-weighted planning, and multi-field optimization (MFO), are well explained and include clinical case illustrations. Notably, this edition includes detailed discussions of proton arc therapy, range modulation strategies, and the implementation challenges of adaptive proton therapy.

3. Monte Carlo Methods and Analytical Modeling

The role of Monte Carlo (MC) simulation in proton therapy is increasingly important, and this edition offers a clear, thorough presentation of its physics and clinical utility on several MC platforms including Geant4, TOPAS, and FLUKA, with validation data and comparisons to analytical models.

The section bridges the gap between theoretical modeling and clinical implementation, addressing topics such as variance reduction, uncertainty quantification, and patient-specific QA using MC-based systems.

4. Dosimetry, Calibration, and QA

The dosimetry section reflects the latest recommendations from IAEA and ICRU. Key topics include:

- Absolute dosimetry using ionization chambers
- Water calorimetry
- LET-dependence of detector response
- Dosimetry in small and non-standard fields
- QA protocols for PBS and moving targets

This section is particularly beneficial for physicists responsible for clinical commissioning and quality assurance of proton systems.

5. Radiobiology and RBE Modeling

One of the strongest aspects of this edition is the expanded treatment of proton radiobiology and RBE modeling. While clinical proton therapy traditionally uses a fixed RBE of 1.1, this edition explores:

- Variable RBE models based on LET, dose per fraction, and tissue type
- Experimental evidence for RBE variation
- Computational strategies for incorporating LET and RBE into treatment planning

These discussions are supported by current literature and guide physicists and clinicians grappling with biological uncertainties in treatment planning.

6. Advanced Topics: FLASH, Imaging, and Future Trends

The final sections explore emerging technologies, including:

- FLASH proton therapy: Radiobiological rationale, beam delivery requirements, and early preclinical data
- Proton CT and in-vivo range verification techniques
- Proton arc therapy, with its potential to reduce normal tissue exposure
- Artificial intelligence and automation in proton therapy planning

This forward-looking section offers insight into the future trajectory of proton therapy, especially as more facilities adopt AI-driven workflows and advanced imaging systems for adaptive planning.

Pedagogical Strength and Scientific Depth

The writing is technically rigorous yet accessible, striking a careful balance between depth and clarity.

Each chapter includes:

- Detailed derivations of key equations
- Tables and graphs summarizing empirical data
- Clinical scenarios and illustrative planning examples
- Extensive bibliographies for further reading

The inclusion of clinical correlations, such as case studies and comparative treatment plans, enhances the book's utility for practicing radiation oncologists and medical physicists.

The editor has maintained coherence across contributions by ensuring consistency in terminology, units, and notation—often a challenge in multi-author technical books.

Strengths and Unique Features

- Up-to-date and comprehensive: Reflects the state-of-the-art in proton therapy
- Expert authorship: Contributors include pioneers and leading scientists in the field
- Balanced coverage: Merges physics, biology, technology, and clinical practice
- Highly visual: Includes over 300 diagrams, images, and treatment plan overlays
- Practical focus: Offers workflows for commissioning, QA, and planning

Limitations

Despite its strengths, a few areas could benefit from further expansion in future editions:

- Economic and logistical considerations of proton therapy adoption worldwide
- Detailed case-based planning examples for specific tumor sites
- Global perspectives from developing regions where proton therapy is emerging

Also, given the rapidly changing nature of the field, topics like AI integration, MR-guided proton therapy, and cost-effectiveness studies could be more thoroughly explored.

Conclusion and Recommendation

The 3rd Edition of Proton Therapy Physics is a landmark resource that will serve as a foundational text for the next generation of proton therapy professionals. It is both a scientific reference and a practical guide, indispensable for clinical physicists, dosimetrists, medical physics students, and radiation oncologists working in or transitioning to proton therapy.

AFOMP Education and Training Committee Report

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2. Dr. Kimi Bin Yang
3. Dr. SuphalakKhachonkham
4. Dr. Jiazhou Wang
5. Dr. Md Akhtaruzzaman
6. Dr. Sudesh Deshpande
7. Dr. Mohd Hafiz Mohd Zin
8. Prof. NatalkaSuchowerska

Warmest Congratulations on the Silver Jubilee of AFOMP

On this momentous occasion of the Silver Jubilee of the Asia–Oceania Federation of Organizations for Medical Physics (AFOMP), it is with immense pleasure and pride that we extend our heartiest congratulations.

For twenty-five years, AFOMP has served as an indispensable beacon, fostering remarkable advances and unique collaborations within medical physics across our diverse region. It has been a vital platform for sharing knowledge, championing professional excellence, and unifying our community under a common goal: the advancement of safe and effective patient care.

This Silver Jubilee is not just a celebration of time passed; it is a testament to the dedication of countless individuals—its founding members, leaders, contributors, and supporters—whose passion has been the lifeblood of AFOMP. It reflects on a rich past, celebrates a dynamic present, and eagerly looks forward to a future of innovation and growth.

We commend the entire AFOMP community for this stellar achievement and look forward to many more years of insightful progress and pioneering contributions.

Committee Report

AFOMP School and Monthly Webinars:

In 2023, ETC has hold eight AFOMP Monthly Webinars and seven AFOMP School Webinars. Outstanding medical physicists from Asia and Oceania regions were invited to give lectures at webinar. And the number of registrations for each webinar has exceeded 200.

In 2024, ETC has hold four AFOMP Monthly Webinars and three AFOMP School Webinars. Outstanding medical physicists from Asia and Oceania region were invited to give lectures at webinar. And the number of registrations for each webinar exceeded 200.

In 2025, ETC has hold four AFOMP Monthly Webinars and four AFOMP School Webinars. Outstanding medical physicists from Asia and Oceania region were invited to give lectures at webinar. And the number of registrations for each webinar exceeded 200.

ETC endorsed four events:

(i) 'Brachytherapy Treatment Techniques: Procedures and Planning' submitted by Department of Radiation Oncology Christian Medical College and Hospital, Ludhiana.

(ii) "MEFOMP Medical Physics Conference 2023" hosted by the Royal Hospital, Muscat, Sultanate of Oman.

(iii) An educational activity: "the Geant4-DNA International tutorial" from Japanese colleagues.

(iv) "11th Annual Conference of Bangladesh Medical Physics Society(ACBMPS-2023)"

Work out a procedure for endorsement

There are 11 rules in this procedure. ETC members can evaluate based on well-defined criteria and guide the evaluators well as to what to look for when assessing an application for endorsement.

ETC prepared a multiple choice questions (MCQs) bank

- MCQs bank has been developed for the training and education of Medical Physicists in the AFOMP region. The bank comprises a total of 179 questions."

Completing the proposal of the special symposium to ICMP2023, 2024

The topic is "The role and the involvement of medical Physicists in the new AI world by defining the challenges of AI in healthcare for the MPs"

- ETC finished the interview with Prof Yimin Hu, the winner of the 2022 AFOMP Lifetime Achievement Award.
- ETC has provided suggestions for updating the Syllabus of medical physics.
- Established of the International Cooperation and Communication Study Group of the Medical Physics Branch of the Chinese Society of Biomedical Engineering

The International Cooperation and Communication Study Group has been founded to interface with IAEA, AFOMP, AAPM and IOMP for Chinese medical physicists. There are 38 members in the study group.

Establishment of the WeChat official account "International exchange of medical physics"

The WeChat official account "International exchange of medical physics" has published 158 original articles. And the number of subscribers has exceeded 3000.

1. Organized the 2023, 2024 and 2025 Academic Annual Meeting of the Radiotherapy physics Technology Committee of Zhejiang Anti-Cancer Association
2. ETC organized two industrial webinars

Report prepared by:
Dr. Xiance Jin

AFOMP Funding Committee Report

Committee Chairperson

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Committee Members

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2. Associate Prof. Ung Ngie Min
3. Dr. Huanli Luo
4. Prof. So Hyun Park
5. Prof. Dr. Rajesh Kinhikar

Dear AFOMP Members,

It is my great honor and joy to join you in celebrating the 25th Anniversary (Silver Jubilee) of AFOMP. This milestone is not only a moment to reflect on the visionary leadership and dedication of our founders, but also a reminder of the collective commitment that has carried us through a quarter century of achievements in advancing medical physics across the Asia-Oceania region.

During the past three years, in my role as Chair of the AFOMP Funding Committee, I have witnessed first-hand the devoted efforts and tireless work of all our officers. It has been truly inspiring, and at the same time, it has given me valuable moments of self-reflection.

The Silver Jubilee is a celebration of our shared journey—a testament to collaboration, innovation, and service. AFOMP has grown into a strong and vibrant federation, uniting educators, researchers, clinicians, and industry partners to promote excellence in medical physics. Looking forward, I am confident that AFOMP will continue to thrive as a platform for advancing science, education, and clinical practice in our region.

On this special occasion, I extend my heartfelt congratulations to all members, past and present, who have contributed to AFOMP's growth. May the coming years bring even greater achievements and continued success for our community.

Committee Report

The Funding Committee is delighted to update you on our activities and achievements since the last report in March 2024.

Launch of the AFOMP Industrial Webinar Series

One of our major initiatives this year has been the establishment of the Terms of Reference (TOR) for the AFOMP Industrial Webinar Series, approved by ExCom in April 2024. The series was designed to:

– Provide a platform for industry experts to share medical physics knowledge,
– Strengthen collaboration between AFOMP and industry,
– Offer our members access to cutting-edge developments.

Each webinar consists of two 30-minute scientific presentations, followed by interactive Q&A.

Promotional content is strictly limited to ensure educational value.

We are pleased to share that two successful sessions have already been held:

- Radformation Industrial Webinar – held on November 27, 2024.
  Website: https://afomp.org/2024/11/28/view-afomp-industrial-webinar-held-on-nov-27th-2024/
- RTI Industrial Webinar – held on August 30, 2025.
  Website: https://afomp.org/2025/09/01/view-afomp-industrial-webinar-by-rti-on-aug-30-2025/

Corporate Membership Updates

Our outreach and renewal activities have further strengthened AFOMP's partnership base:

– New and renewed members for 2025 include RTI, Radformation, LAP, and RaySearch Laboratories.
– RaySearch joined as a five-year corporate member (2025–2030).
– PTW and Sun Nuclear memberships expired at the end of 2024.
– ROSALINA remains a committed partner through May 2025.

We extend our sincere appreciation to all corporate partners for their continued support.

Looking Ahead

The Funding Committee will:

- Continue to strengthen the Industrial Webinar Series,
- Explore new sponsorship opportunities in conjunction with AFOMP monthly webinars,
- Expand outreach to potential partners across the Asia-Oceania region,
- Ensure transparent and effective management of membership entitlements and sponsored events.

With these initiatives, we remain confident in securing sustainable support for AFOMP's mission of advancing medical physics in our region.

The AFOMP Funding Committee
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AFOMP Professional Relations Committe Report

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Committee Members
Prof. Dr. Chai Hong Yeong
Dr. Deloar Hossain
Dr. Jianjian Qiu
Dr. Kitiwat Khamwan
Ms. Nur Rahmah Hidayati
Prof. Parinaz Mehnati
Dr. Wei-Ta Tsai

Greetings from AFOMP PRC to one and all.

On behalf of the Professional Relations Committee (PRC), it gives me immense pleasure to extend heartfelt congratulations to the Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) on the momentous occasion of its 25th Anniversary.

Over the past quarter of a century, AFOMP has played a pivotal role in uniting medical physics professionals across the region, fostering collaboration, advancing education, and strengthening the professional identity of our community. This milestone is not only a celebration of AFOMP's enduring legacy, but also a testament to the vision, dedication, and collective effort of all member organizations, past and present leaders, and countless professionals who have contributed to its growth.

The Professional Relations Committee has always valued AFOMP's spirit of inclusiveness and its mission to promote excellence in medical physics practice, research, and training. As we mark this silver jubilee, PRC reaffirms its commitment to furthering partnerships, building networks of trust, and enhancing the visibility of our profession globally.

As the current PRC-AFOMP is nearing the completion of the tenure, I would like to take this opportunity to thank you all for your warm response, exuberant enthusiasm and strong support in all our activities. Wish you all continued success in achieving professional and personal goals.

AFOMP LinkedIn | AFOMP X (Twitter) | AFOMP Facebook | AFOMP Bluesky | AFOMP Youtube

The AFOMP monthly webinars and schools are continuing on a successful note with enthusiastic participation of members from AFOMP as well as outside the region. The 2nd AFOMP Industrial webinar in collaboration with RTI was held on 30th August 2025. Thank you very much all of you for the active participation in all the webinars and schools. Looking forward to having your continued participation in the upcoming webinars.

As we strive forward for excellence in medical physics and professional competiveness, AFOMP PRC is trying to reach out to all medical physicists in the region to support and collaborate for the betterment of each one's professional pursuits. Please feel free to reach out at prc.afomp@gmail.com.

AFOMP has LinkedIn, Twitter (X), Facebook and Bluesky accounts and a YouTube channel through which AFOMP activities, medical physics news etc. are shared. Follow the accounts to keep ourselves updated with the AFOMP educational and professional activities.

May AFOMP continue to inspire generations of medical physicists, expand its impact across borders, and serve as a beacon of professional solidarity in the years to come.

On this special occasion, I wish AFOMP and all its members continued success and look forward to contributing together towards a stronger and brighter future for medical physics.

With warm regards and congratulations,
Prof Dr Mary Joan, Chair, Professional Relations Committee (PRC- AFOMP)

NMO Activity Report: BMPS celebrates International Medical Physics Week (IMPW) 2025

Md Akhtaruzzman, PhD
Chief Medical Physicist, Evercare Hospital Chattogram
President, Bangladesh Medical Physics Society (BMPS)

The Bangladesh Medical Physics Society (BMPS) successfully organized a series of webinars from May 5 to 9, 2025, on the occasion of International Medical Physics Week (IMPW). It is an annual endeavor that encourages global involvement in the learning and discussion of medical physics.

The webinar series featured four insightful lectures delivered by distinguished national and international experts, attracting approximately 450 participants from 42 countries.

The sessions includethe following diverse medical physics topics:

- Understanding the Radiobiology of Brachytherapy (5th May)
- Geometric and Dosimetric Impact of Bladder and Rectal Filling on Pelvic Radiotherapy Quality Using 3DCRT, IMRT, and VMAT (6th May)
- Pediatric Radiotherapy in Resource-Limited Countries: Addressing Setup Errors, Anesthesia Challenges, Stochastic-Deterministic Risks, and Late Toxicity Using IGRT, IMRT, SGRT (8th May)
- Hypofractionation, Digital Image Formation in Medicine (9th May)

BMPS's initiative in organizing these webinars fostered global collaboration, knowledge sharing, and professional development in medical physics. It provided a platform for medical physicists to discuss innovations, challenges, and emerging techniques in radiation therapy, imaging, and clinical applications. The IMPW 2025 webinar series was a resounding success, demonstrating BMPS's commitment to promoting medical physics education worldwide. The engagement of considerable participants from across the world highlights the increasing interest in the field and the importance of continued efforts to advance medical physics research and practice.

NMO Activity Report: The Hong Kong Association of Medical Physics (HKAMP) Activities

The Hong Kong Association of Medical Physics (HKAMP) has organized and co-organized different scientific seminars, workshops and symposia in 24/25. This report highlights several of our activities, demonstrating ourkin effort to promote professional development.

Key Activities Organized:

1. Symposium on ‘AI in Medical Radiation Science’ (7 June 2024)

Together with one of the local tertiary education institutes (Tung Wah College), this symposium has attracted approximately 80 participantswith Allied Health background. The symposium was focused onthe use of artificial intelligence indiagnostic imaging and radiation therapy planning.

2. Workshop on ‘Application for Founding Membership of HKIE Nuclear Discipline’ (27 July 2024)

This workshop provided guidance for eligible HKAMP members, particular for those who had a solid engineering background in radiation, to apply for founding membership in the Hong Kong Institution of Engineers (HKIE). Leaders from the Nuclear Discipline of the HKIE briefed our members on the application process, and answer questions from those interested.

3. SANTRO 15th Anniversary Symposium – Advanced Technology in Radiation Oncology and

Beyond (4 December 2024)

Held at the Fullerton Ocean Park Hotel, this symposium gathered approximately 50 participants, including prominent oncologists and physicists, local and overseas, to celebrate the 15th years anniversary of the Sino-American Network of Radiation Oncology (SANTRO). This symposium covered topics in combination of immunotherapy and radiation therapy, role of radiotherapy in precision oncology, as well as the management of advanced paranasal sinus malignancies. The symposium was co-organized with the University of Hong Kong, Li Ka Shing Faculty of Medicine (HKU Med).

4. **SANTRO Scientific Meeting (5 December 2024)**

This meeting was again co-organized with HKU Med, and was held as an extension of the SANTRO 15th Anniversary Symposium. Approximately 80 participants attended. It provided a platform for discussions in medical physics development with renownoverseas researchers.

5. HKSBRT Study Group Annual Scientific Meeting 2025 (26 April 2025)

This scientific meeting was co-organized with the Hong Kong Stereotactic Body Radiotherapy (HKSBRT) Study group, and has attracted approximately 250 attendees, including mostly oncologists and medical physicists. This event focused on the latest development in SBRT, with keynote speeches from prominent overseas speakers. The meeting served as an excellent opportunity to foster collaboration among different professionals in radiation oncology.

Other Engagement

HKAMP also promoted 26 local and international scientific seminars to members in the year 24/25. To name but a few, these included the AFOMP webinars, the IAEA International Conference on Advances in Radiation Oncology, the IUPESM World Congress on Medical Physics and Biomedical Engineering, andeducational events organized by the Hong Kong Polytechnic University (the institute offering the Master program in Medical Physics). These helped our members to keep updatedin professional knowledge.

Conclusion

The HKAMP is proactive in organizing events for the professional development of our members. Collaboration with different institutes, and with different disciplines (e.g. medical practitioners, radiographers, radiation therapists, researchers, etc) are essential to maintain our professional standard.

Advancing Precision Radiotherapy in South Asia: A Collaborative SCMPCR Hands-on Workshop (HW-08) in Nepal

Jabidul Islam[1], *Md Anwarul Islam*[1], *Hasin Anupama Azhari*[1], *Golam Abu Zakaria*[1], *Mr. Dinesh Saroj*[3], *Suresh Poudel*[2], *Ranjanbhakta Bhandari*[2], *Surendra Bahadur Chand*[2], *Shivaji Poudel*[2]
[1]South Asia Center for Medical Physics and Cancer Research, Dhaka, Bangladesh
[2]B P Koirala Memorial Cancer Hospital, Bharatpur, Chitwan, Nepal.
[3]Balco Medical Centre, a Unit of Vedanta Medical Research foundation, Raipur Chhattisgarh, India.

In the evolving landscape of oncology, stereotactic radiotherapy has emerged as a cornerstone in the treatment of small-to-medium tumors in anatomically sensitive or surgically inaccessible regions. With a growing emphasis on precision and personalized cancer treatment, advanced high-dose techniques such as Stereotactic Radiosurgery (SRS), Stereotactic Radiotherapy (SRT), and Stereotactic Body Radiotherapy (SBRT) are transforming clinical outcomes worldwide.

Group photo of participants and faculty

A significant milestone in promoting these techniques in South Asia was marked by the **SCMPCR HW-08**, a four-day international hands-on workshop jointly organized by the **South and Central Asia Medical Physics Collaboration and Research (SCMPCR), B.P. Koirala Memorial Cancer Hospital (BPKMCH)**, and **Bhaktapur Medical College**, held from **March 13–16, 2025** in **Bharatpur and Bhaktapur, Nepal**.

This workshop represented a powerful example of cross-border collaboration in medical physics and clinical oncology. It brought together **42 participants** from **Nepal, India, and Bangladesh**, and an esteemed faculty from **Germany, Belgium, Switzerland, the Netherlands, and India**, creating a vibrant platform for education, hands-on training, and knowledge exchange.

Bridging Clinical Insight and Technical Excellence

One of the workshop's defining features was its interdisciplinary format. Sessions were tailored for both **medical physicists and radiation oncologists**, acknowledging that the implementation of stereotactic techniques depends on synchronized teamwork. While radiation oncologists determine eligibility, contour targets, and set treatment strategies, medical physicists ensure the technical precision through dose calculations, planning algorithms, and rigorous quality assurance (QA).

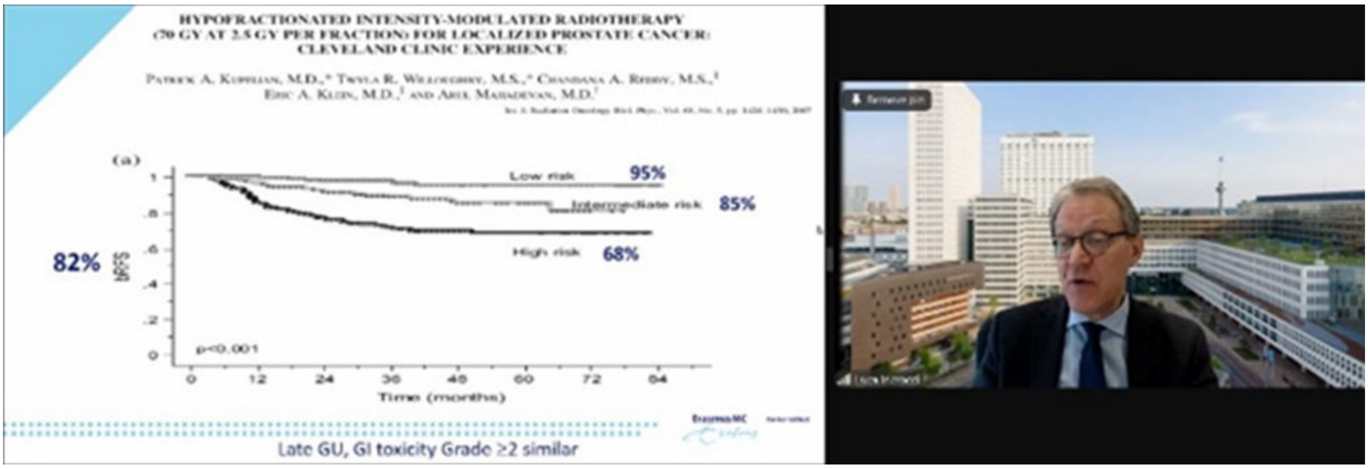
The workshop emphasized a dual-track structure with collaborative modules, where participants alternated between clinical contouring, radiobiological discussions, treatment planning, and QA workflows.

Day 1: Fundamentals and Clinical Framework

Participants during the lecture at day 1

The first day began with a warm registration at BPKMCH, followed by an **introductory keynote by Dr. Raju Srivastava (Belgium)** outlining the core principles, applications, and clinical decision-making for SRS, SRT, and SBRT. Subsequent lectures by **Dr. Sarbani Ghosh Laskar (India)** and **Dr. Robert Semrau (Germany)** focused on anatomical delineation, contouring strategies for head and neck cancers, and image-guided radiotherapy challenges.

Online lectures by **Dr. Janine Simons (Netherlands)** and **Prof. Luca Incrocci (Netherlands)** highlighted the clinical applications of hypo-fractionation in breast and prostate cancers respectively, referencing key trials such as Fast-Forward and HYPO-RT-PC.The day concluded with warm interactions over a traditional Nepali lunch at **Chitwan Garden Resort**, where international and regional participants exchanged ideas and experiences.



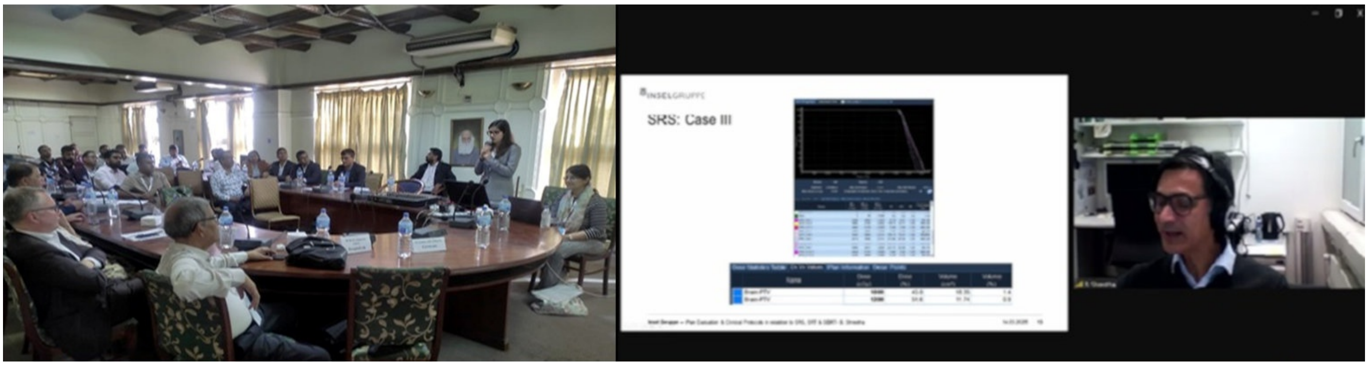
Prof. Dr. Luca Incrocci during his online talk

Day 2: Radiobiology, Planning, and Quality Assurance

The second day began with Dr. Ghosh Laskar's session on radiobiology—explaining the **LQ model, BED, and EQD2**—which provided essential theoretical grounding for high-dose per fraction therapies.

Dr. S Ghosh Laskar and Prof. Dr. G. A. Zakaria during their presentation on day 2

This was followed by **Prof. Dr. Golam Abu Zakaria (Germany)** delivering a comprehensive session on **patient-specific QA**, including absolute dose verification, gamma index analysis, and stereotactic-specific tools.



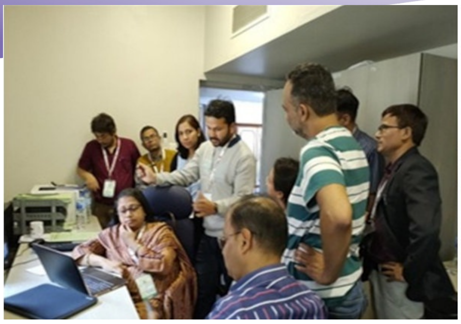
Ms. Tanya Behl(Varian Medical System, India) and Dr. Binay Shrestha(Switzerland) during their lecture

Later, Ms. Tanya Bahl (Varian) introduced **HyperArc**, an advanced planning solution for non-coplanar cranial SRS, known for its steep dose gradients and automated workflows. She also addressed 4D CT scanning, MR fusion, and RGSC.

Dr. Binay Shrestha (Switzerland) joined online to present clinical protocols for various tumor sites, while **Mr. K. Kanakavel (PTW, India)** concluded with a hands-on demonstration of **RUBY** and **OCTAVIUS 4D** QA systems, showing practical steps for end-to-end testing and QA validation.

In the evening, the **official inauguration ceremony** was held with dignitaries including **Prof. Dr. Anjani Kumar Jha (Vice Chair, Nepal Medical Council), Dr. Bijay Raj Neupane (Chairman, BPKMCH)**, and leaders from SCMPCR. Prof. Zakaria and **Prof. Dr. Hasin Anupama Azhari (CEO, SCMPCR)** shared the vision of expanding SCMPCR activities across South Asia, advocating for equity in cancer care and promoting clinical innovation.

Day 3: Hands-on Learning and Practical Application

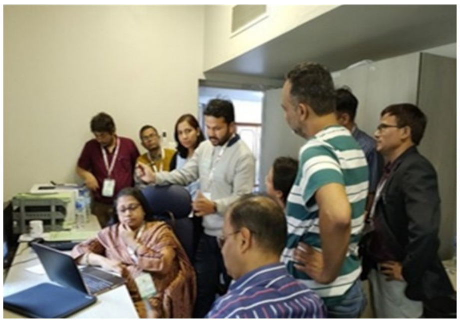
The third day focused on **practical skill development**. Participants were divided into two groups:

- **Group A** (Radiation Oncologists) performed target contouring, image fusion, and plan evaluations under expert guidance.
- **Group B** (Medical Physicists and RTTs) explored QA procedures, including Winston-Lutz isocenter verification, dose delivery analysis, and log file interpretation using PTW systems.

Later sessions led by **Dr. Binay Shrestha** and **Prof. Zakaria** introduced evaluation metrics like **Conformity Index (CI), Homogeneity Index (HI), Gradient Index (GI)**, and **Dose-Volume Histograms (DVH)** for assessing plan quality.

Participants also practiced 4DCT fusion with PET-CT and reviewed contour discrepancies in a peer-feedback model. This integration of real patient data and expert interaction created a powerful learning environment.

Day 4: Evaluation, Certification, and Shared Vision

On the final day, an **academic evaluation** tested participants' comprehension of the workshop topics. Most participants passed with distinction, earning **38 EBAMP-accredited Continuing Professional Development (CPD) points**, recognized by professional licensing authorities.

A **certificate distribution** ceremony followed, where participants, faculty, and organizers reflected on the academic rigor, logistical excellence, and hospitality experienced during the workshop.

Prof. Zakaria urged all participants to continue engaging through **SCMPCR's newsletters**, projects, and upcoming regional initiatives. He reaffirmed SCMPCR's commitment to supporting institutions like **BPKMCH** in clinical implementation of advanced techniques and encouraged the formation of more collaborative training programs across the region.

Participant Reflection: A Transformative Journey

One participant eloquently summarized the experience:

"Participating in this workshop was more than academic—it was transformative. The integration of lectures, clinical cases, and hands-on sessions deepened my understanding of high-precision radiotherapy. Interacting with peers and experts across South Asia fostered a spirit of collaboration that I will carry forward in both my clinical and academic journey."

Beyond the lectures and QA sessions, participants also enjoyed the serene surroundings of **Chitwan**, including visits to the **Royal Chitwan National Park**, where they observed local wildlife like one-horned rhinos and elephants—highlighting the unique blend of scientific pursuit and cultural experience.

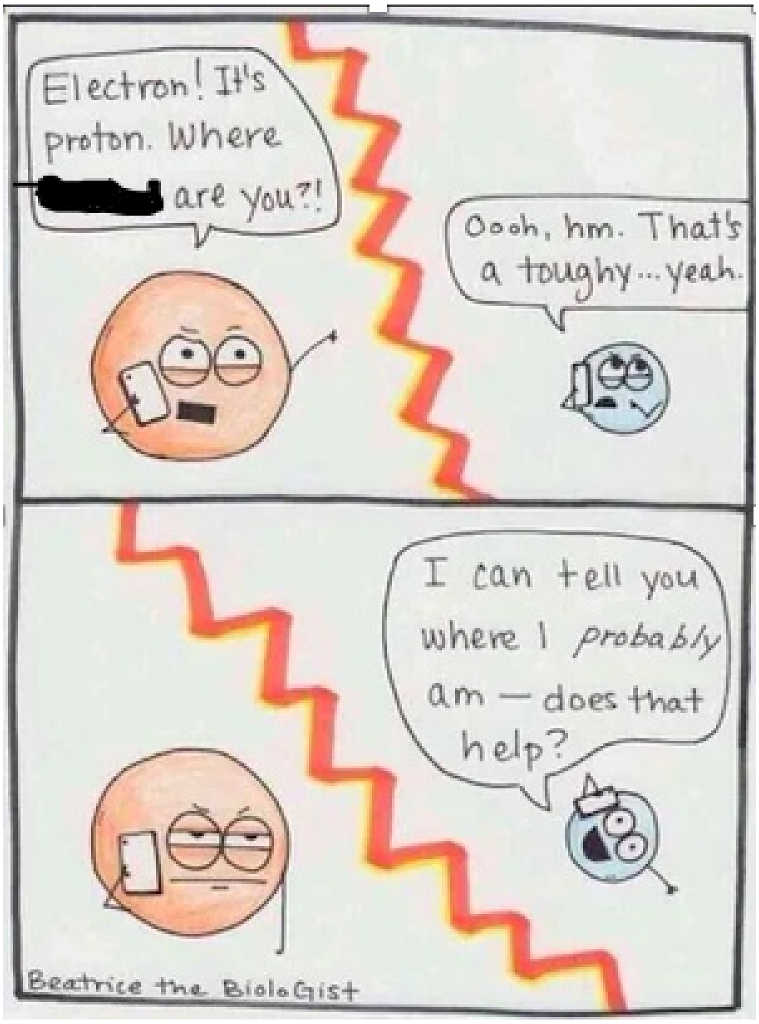
Conclusion

The SCMPCR HW-08 workshop was a landmark event in advancing precision radiotherapy in South Asia. It successfully blended theoretical insights, hands-on training, and interdisciplinary collaboration to equip healthcare professionals with the tools and mindset required for modern cancer care.

Thanks to the leadership of **SCMPCR, BPKMCH**, and **Bhaktapur Medical College**, and the enthusiastic participation of professionals from across the region, this event not only enhanced clinical expertise but also reinforced the shared vision of building an equitable, high-quality radiotherapy infrastructure across borders.

Fun with Science

Sourced from Internet by Rajni Verma, Ph.D, Assistant Professor,
Department of Radiological Physics, SMS Medical College and Hospitals,India



From Concept to Clinical Reality with LUNA 3D SGRT from LAP

By Martin Bendel

In 2024, Röntgenpraxis am Marstall, a private radiotherapy group in Germany, embarked on a transformative journey to enhance patient positioning and monitoring through the implementation of Surface Guided Radiation Therapy (SGRT) using the LUNA 3D system by LAP. As a radiooncologist and partner at the practice, I am pleased to share our practical experiences, clinical insights, and the collaborative spirit that turned our project into a success story.

A Question of Precision: Why SGRT?

With over 3,000 patients treated annually across five linear accelerators and multiple certified oncology centres, precision and patient comfort are critical to our clinical philosophy. SGRT offers technical advantages—markerless setup, sub-millimetre accuracy, and enhanced treatment reproducibility—and crucial "soft skills" benefits, such as reducing patient anxiety and improving quality of life through non-invasive procedures.

Making the Choice: A Collaborative and Transparent Process

Selecting an SGRT system requires more than a technical comparison. Our decision-making was truly interdisciplinary. Physicists, therapists, and physicians collectively evaluated all vendors via presentations, site visits, and hands-on testing. We prioritised workflow integration, compatibility with existing Elekta LINACs, and ease of use. LUNA 3D excelled in all criteria. Having relied on LAP lasers for years, we trust the company's reliability and technical service.

Implementation: A Logistical and Educational Achievement

Our entire infrastructure was upgraded within ten months from initial discussions to clinical use. LAP's team provided thorough support, aligning IT systems, DICOM-RT interfaces, and room configurations across three sites. The result? A seamless six-week installation covering five LINACs (2 Synergy, 1Infinity and 2 Versa) and two CT units (1Siemens go! Sim and 1 Siemens Somatom Confidence). (see Figure 1)

Figure 1: LUNA 3D system implementation

Staff Training: Embracing the Change

Training was key to acceptance. We began with immersive sessions at LAP's headquarters in Lüneburg, Germany, and on-site, role-specific instruction. LAP Academy's digital modules and application specialists ensured high engagement. DIBH modules and future-focused features were introduced with clarity and enthusiasm.

Clinical Integration: From Trial to Triumph

Our staff quickly appreciated the LUNA 3D interface's intuitiveness. Selected patients were treated using LUNA 3D and traditional LAP lasers. Cone Beam CT comparisons confirmed accuracy and reproducibility. By launch, the new system was rolled out across nearly all indications, with immediate buy-in from our multi-disciplinary team. (see Figure 2)

Figure 2: Treatment console

Looking Ahead

We're now testing new immobilisation masks for cranial treatments and implementing LUNA 3D in DIBH, SBRT, and SRS protocols. Beyond technology, this journey underscored a more profound truth: when clinical, technical, and logistical minds unite, innovation becomes achievable and sustainable.

Author Bio:
Dr. Martin Bendel is a radiooncologist and partner at Röntgenpraxis am Marstall, Germany. He is passionate about integrating cutting-edge technologies to improve patient outcomes and treatment precision in radiation oncology.

Streamlining CT Quality Assurance: RTI Group's Innovative Solutions For Accurate Dosimetry

In the rapidly evolving landscape of medical imaging, Computed Tomography (CT) has become an indispensable diagnostic tool. As CT technology advances, ensuring precise calibration and quality assurance (QA) becomes paramount to maintaining image accuracy and patient safety. RTI Group, a leader in X-ray QA solutions with over 40 years of experience, addresses these challenges with its state-of-the-art CT calibration probes and measurement tools, designed to meet the rigorous demands of modern imaging environments and streamline testing.

RTI Mako Testing Computed Tomography X-ray

With the launch of the latest X-ray meter, **Mako**, RTI Group further strengthens CT dosimetry and X-ray testing capabilities with the most advanced CT testing tools available. The RTI Mako system measures all parameters needed for routine testing, including kV measurements (on the couch or on the gantry) with industry-leading accuracy of the Mako R/F Probe, typical CT Dose Index with the RTI CT Ion Chamber, and streamlined tests of CTDI, DLP, and FWHM with the patented RTI CT Dose Profiler, either free-in-air or in phantom. RTI also provides regulation-size CTDI phantoms and leading Ocean Next software for an all-in-one premium solution.

RTI Mako CT Solution with Accessories

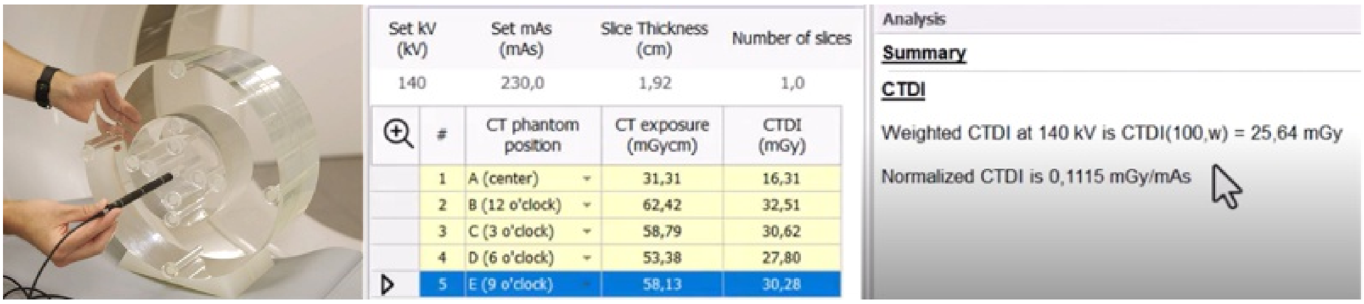
A range of parameters influence the uncertainty of CTDI measurement in axial scans. Two particular factors pertaining to the Ion Chamber include:

1. **Energy dependence**
2. **Effective length**

Different manufacturers show variation in effective length from 97 mm to 117 mm, with an estimated uncertainty of ±1 mm.

For that reason, the RTI CT Ion Chamber has been built with outstanding energy linearity, within 0.5% in the range of 70–150 kV for the IEC 61267 radiation qualities RQR 5 to 10, RQA 5 to 10, and RQT 8 to 10, as well as ISO N-150. This applies for soft radiation (low HVL) as well as highly attenuated radiation (high HVL). With an effective length that is very precise (100 ±0.5 mm), a chamber that is traceable to primary standards, and integration with the advanced electrometer in the Mako system, users can be confident they are getting a premium solution for CT dosimetry.

To further enhance the efficiency of CTDI testing, the RTI Ocean Next software has built-in measurement protocol templates that automate and streamline typical CTDI measurements. For example, the procedure of 1 axial scan in the isocenter of the PMMA CTDI phantom, and 4 scans in the periphery, can be fully automated in Ocean Next with fully traceable reporting. The weighted CTDI is calculated automatically upon completion of the 5 scans. Templates can be customized to any routine and setup.

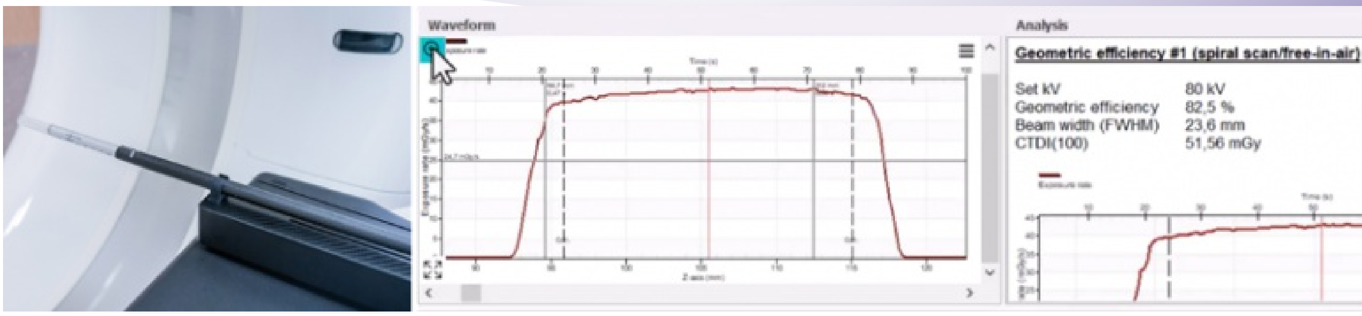


RTI CT Ion Chamber

Over the past decade, there has been increased discussion about the testing of wider beams in CT, and how the CTDI100 formalism applies. As technology has advanced, wider beams in CT combined with helical scanning have placed more demands on CT dosimetry testing, to ensure the CT Dose Index measurement provides a solid foundation for calculating patient or effective dose.

The patented RTI CT Dose Profiler (CTDP) was built to overcome such challenges and streamline routine testing. The CT Dose Profiler has the same form factor as an Ion Chamber (fitting into standard CTDI phantoms) but uses solid-state technology with a point-dose detector. It can be moved through the beam, such as in a helical scan, to obtain dose data throughout the entire scan profile—overcoming the traditional drawbacks of an Ion Chamber and avoiding multiple scans.

The CT Dose Profiler provides a visible view of the dose profile. When scanned in the isocenter of the CTDI phantom, a single helical scan provides the weighted CTDI measurement (typically requiring 5 axial scans with an Ion Chamber), which streamlines routine testing. When scanning free-in-air, the CT Dose Profiler also provides information on geometric efficiency, beam width (full-width-half-maximum; FWHM), and CTDI100 in mGy, making it a unique tool in CT scanner testing and dosimetry.



RTI CT Dose Profiler

Bringing It All Together

RTI Group’s advanced tools—**Mako, CT Ion Chamber, CT Dose Profiler, and Ocean Next software** offer a complete solution for accurate, efficient CT quality assurance. Together, they simplify testing, support compliance, and enhance patient safety.

Michael Olding, PhD, is Head of Product Management at RTI Group. Michael works at the interface between product development at RTI and global end users of RTI’s products and solutions (physicists, engineers, and medical professionals), and is passionate about ensuring user needs are at the forefront of new product development at RTI Group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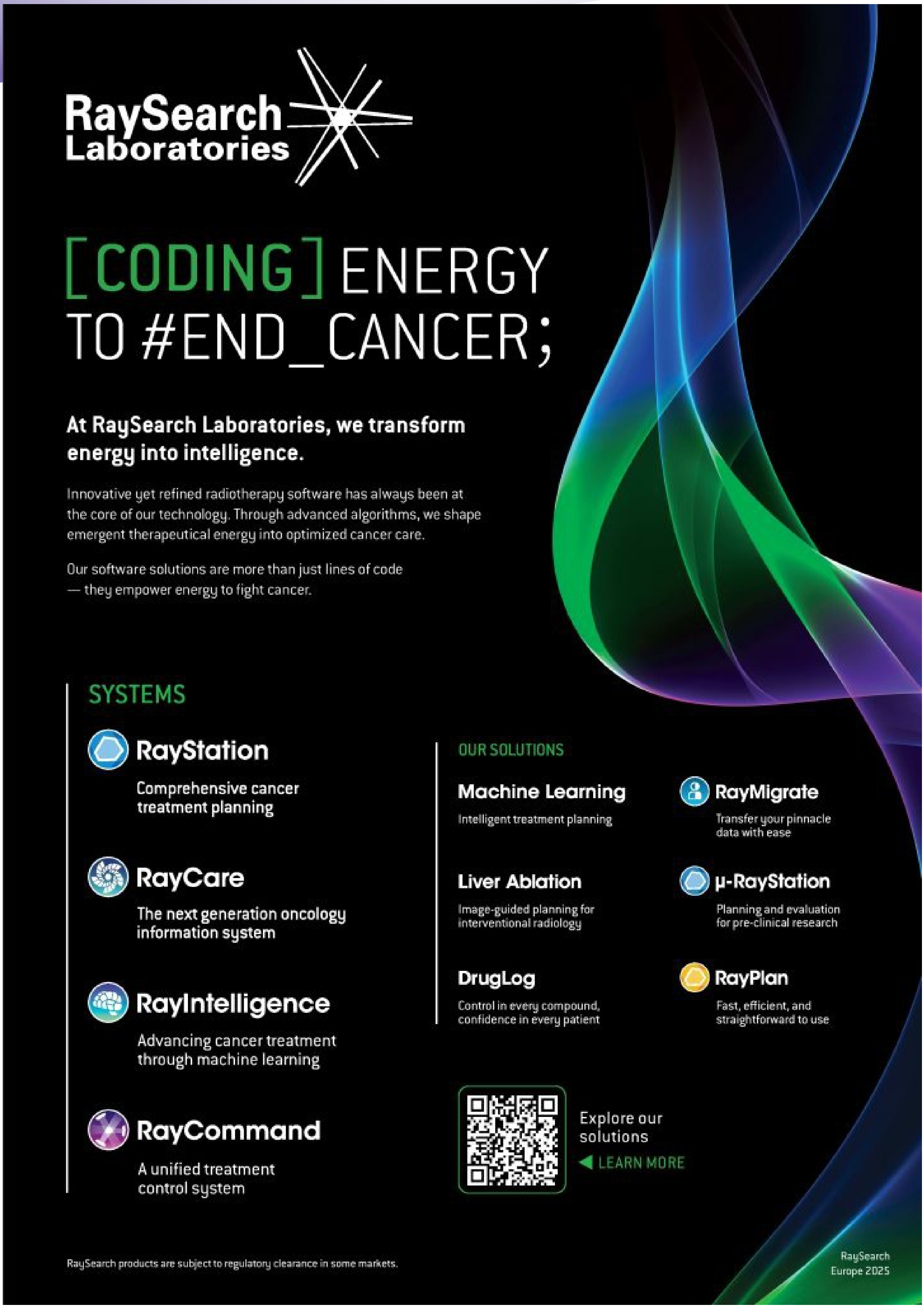

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Answers for MCQ Quiz

1) lesion at 1-cm depth in tissue is to be treated with 6-MeV electron beam with bolus. A dose of 1.5 Gy to 80% is prescribed. If output is 1cGy/MU, SSD is 104 cm and cone factor is 0.8, what should the thickness of the bolus be, and how many MU should be delivered?

ANSWER: C. 0 cm, 170 MU

2) Which of the following is true regarding geometric penumbra?

ANSWER: A. It increases as source diameter increases.

3) To achieve a standard deviation of 2%, _ counts must be collected.

ANSWER: C. 2500

4) All of the following reduce resolution in positron emission tomography (PET) except:

ANSWER: D. Size of the focal spot.

5) Which parameter(s) change as a result of coherent scatter of a photon from an atom?

ANSWER: C. Direction of travel.

6) Which imaging modality would allow one to distinguish an artificial diamond made of zirconium oxide ZrO2 (zirconium has atomic number 40) from a natural one made of carbon atoms (atomic number 6)?

ANSWER: B. Diagnostic X-rays.

7) Which of the following is not true regarding pair production?

ANSWER: A. The threshold photon energy is 0.511 MeV

8) The maximum number of photoelectrons produced in a photoelectric interaction by a single photon with incident energy of 150 keV is _.

ANSWER: A. 1

9) The mass attenuation coefficients for most materials (except hydrogen) are similar when _ interactions predominate.

ANSWER: B. Compton

10) A superficial x-ray treatment is prescribed with a 2 mm A1 filter. By mistake, a 1 mm filter is used All of the following will occur except:

ANSWER: D. Increased PDD.

Notes

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