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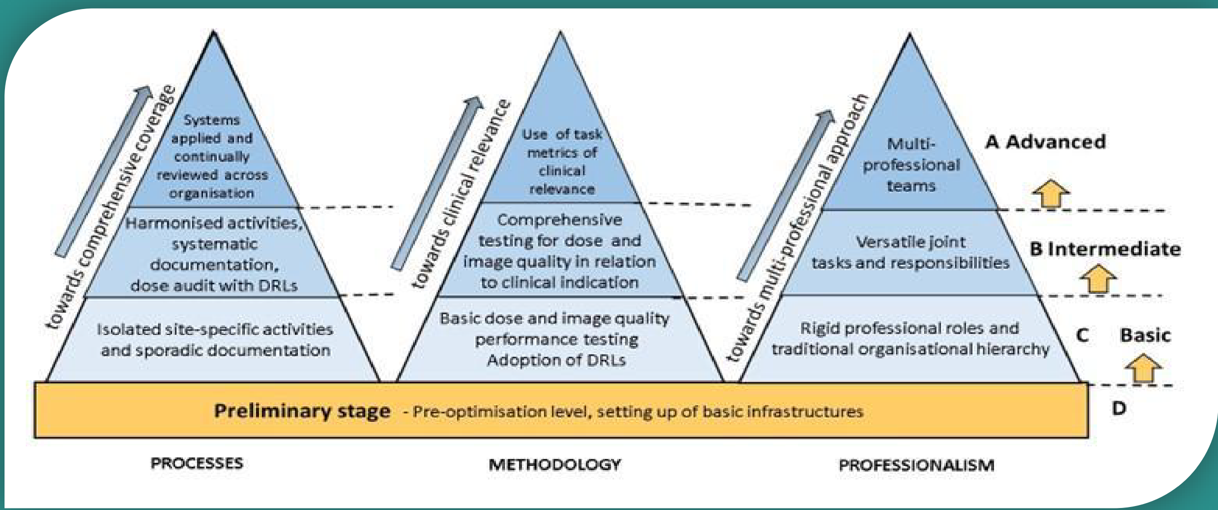
AFOMP Pulse

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



Optimisation of Radiological Protection in Digital Radiology (ICRP Publications 154 C 160)

VOLUME 18 • ISSUE 02 • SEPTEMBER 2026

HIGHLIGHTS

- Six Decades of Medical Physics Education in India: Evolution, Challenges and Future Directions
- Meet the expert series: Prof W. Howell Round interviewed by Dr. Rajni Verma
- Did you know? Marvellous science in action: AI-Powered Breakthroughs in Early Cancer & NCD Detection
- AFOMP ECMP: A Clinical Training Practice Spotlight
  Book review • Professional news • NMO activity • Events • Quiz

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NAVIGATE

Inside this issue

FROM THE EDITOR

Editorial

"Our fundamental responsibility remains unchanged: to ensure that technology is implemented safely, effectively, appropriately and equitably for the benefit of patients."

EDITORIAL NOTE

Dear Colleagues and Friends,

Warm Greetings!

On behalf of the editorial board, I am delighted to present you, the year 2026 second edition of AFOMP PULSE, an official newsletter of Asia Oceania Federations of organization for Medical Physics, Volume.18: Issue 2. This issue reflects the breadth, diversity and dynamism of medical physics across our region, spanning education, clinical practice, research, innovation, professional development and international collaboration.

Medical Physics is advancing rapidly. Precision radiotherapy, proton therapy, SBRT, motion management, artificial intelligence, Monte Carlo methods, advanced dosimetry and FLASH radiotherapy are increasingly moving from research into clinical practice. Yet, alongside innovation, our fundamental responsibility remains unchanged: **to ensure that technology is implemented safely, effectively, appropriately and equitably for the benefit of patients.**

Education is the foundation of our profession. The feature article, **"Six Decades of Medical Physics Education in India: Evolution, Challenges and Future Directions,"** provides valuable insight into the evolution of medical physics education and its future needs. As our discipline becomes increasingly multidisciplinary, education must integrate physics, biology, computing, engineering and clinical medicine while fostering problem-solving, leadership, innovation and lifelong learning.

The **"Meet the Expert"** feature on **Dr. W. Howell Round** reminds us that the progress of medical physics is driven not only by technology and research, but also by individuals who share knowledge, mentor colleagues and build institutions.

The **Editor's Choice** section highlights advances in proton therapy, dosimetry, Monte Carlo simulation, pancreatic SBRT, intrafraction motion tracking, radiochromic film reuse and machine performance evaluation. These developments reinforce an important principle: **precision requires accurate measurement, verification and quality assurance.**

The medical physicist therefore remains central to commissioning, optimization, independent evaluation and patient-specific verification. The **"Did You Know?"** feature on Artificial intelligence -enabled early detection of cancer and non-communicable diseases highlights both its promise and its challenges. Successful clinical adoption requires attention to data quality, validation, generalizability, workflow integration, cybersecurity, ethics and accountability. Medical physicists are well positioned to contribute through their expertise in quantitative science, technology assessment, quality assurance and risk management.

The **"What's New?"** and **"Technology & Innovation"** sections showcase emerging developments in patient-specific QA, electron FLASH radiotherapy and innovative linear accelerator platforms. These advances emphasize the need to balance innovation with robust evidence, reproducibility, regulatory compliance, appropriate training and measurable patient benefit. The professional news and National Member Organization reports further demonstrate the remarkable activity across Asia and Oceania—from radiological protection and proton therapy to precision radiotherapy, BNCT, in-vivo dosimetry and intraoperative radiotherapy. These initiatives highlight the importance of regional knowledge-sharing, networking and collaboration, particularly where expertise and resources remain unevenly distributed.

The **upcoming meetings**, including AOCMP 2026 in Busan, International Day of Medical Physics activities, SCMPCR 2026 and EPSM 2026 in Brisbane, offer valuable opportunities to exchange ideas, develop collaborations, mentor young professionals and shape the future of our discipline. As Chief Editor, I believe AFOMP Pulse belongs to the entire medical physics community. I warmly encourage colleagues to contribute articles, professional news, NMO reports, educational materials, innovations, perspectives, photographs and professional milestones. Every contribution can help strengthen connections and inspire our community.

I sincerely thank the AFOMP Executive Committee, led by **Prof. Hasin Anupama Azhari, President, and Dr. Aik Hao Ng**, Secretary-General, as well as the Committee Chairs, Editorial Board members, contributors, reviewers, National Member Organizations, and industry partners, for their continued support and valuable contributions in making this publication possible. I extend my special thanks to **A/Prof. Vanessa Panettieri** and **Dr. Rajni Verma**, **Vice-Chairs** of the Publication Committee, for their excellent coordination and valuable contributions to this issue.

I hope this issue of *AFOMP Pulse* stimulates curiosity, encourages collaboration and strengthens our shared commitment to excellence in medical physics, innovation and patient care.

Wishing you a great and enjoyable reading experience!

With Warm Regards,
Dr. V. Subramani
Chief Editor
AFOMP Pulse Newsletter and Chairman
Publication Committee, AFOMP

LEADERSHIP MESSAGE

AFOMP President’s Message

Dear Friends and Colleagues,

It is a privilege to connect with you once again through *AFOMP Pulse*. Looking across our vast Asia-Oceania region, I am constantly inspired by how our community adapts, innovates, and supports one another. Despite the differing resources and healthcare landscapes across our member nations, our fundamental purpose remains unchanged: ensuring that every patient receives safe, precise, and compassionate care through medical physics.

Recently, our focus has been centered on bridging gaps whether through specialized workshops, online webinars, or peer-to-peer mentorship. With technologies like artificial intelligence, adaptive radiotherapy, and advanced diagnostic imaging reshaping our daily routines, standing still isn't an option. Our continuous learning initiatives are designed to help both seasoned professionals and emerging clinical physicists stay ahead of these rapid shifts without losing sight of foundational standards.

What gives me the greatest confidence in our future is the vibrant energy of our young medical physicists. Seeing early-career researchers step up, share fresh ideas, and take on leadership roles brings tremendous vitality to AFOMP. Alongside this, our commitment to fostering diversity and supporting women in science remains at the heart of our organizational growth because a stronger, more inclusive community directly translates to better patient outcomes.

As we look toward major regional gatherings like **AOCMP 2026** in Busan, I encourage each of you to contribute your work, build new connections, and remain actively engaged in our shared journey. Thank you for your tireless dedication, your passion for scientific excellence, and your commitment to elevating our profession every single day.

Warmest regards,
Prof. Dr. Hasin Anupama Azhari
President, AFOMP

LEADERSHIP MESSAGE

AFOMP Vice President’s Message

Dear Colleagues and Friends,

It is a privilege to address you once again through the *AFOMP Pulse*. As we look ahead to the final quarter of 2026, our region is alive with activity and marked by significant progress in our shared mission to advance medical physics. We live in a rapidly changing world, where technological innovation is accelerating at an unprecedented pace. In the field of medical physics, this transformation is especially profound. The integration of artificial intelligence and machine learning into radiotherapy planning, adaptive treatment delivery, image reconstruction, and quality assurance is reshaping our professional landscape almost daily. We are witnessing the emergence of AI-assisted contouring, automated treatment planning, real-time motion management, and predictive outcome modelling—capabilities that were considered futuristic only a few years ago.

This rapid evolution presents both immense opportunities and considerable challenges. While new technologies promise greater precision, efficiency, and personalization in patient care, they also demand that we, as medical physicists, continually update our knowledge and skills. The tools we mastered during our initial education are no longer sufficient for a career spanning decade. To remain effective, safe, and relevant, we must embrace a mindset of lifelong learning.

The accelerating pace of technological change makes it more urgent than ever to strengthen our educational foundations. The safe and effective delivery of modern radiotherapy and diagnostic imaging depends entirely on the competence of the medical physicists who design, implement, and quality-assure these technologies. Even as AI and automation advance, they do not replace the physicist—they augment our role, shifting our focus from routine tasks to higher-level oversight, decision-making, and problem-solving. This shift requires a deeper, not shallower, understanding of both physics and clinical context.

In this context, continuous education and training are not optional, they are essential. Medical physicists must adapt to new hardware, software, and clinical workflows; understand the principles and limitations of AI-driven tools; and maintain the critical thinking and clinical judgment necessary to oversee these increasingly complex systems. Our professional responsibility to patients demands that we stay ahead of the curve—not only in technical proficiency but also in our ability to integrate new technologies safely and effectively into clinical practice.

In the Asia-Oceania region, we face a dual challenge: many countries are expanding access to radiotherapy and advanced imaging, while simultaneously grappling with a shortage of qualified medical physicists. This gap cannot be bridged by recruitment alone; it must be addressed through robust, standardised, and clinically immersive education and training programmes.

AFOMP is committed to supporting this adaptation through educational initiatives, workshops, and knowledge-sharing platforms. Our annual congresses, regional training courses, and collaborations with the International Organization for Medical Physics (IOMP) and the International Medical Physics Certification Board (IMPCB) are all designed to help our members navigate this changing landscape. However, the ultimate responsibility rests with each of us—and with the institutions that train and employ us—to prioritise continuous professional development. The clinical training programme I wish to highlight is situated within a broader ecosystem of academic excellence. Wenzhou Medical University (WMU), established in 1912, has grown into one of China's key medical education institutions, co-constructed by the Zhejiang Provincial Government, the National Health Commission, and the Ministry of Education. The university has a long-standing commitment to graduate education, having been authorized to confer master's degrees since 1978.

Of particular note is WMU's strong commitment to international education. The university received its academic credential to enroll foreign students in 1996 and established the School of International Studies in 2006, offering degree programmes taught in English. WMU was among the first schools in China approved for English-based bachelor's programmes in clinical medicine. Today, WMU hosts approximately 650 to 1,000 international students from 56 countries across Asia, Africa, Europe, the Americas, and Australia. The graduate programmes for international students currently enroll 32 master's candidates and 7 doctoral candidates, with additional candidates in combined fast-track programmes, including master's and PhD programmes for medical physics. This international dimension is particularly relevant to our medical physics community. WMU's existing infrastructure for hosting international students, its English-medium programmes, and its established research collaborations create a natural foundation for expanding training opportunities in medical physics. The clinical training programme at the First Affiliated Hospital, which has already welcomed international trainees, benefits from this broader university environment that values cross-cultural learning and global collaboration.

Finally, I am delighted to extend a warm invitation to the 26th Asia-Oceania Congress of Medical Physics (AOCMP 2026), which will be held from September 9–11, 2026, in the vibrant coastal city of Busan, Korea. Hosted by the Korean Society of Medical Physics (KSMP), this congress promises to be a cornerstone event for our community. The theme, *"Beyond Precision through Intelligent Innovation for Advanced Patient Care"*, aptly captures the transformative period our field is entering. The programme will feature cutting-edge scientific sessions, educational workshops, and invaluable opportunities for networking with peers from across the region and beyond. Also at this annual meeting, the IMPCB certification examinations will be held.

As we look forward to AOCMP 2026 in Busan, let us continue to share our educational best practices, strengthen our collaborations through certification frameworks such as the IMPCB, and inspire one another to advance the field of medical physics for the benefit of patients everywhere. The future of our profession depends on the investments we make today in education, training, and certification—and on our collective commitment to adapting, learning, and leading in this fast-changing world.

Sincerely,

Dr. Xiance Jin, Ph.D
Vice president, AFOMP

LEADERSHIP MESSAGE

AFOMP Secretary-General's Message

Dear colleagues,

As we published in the September 2026 edition of the AFOMP Pulse Newsletter, I want to express my deepest gratitude to all our National Member Organizations (NMOs), executive committee members, and dedicated volunteers for your continued collaboration and invaluable support. Working closely together under the AFOMP platform, we continue to strengthen the medical physics profession and expand our impact across the Asia-Oceania region.

A key milestone in our commitment to nurturing the next generation of professionals is the launching of the Subcommittee of Early Career Medical Physicists (ECMP) under the AFOMP Professional Relations Committee. This initiative has been established to provide an inclusive regional platform designed specifically to support, connect, and empower our young medical physicists. I strongly encourage all eligible candidates to put forward nominations to this subcommittee, and to participate actively, work together, share your vision, and make full use of the professional support and mentoring opportunities within our region and beyond.

I am also delighted to warmly invite each of you to join us at AOCMP 2026 (the 26th Asia-Oceania Congress of Medical Physics), taking place in Busan, South Korea, from 9 to 11 September 2026. Hosted by the Korean Society of Medical Physics (KSMP) at the Busan Port International Exhibition & Convention Center (BPEX), this year's congress is centered around the theme, "Beyond Precision through Intelligent Innovation for Advanced Patient Care". It is a premier opportunity for us to share cutting-edge scientific research, network, and foster a forward-looking, vibrant professional community.

Looking slightly further ahead, we are also preparing to celebrate the International Day of Medical Physics (IDMP) 2026 on November 7. This year's theme, "Advancing Global Health Equity: The Ethical Foundation of Medical Physics," highlights our ethical responsibility to make high-quality medical physics services and safe medical technologies universally accessible to all patients, regardless of geographic or socioeconomic barriers. I encourage all NMOs to actively participate in the scheduled IOMP webinars, and organise local promotional activities to emphasize the compassionate, human-centered role of medical physicists in healthcare.

Thank you for your continued support. Together, we learn, serve and contribute!

Yours sincerely,

Dr. Aik Hao Ng

Secretary-General, AFOMP

LEADERSHIP MESSAGE

AFOMP Treasurer's Message

Dear Colleagues and Friends,

It is a great privilege to address the medical physics community in the Asia–Oceania region through this issue of AFOMP Pulse.

Financial sustainability and transparent stewardship form the bedrock upon which our federation's vision is built. I am delighted to report that AFOMP maintains a remarkably strong and resilient financial position—a testament to the collective commitment of our entire regional network.

This financial strength stems primarily from the steady support of our dedicated National Member Organizations (NMOs) through their annual subscription fees, alongside the generous contributions of our corporate members. Our industry partners play a crucial role not only in backing our financial ecosystem, but also in driving technological innovation that advances patient care across the region.

Importantly, our robust financial health is a dynamic tool for growth. AFOMP actively reinvests these resources directly into our community to nurture talent and foster professional development. Through dedicated financial grants, educational subsidies, and annual Travel Awards, we continue to empower our members, especially early-career medical physicists, researchers, and colleagues from low- and middle-resource settings. These funds provide critical support for members to participate in our flagship event, the Asia–Oceania Congress of Medical Physics (AOCMP), facilitating vital knowledge exchange, international collaboration, and professional networking.

As we look to the future, the Treasury will remain steadfast in maintaining rigorous financial integrity while seeking new ways to expand our award and support programs to serve the evolving needs of our region.

I extend my deepest appreciation to our NMO leadership, valued corporate partners, and fellow Executive Committee members for their unwavering trust, guidance, and support. Together, we ensure that our shared resources continue to translate into a stronger, more connected medical physics community.

Warmest regards,

Dr. Taweap Sanghangthum, PhD

Treasurer, AFOMP.

LEADERSHIP MESSAGE

AFOMP Chair of Science Committee

It is my great pleasure and honor to serve as the Chair of the Science Committee of the Asia–Oceania Federation of Organizations for Medical Physics (AFOMP). I would like to begin by expressing my sincere gratitude to all the members of the Committee for accepting this important role and for their continued commitment to the advancement of medical physics in the Asia–Oceania region.

I am also privileged to work with distinguished committee members representing AFOMP member organizations across the region: Dr. P. Venkatraman from AMPI, Dr. Jeannie Wong Hsiu Ding from IFM, Dr. Mohammad Amin Mosleh-Shirazi from IAMP, Dr. Daisuke Kawahara from JSMP, Dr. Wonmo Sung from KSMP, Dr. Francis Lee from HKMPA, Dr. Sivananthan Sarasanandarajah from ACPSEM, and Dr. Xinye Ni from CSMP. The diversity of expertise, professional backgrounds, and regional perspectives represented by these members will be a major strength. The AFOMP Science Committee aims to promote the academic advancement and scientific development of medical physics in the Asia–Oceania region. In line with this mission, the Committee serves as a scientific advisory and coordinating body supporting AFOMP, its Executive Committee, and its member organizations. Its key roles include providing scientific advice, promoting research collaboration, supporting scientific meetings such as the Asia–Oceania Congress of Medical Physics (AOCMP), contributing to academic and scientific resources, and participating in the evaluation of scientific proposals, awards, and other related activities. As part of our recent activities, the Science Committee has contributed to the scientific review process for the AOCMP 2026, including abstract evaluation and support for the development of the scientific program. The Committee has also been involved in the review process for the AFOMP Journal Prize for Best Paper. These activities are directly aligned with our responsibility to support scientific quality, academic rigor, and fair evaluation of AFOMP-related scientific activities.

Looking ahead, the Science Committee will continue to support AFOMP's scientific activities through close collaboration with other AFOMP committees, local organizing committees, member organizations, and relevant international bodies. We will also seek to encourage cross-border research collaboration, strengthen scientific exchange, and support the development of early career medical physicists across the Asia–Oceania region in the future. I am confident that, through the collective expertise and dedication of all committee members, the AFOMP Science Committee can make a meaningful contribution to the further scientific advancement of medical physics. We will continue to work together to support AFOMP's scientific growth of AFOMP and contribute to the broader medical physics community.

Dr. Naoki Hayashi, PhD

Chair, AFOMP Science Committee

LEADERSHIP MESSAGE

AFOMP Funding Committee Report

Dear AFOMP Members,
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
- Strengthening 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 (Email: fc.afomp@google.com)

LEADERSHIP MESSAGE

AFOMP Chair of ETC Report

Dear Colleagues and Friends,

On behalf of the AFOMP Education and Training Committee (ETC), it is a great privilege to address the medical physics community through this issue of AFOMP Pulse. Medical physics is advancing at an unprecedented pace. Artificial intelligence, automation, innovative radiotherapy, quantitative and hybrid imaging, theranostics, and other new technologies continue to revolutionize the clinical practice. While such developments present exciting new opportunities, they further underscore the significance of accessible, systematic, and continuously updated education and training for medical physicists in the Asia-Oceania region.

Our region is characterized by remarkable diversity with respect to healthcare infrastructure, technology availability, educational resources and opportunities for continuing professional development. Such diversity presents a particular challenge and at the same time unique advantage for the ETC in its regional cooperation. We are not only aiming to organize educational events; but also, to facilitate the creation of sustainable learning platforms where the members of our profession learn from each other and develop practical skills and professional competencies. During this term, the ETC is planning to enhance the education activities of AFOMP through webinars, AFOMP Schools, workshops, collaborative education programs, and interaction with National Member Organizations (NMOs).

An important priority is also to increase the involvement of early-career medical physicists and the next generation of professionals. Providing opportunities to learn from experienced colleagues, interact with experts from different countries, and participate actively in regional educational initiatives will be essential for developing future leaders in our profession.

Education becomes stronger when it is collaborative. I therefore encourage our NMOs, educators, clinical medical physicists, researchers, and young professionals to share their educational needs, expertise, and ideas with the ETC. Greater participation from across the AFOMP region will help us develop programs that are relevant, inclusive, and responsive to the changing needs of our profession.

As we move forward, our vision is clear: to connect expertise across the Asia–Oceania region and translate knowledge into better clinical practice, stronger professional capacity, and ultimately safer and higher-quality patient care.

I sincerely thank the AFOMP leadership, ETC members, NMOs, speakers, moderators, educators, and volunteers whose commitment makes these educational initiatives possible.

Md Akhtaruzzaman, PhD
Chair, ETC

LEADERSHIP MESSAGE

AFOMP Chair of PRC Report

Dear Colleagues and Friends,

Greetings from the AFOMP Professional Relations Committee (PRC)!

It gives me great pleasure to connect with the AFOMP medical physics community through this issue of *AFOMP Pulse*. The PRC remains committed to strengthening professional relationships, fostering collaboration across the Asia–Oceania region, and creating opportunities for medical physicists to learn, connect, and grow together.

One of the highlights of 2026 was the **International Medical Physics Week (IMPW) 2026 celebrations**, held on **25–26 April 2026**, bringing together the **Presidents of AFOMP Member Organizations** in a special series of sessions. The participation of leaders from across the region provided a unique platform to reflect on the growth of medical physics, share perspectives on the challenges and opportunities facing our profession, and strengthen the spirit of collaboration and solidarity within the AFOMP community. The enthusiastic participation of the Presidents made these celebrations particularly meaningful and demonstrated the strength and diversity of medical physics across the Asia–Oceania region.

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.

AFOMP LinkedIn AFOMP X (Twitter) AFOMP Facebook AFOMP Bluesky AFOMP YouTube

As we look ahead, I am particularly delighted to invite all AFOMP members and colleagues to AOCMP 2026, to be held in Busan, South Korea, from 9–11 September 2026. This congress will be a wonderful opportunity to reconnect with friends and colleagues from across the region, exchange scientific and professional knowledge, explore emerging developments in medical physics and strengthen the networks that make our AFOMP community so vibrant.

I strongly encourage our National Member Organizations, senior medical physicists, early-career professionals, researchers, educators, and students to take this opportunity to be part of AOCMP 2026. Beyond the scientific programme, such gatherings remind us of the importance of professional fellowship and regional collaboration. Let us come together in Busan, not only to share knowledge, but also to celebrate our profession, strengthen friendships, build new collaborations, and shape the future of medical physics in the Asia–Oceania region.

I look forward to welcoming you all to AOCMP 2026 in Busan, South Korea!

With warm regards,

Prof Dr Mary Joan
Chair, Professional Relations Committee (PRC- AFOMP)

FEATURE ARTICLE

Six Decades of Medical Physics Education in India: Evolution, Challenges and Future Directions

Prof. (Dr) Arun Chougule PhD, FIUPESM, FAMS, FIOMP, FICMP

Ex. Senior Professor and Head, Department of Radiological Physics, SMS Medical College and Hospitals, Jaipur, India, Past President of AFOMP, Past President of AMPI, Ex Chair ETC IOMP and Chairman IOMP Accreditation Board

Prologue

Formal medical physics education in India began in 1962, when a one-year post-graduate course in radiological physics [Dip. R.P] was instituted at the Atomic Energy Establishment, Trombay. Six decades later, the country hosts several dozen academic programmes, a professional association with a national footprint, a statutory regulator that defines who may practice, and since 2021, legislative recognition of the medical physicist as a healthcare professional. This article traces that trajectory, takes stock of where medical physics education in India stands today, sets out the structural challenges that continue to constrain it, and proposes a set of directions for the decades ahead. The central argument is simple: India has solved the problem of academic supply but has not yet solved the problem of clinical competence assurance. The next phase of our development must be built around accredited programmes, structured residency, and competency-based assessment.

1. Introduction: A Profession Born of Physics, Raised by Medicine

Medical physics occupies an unusual position in the architecture of modern healthcare. It is not a clinical specialty in the conventional sense, yet no radiotherapy department can lawfully or safely function without it. It is a branch of applied physics, yet its practitioners spend their working lives in hospitals, at treatment consoles, beside patients. It is invisible to the public, yet every one of the millions of radiological examinations and radiotherapy fractions delivered in India each year depends on the quantitative rigor that medical physicists bring to dosimetry, quality assurance, treatment planning and radiation protection.

Because of this hybrid identity, the education of a medical physicist has always been a difficult thing to design. A curriculum that is too physics-heavy produces a graduate who cannot function in a clinic. One that is too clinical produces a technologist rather than a physicist. The history of medical physics education in India is, in large measure, the history of successive attempts to find the correct balance between these two poles, under conditions of severe resource constraint and rapidly advancing technology.

It is worth stating at the outset why this history matters now. India today carries one of the world's largest cancer burdens, with well over 1.5 million new cases annually and most patients presenting at locally advanced stages where radiotherapy is indicated. The country continues to expand its radiotherapy capacity, and each new linear accelerator, brachytherapy suite, PET-CT scanner and radio pharmacy requires qualified medical physics support. Whether that support is genuinely qualified as opposed to merely credentialed, is determined almost entirely by the education and clinical training system. The stakes of getting this right are measured in patient outcomes.

2. The Genesis: 1962 and the Trombay Beginning

In India, medical physics activities started in the mid-1940s with the appointment of Dr. Ramaiah Naidu as the first medical physicist at the Tata Memorial Hospital, Mumbai with a responsibility to set up and operate a radon plant for cancer treatment, however the medical physics education started much later. The origins of Indian medical physics lie not in a medical college but in the country's atomic energy establishment. This was no accident. In the 1950s and early 1960s, the expertise required to handle radiation sources, calibrate them, and protect workers and patients existed in India almost exclusively within the Department of Atomic Energy. When Homi Bhabha's institutional vision produced a national capability in nuclear science, radiological physics came with it as a necessary adjunct.

In 1962, a one-year post-M.Sc. course in radiological physics was started at the Atomic Energy Establishment, Trombay, renamed the Bhabha Atomic Research Centre (BARC) in 1967, under the aegis of the Mumbai University. The programme was designed to produce medical physicists who could serve as radiological safety officers and hospital physicists for the small but growing number of radiotherapy and nuclear medicine installations in the country. Its graduates were few in number, hand-picked, and trained near the national standards laboratory and to the regulatory apparatus that was then being built.

Several features of that founding programme deserve emphasis, because they set patterns that persist to this day.

- It was national in scope and singular in provision. For the better part of two decades, essentially every practicing medical physicist in India came from a single institution. This produced a remarkably uniform professional culture, a shared technical vocabulary, and a network of personal relationships that made national coordination possible long before there was any formal machinery for it.
- It was tightly coupled to regulation. The course was run by the same organisational family that certified radiological safety officers and inspected installations. Education, certification and regulation were, in effect, a single system. This gave the qualification unimpeachable authority.
- It was post-graduate and physics-first. Entrants already held an M.Sc. in physics. The course added radiological specialization on top of a complete physics education rather than attempting to interleave the two.
- It included substantial hands-on exposure. Because the numbers were small and the facilities were world-class by the standards of the time, students received a depth of practical training that later mass expansion would find very hard to replicate.

The graduates of these early cohorts went on to establish medical physics services in the major cancer centres of the country and, in due course, to found the academic programmes and professional structures that followed. Any honest account of this period must acknowledge that it rested on the personal commitment of a small number of individuals working with limited means, a debt that the profession in India has not always adequately recorded.

A note from the twenty-third batch: I came to the course as a student of the twenty-third batch, in 1983–84. That ordinal is itself a small piece of corroborating evidence for the founding date: counting back twenty-two intakes from 1983 returns 1961–62, which is precisely where the institutional record places the first batch. By then the course had been running for two decades. The faculty I encountered included Dr A. K. Ganguly, Dr V. K. Iya, Dr K. G. Vohra, Dr S. D. Soman, Dr G. Subramanian, Dr U. Madhvanath, Dr S. J. Supe, Dr K. S. Parthasarathy, Dr. A. S. Pradhan, Dr. B. C Bhat among many others. Dr P. S. Iyer was our course coordinator.

3. Building an Identity: 1976 to 1999

If the first phase produced practitioners, the second produced a profession. The establishment of the Association of Medical Physicists of India (AMPI) in 1976 gave the discipline a collective voice, a forum for scientific exchange, and eventually a scholarly publication of its own, the bulletin that would evolve into the Journal of Medical Physics. These are not ceremonial developments. A profession without a learned society has no mechanism for setting its own standards, no venue in which to argue about them, and no standing when it negotiates with government, hospital administrations or sister specialties. AMPI celebrates five decades of it contribution to profession.

The period also saw the creation of the Atomic Energy Regulatory Board in 1983, which formalized the regulatory framework governing radiation installations. For medical physics education this had a decisive consequence: the regulator, rather than the university system, became the effective arbiter of who could practice. AERB requirements regarding the qualification and deployment of medical physicists and radiological safety officers in radiotherapy and nuclear medicine facilities created a hard, enforceable demand for trained personnel and, equally importantly, defined what "trained" meant.

Academic provision began to diversify during these decades. Universities and institutes outside the atomic energy system started M.Sc. programmes in medical physics or radiological physics, initially in the south and west of the country and later more widely. This was a necessary development, a single institution could never have met national demand but it introduced, for the first time, the problem of variance. Programmes now differed in curriculum, in laboratory infrastructure, in faculty depth and, most consequentially, in the quality of clinical exposure they could arrange for their students.

The response to this variance was the requirement, enforced through the regulatory route, that an M.Sc. in medical physics be followed by a period of supervised clinical training in a recognized institution before the graduate could be certified to practice independently. In principle this was exactly the right instrument: it placed a common clinical filter downstream of heterogeneous academic inputs. In practice, as Section 7 of this article argues, the capacity to deliver that clinical training has never kept pace with the number of graduates seeking it, and this mismatch has become the single most serious structural problem in Indian medical physics education.

4. The Expansion Decades: 2000 to 2015

The turn of the century brought three simultaneous transformations: an explosion in the number of academic programmes, a revolution in radiotherapy technology, and India's emergence as a significant player in regional and international medical physics organizations.

Programme proliferation. The number of institutions offering post-graduate medical physics education in India grew several-fold. Central universities, state universities, deemed universities, private institutions and hospital-based programmes all entered the field. Entry routes multiplied as well, with some programmes admitting students directly after a B.Sc. into integrated or two-year M.Sc. streams alongside the traditional post-M.Sc. diploma route. The profession went from producing a handful of graduates a year to producing several hundred.

Technological transformation. In the same period, Indian radiotherapy moved from cobalt-60 and two-dimensional planning to linear accelerators, three-dimensional conformal therapy, intensity-modulated radiotherapy, image-guided radiotherapy, stereotactic techniques, and high-dose-rate brachytherapy with volumetric planning. Nuclear medicine moved from planar gamma cameras to SPECT-CT and PET-CT, and towards therapeutic radiopharmaceuticals. Diagnostic radiology moved to multi-detector CT, digital radiography and increasingly sophisticated dose-management requirements. Each of these transitions expanded the knowledge base a competent medical physicist was expected to command.

International engagement. India was a founding participant in the Asia-Oceania Federation of Organizations for Medical Physics, established in 2000, and has since contributed leadership to AFOMP and to the International Organization for Medical Physics. Indian physicists have participated in IAEA technical cooperation and coordinated research projects, hosted regional congresses, and contributed to the international guidance documents that now shape curricula worldwide, notably the IAEA's Training Course Series and Human Health

Series volumes on academic programmes, clinical training and the roles and responsibilities of the clinically qualified medical physicist.

The tension of this period is easily stated. Academic capacity grew roughly in line with demand. Clinical training capacity did not. Technological complexity grew faster than either. The gap between what a graduate knew and what a practicing physicist needed to know widened precisely when the consequences of that gap became more severe.

5. From Practitioner to Profession: 2016 to 2025

The most significant development of the recent period is not technological but legal. The National Commission for Allied and Healthcare Professions Act, 2021, brought medical physics within a statutory framework for allied and healthcare professions, providing for registration, recognition of qualifications and the setting of professional standards. For a discipline that had spent six decades being regulated primarily through radiation-safety law, that is, through its hazard rather than through its clinical function, this is a change of category, not merely of degree.

The practical implications are still unfolding, but the direction is clear. A statutory professional council implies a register, and a register implies agreed entry standards. Agreed entry standards imply recognized qualifications, which implies a mechanism for recognizing and, by necessity, for declining to recognise academic programmes. In other words, the legislative development of 2021 makes programme accreditation not merely desirable but structurally inevitable. The profession's task is to shape that accreditation process rather than to have it imposed. Alongside this, the period has seen continued growth in clinical infrastructure, the introduction of online regulatory processes that have made licensing and personnel records more systematic, the arrival of advanced modalities including proton therapy and MR-guided radiotherapy at a small number of Indian centres, and the beginnings of serious engagement with artificial intelligence in treatment planning, auto-segmentation, quality assurance and image analysis.

6. Where We Stand Today: A Stock-Taking

A candid assessment of the present position must record both the achievements and the deficits, I have tried to do that honestly, unbiased.

What has been achieved. India has an established, internationally recognized medical physics community; a national professional association with a long publication record; a functioning regulatory framework that mandates medical physics staffing in radiation facilities; a substantial number of academic programmes distributed across the country; a cohort of medical physicists holding leadership positions in regional and global bodies; and, now, statutory recognition as a healthcare profession. Measured against where the discipline stood in 1962, or against the position of medical physics in most comparable middle-income countries, this is a considerable record.

What has not. There is no independent national body that accredits medical physics academic programmes against published standards and inspects them periodically. There is no structured, funded, nationally organized residency system with defined competencies and a common exit assessment. Clinical training placements are secured largely through individual initiative and institutional goodwill rather than through a planned allocation of a national resource. There is no routine, mandatory recertification tied to continuing professional development. Faculty depth in many newer programmes is thin. And the distribution of both training capacity and practicing physicists remains heavily skewed towards the metropolitan centres of the south and west. The honest summary is that we have built a large system without having built the quality-assurance apparatus that a large system requires. This is, ironically, a failure of exactly the discipline that medical physicists profess: we have expanded throughput without commissioning the process.

7. The Challenges

7.1 The clinical training bottleneck

This is the central problem, and it deserves to be named as such. Every other difficulty discussed below is either a contributor to it or a consequence of it. Post-academic clinical training is where a graduate learns to do the job: to commission a linear accelerator, to interpret a failed quality-assurance result under time pressure, to plan a difficult case, to say no to a clinician when the physics does not support the request, and to carry professional responsibility for a patient's dose. Nothing in a lecture theatre substitutes for this. Yet the number of recognized institutions able to offer such training, and the number of trainees each can meaningfully supervise, is bound by clinical workload, equipment access and critically, the availability of experienced physicists with time to teach.

The consequences of the shortfall are corrosive. Graduates wait for placements, sometimes for extended periods, and lose momentum. Some accept nominal training that discharges the paperwork requirement without delivering the competence. Departments that do train carry an unfunded burden and the profession as a whole is left without any assurance that two physicists holding the same certificate have received remotely comparable preparation.

7.2 Heterogeneity and the absence of accreditation

Programmes vary enormously in their curriculum implementation, contact hours, laboratory provision, access to clinical equipment, faculty qualifications and assessment rigor. Some are excellent. Some are not. At present there is no systematic, published, independent means for a prospective student, a hiring department, or a regulator to tell the difference.

Accreditation is often resisted as bureaucratic overhead. That resistance misreads what accreditation is for. Its purpose is not to punish weak programmes but to make quality visible, to give good programmes a defensible standard to point to, and to give weak programmes a concrete improvement agenda. Every mature medical physics community has concluded that it is necessary.

7.3 The faculty deficit

Rapid programme expansion has outrun the supply of teachers who combine a doctoral-level physics education with substantial clinical experience. Many programmes are staffed by academics with limited clinical exposure or by clinical physicists with limited time and no formal preparation for teaching. Neither is adequate on its own. The problem compounds itself: programmes without strong faculty produce graduates who are less likely to become strong faculty.

7.4 A radiotherapy-heavy curriculum in a multimodality world

Indian medical physics education remains, in its centre of gravity, radiation oncology physics. That emphasis is historically justified as radiotherapy is where the regulatory mandate and most of the employment lie. But it has left diagnostic and interventional radiology physics, nuclear medicine physics, radiopharmaceutical therapy and MRI safety comparatively under-served, both in curriculum time and in clinical training opportunity. This matters increasingly. Imaging volumes in India are growing far faster than radiotherapy volumes, dose optimization in CT and interventional fluoroscopy is a genuine public health issue, MRI safety incidents are under-recognized, and theranostics is expanding rapidly. A profession that has trained itself almost exclusively for one modality will find itself absent from the places where it is most needed next.

7.5 Technology outruns the syllabus

Curricula are revised on a cycle of years; clinical technology changes on a cycle of months. Adaptive radiotherapy, MR-linac workflows, surface-guided setup, automated and knowledge-based planning, FLASH, radiomics and machine-learning-assisted quality assurance have all moved from research to practice faster than formal education has absorbed them. The gap is filled, if at all, by vendor training which is valuable but is not, and should not be mistaken for, independent professional education.

7.6 Research culture and the doctoral pipeline

Relative to the size of the community, Indian medical physics produces modest volumes of original research, and the doctoral pipeline is narrow. There are structural reasons: heavy clinical workloads, limited protected research time, few dedicated funding streams for clinical medical physics, and limited institutional expectation that a hospital physicist will publish. The cost is not only reputational. Without a research culture, a profession cannot generate its own evidence, cannot critically evaluate the technology it is sold, and cannot train the faculty it needs.

7.7 Career structure, recognition and retention

Career pathways for medical physicists in Indian hospitals remain inconsistently defined, with wide variation in designation, remuneration and progression between government and private institutions and between states. Recognition within the clinical hierarchy is uneven. The predictable result is attrition to industry, to other countries, and out of the discipline entirely, concentrated precisely among the most capable early-career physicists. Education cannot be considered in isolation from this: students make rational decisions about where to invest years of their lives.

7.8 Geographic inequity

Both academic programmes and advanced clinical facilities are concentrated in a limited number of states and cities. Students from under-served regions face higher barriers to entry, and hospitals in those regions face greater difficulty recruiting and retaining qualified physicists. Left unaddressed, this reproduces itself indefinitely.

8. Future Directions

8.1 Establish a national accreditation mechanism for medical physics education

The single highest-leverage intervention available to the profession is the creation of an independent accreditation body, developed by the profession, aligned with the statutory framework, and informed by international models, that publishes standards for academic programmes, assesses programmes against them, and reviews them periodically. Standards should address curriculum content, contact and laboratory hours, faculty qualifications and student-to-faculty ratios, access to clinical equipment, assessment methods and graduate outcomes. Accreditation should be a public status, and the list of accredited programmes should be published.

8.2 Replace "internship" with structured residency

The post-academic clinical training year should be reconceived as a residency: a defined training post, with a named supervisor, a documented competency framework, a logbook of performed and observed procedures, periodic formative assessment and a summative exit examination. Residency posts should be recognized, funded where possible, and counted as part of departmental establishment rather than treated as free labor or as a favour. Expanding capacity will require creative approaches: hub-and-spoke arrangements in which a large centre supervises trainees rotating through smaller ones; regional training networks that pool equipment access; simulation, treatment-planning-system training and virtual commissioning exercises to build competence before scarce machine time is consumed; and formal recognition and support for the physicists who take on supervision.

8.3 Move to competency-based education and assessment

The relevant question at the end of training is not how many hours a trainee attended but what they can reliably do unsupervised. A national competency framework specifying, modality by modality, the tasks a newly qualified medical physicist must be able to perform, would give programmes a common target, give trainees clarity, and

give employers meaning. Assessment should follow objective structured practical examinations, case-based discussion, direct observation of procedural skills.

8.4 Invest deliberately in faculty development

The profession should treat faculty shortage as a solvable problem rather than a background condition. Practical measures include structured teacher-training for clinical medical physicists entering academia, joint academic-clinical appointments that keep teachers in contact with practice, sabbatical and fellowship schemes, mentorship pairing of new programmes with established ones, and shared national teaching resources, recorded lectures, laboratory protocols, planning case libraries so that a small programme is not obliged to build everything alone.

8.5 Build the digital curriculum

Artificial intelligence, machine learning, medical image informatics, scripting and automation, data management and cybersecurity in the clinical environment should become core, examinable curriculum content rather than optional electives. The medical physicist is the natural custodian of algorithmic quality assurance in the clinic, the professional who asks whether an auto-contour is safe, whether a model generalizes to the local population, and how failure will be detected. If we do not train for that role, it will be occupied by others or, worse, by no one.

8.6 Broaden the modality base

Curricula and clinical training should be rebalanced to give substantive weight to diagnostic and interventional radiology physics, nuclear medicine and radiopharmaceutical therapy dosimetry, MRI physics and safety, and radiation protection of patients in imaging. Where clinical placements in these areas are scarce, regional rotations and structured short attachments offer a practical route.

8.7 Institute continuing professional development and periodic recertification

Competence acquired in 2015 does not certify practice in 2035. A CPD framework with credit requirements, recognized providers, and periodic revalidation linked to professional registration should be introduced. This is the natural complement to statutory registration, and the profession should propose it before it is prescribed.

8.8 Strengthen research and indigenous innovation

Protected research time in clinical posts, dedicated funding lines for clinical medical physics, multi-centre collaborative studies on questions specific to Indian practice, expansion of the doctoral pipeline, and closer engagement with domestic manufacturers of radiotherapy and imaging equipment would all repay investment. India's cost constraints and case-mix are not disadvantages for research; they are a distinctive vantage point from which globally relevant work can be done.

8.9 Exercise regional and global leadership

India has the scale, the institutional depth and the accumulated experience to serve as a training resource for the wider region. Hosting regional training programmes, offering fellowships to physicists from neighboring countries, contributing to AFOMP and IOMP guidance, and participating actively in IAEA activities are not merely acts of goodwill; they raise standards at home and give Indian medical physicists a voice in how international norms are written.

8.10 Make the profession visible

Finally, the profession must advocate for itself. Hospital administrators, clinicians, policymakers and the public should understand what a medical physicist does and why the role cannot be substituted. Clear position statements on safe staffing levels, engagement with health policy consultations, presence in public discussions of radiation safety, and outreach to physics students at the undergraduate level are all part of the work. Education and recognition are not separate agendas; a profession that is not understood will not be adequately resourced, and one that is not adequately resourced cannot train its successors. In this direction celebrations and reaching out to other health professionals, general publish using international days such as IDMP, IMPW are some examples.

9. Conclusion: The Next Sixty Years

The first sixty years of medical physics education in India tell a story of successful expansion. From a single course serving a handful of students, the country has built a distributed academic system, a professional community of substantial size, a regulatory framework with real force, and now a statutory identity as a healthcare profession. That achievement was neither inevitable nor easy, and it was accomplished largely through the personal commitment of individuals rather than through institutional largesse. The next phase must be different in kind. The task is no longer to produce more medical physicists; it is to guarantee that every medical physicist India produces is genuinely competent to practice, in every modality the modern clinic employs, and remains so throughout a career. That requires accreditation of programmes, structured and adequately resourced residency, competency-based assessment, systematic faculty development, and mandatory continuing professional development. None of these is technically difficult. All of them require the profession to organize itself and to accept the discipline of external scrutiny. Medical physicists spend their working lives insisting that a process which has not been measured cannot be trusted. It is time we applied that principle to our own educational system. If the six decades behind us were about building capacity, the decades ahead must be about assuring quality and if we do that well, the profession that emerges will be one the founders of 1962 would recognize as the fulfilment of what they began.

1. International Atomic Energy Agency. Postgraduate Medical Physics Academic Programmes. Training Course Series No. 56. Vienna: IAEA.

2. International Atomic Energy Agency. Clinical Training of Medical Physicists Specializing in Radiation Oncology. Training Course Series No. 37. Vienna: IAEA.

3. International Atomic Energy Agency. Clinical Training of Medical Physicists Specializing in Diagnostic Radiology. Training Course Series No. 47. Vienna: IAEA.

4. International Atomic Energy Agency. Clinical Training of Medical Physicists Specializing in Nuclear Medicine. Training Course Series No. 50. Vienna: IAEA.

5. International Atomic Energy Agency Guidelines for the Certification of Clinically Qualified Medical Physicists. Training Course Series No. 71. Vienna: IAEA.6. International Atomic Energy Agency. Roles and Responsibilities, and Education and Training Requirements for Clinically Qualified Medical Physicists. Human Health Series No. 25. Vienna: IAEA.

7. Atomic Energy Regulatory Board. Safety Code for Radiation Therapy Sources, Equipment and Installations, AERB/RF-MED/SC-1 (Rev. 1). Mumbai: AERB.

8. The National Commission for Allied and Healthcare Professions Act, 2021. Government of India.

9. Association of Medical Physicists of India. Journal of Medical Physics, archival volumes on education, training and professional development.

10. International Organization for Medical Physics. Policy statements on the education, training and certification of medical physicists.

MEET THE EXPERT

Meet the Expert: Dr. W. Howell Round

Interviewed by Dr. Rajni Verma for the AFOMP Meet the Expert Series

The AFOMP Meet the Expert series provides an opportunity to celebrate the journeys and contributions of distinguished medical physicists from the Asia-Oceania region. The series aims to bring forward the experiences of pioneers and leaders whose dedication has contributed to the growth of medical physics, while creating a valuable historical record for future generations.

As part of this series, Dr. W. Howell Round was interviewed by Dr. Rajni Verma. Dr. Round is a distinguished medical physicist, academic, researcher and professional leader whose career has made significant contributions to medical physics, particularly in the areas of education and training, continuing professional development, professional standards, career progression and international collaboration.

Dr. Round's professional journey reflects the evolution of medical physics over several decades. His academic background includes physics and medical physics, followed by doctoral research in electrical and electronic engineering. His career has combined clinical medical physics, academic teaching, research and extensive professional service. His work has covered areas ranging from radiation physics and medical imaging to education, training and workforce development.

One of the defining features of Dr. Round's career has been his commitment to developing the medical physics profession itself. His involvement with professional organizations has extended across national, regional and international levels. Within AFOMP, he served as Secretary General from 2012 to 2018 and was actively involved in professional development, education and training, finance, scientific and other committees. His contribution to the Federation has been particularly important in strengthening professional structures and promoting collaboration across the Asia-Oceania region.

His international contribution has also included active involvement with the International Organization for Medical Physics (IOMP) and the International Union for Physical and Engineering Sciences in Medicine (IUPESM). His professional activities have focused strongly on education, professional relations and the development of systems that support medical physicists throughout their careers.

A major theme of Dr. Round's professional work has been education, training and continuing professional development. He has contributed extensively to discussions and initiatives concerning the education and training of clinical medical physicists, certification and licensing, and mechanisms for maintaining professional competence. His publications include work on continuing professional development systems, education and training frameworks and the international comparison of professional pathways.

His work has also contributed directly to the development of AFOMP policies, including recommendations related to clinical medical physicist staffing, professional roles and responsibilities, continuing professional development and career progression. His work on career progression has been particularly influential in highlighting the importance of providing medical physicists with structured opportunities for professional growth.

Dr. Round has also been deeply involved in workforce development and professional recognition. His research and surveys have examined the medical physics and biomedical engineering workforce in Australasia, while his broader professional activities have addressed how appropriate training, certification and staffing can contribute to safe and effective clinical practice.

Another important aspect of his career is his contribution to teaching and lifelong learning. His academic work has included innovative approaches to education and e-learning, while his professional activities have promoted continuing education for practicing medical physicists. His contributions demonstrate the importance of adapting education and professional development to the changing needs of the healthcare environment.

Dr. Round's research interests have been diverse. His scientific work has included radiation dosimetry, medical imaging, radiotherapy-related research, Monte Carlo modelling and other areas of medical physics. At the same time, he has pursued research into professional issues such as workforce development, education and gender balance within the profession. His publications and presentations demonstrate a career that has consistently combined scientific inquiry with a broader concern for the development of medical physics as a profession.

His contributions have received recognition at both national and international levels. Among these is the IOMP International Day of Medical Physics Award in 2017, presented for his contributions to the profession. AFOMP records him among the distinguished medical physicists from the region who have received the IDMP Award for their multidimensional contributions to medical physics.

Beyond titles, awards and professional positions, Dr. Round's journey reflects the importance of service to the profession. His career demonstrates how medical physicists can contribute not only through clinical practice and research but also through education, mentoring, professional organizations, policy development and international cooperation.

The interview with Dr. Round provides an opportunity to reflect on the development of medical physics and the importance of building strong professional foundations for the future. His experience highlights the value of continuous learning, professional engagement and collaboration across countries and organizations.

For early-career medical physicists, his journey offers an encouraging message: a career in medical physics can take many directions, and meaningful contributions can be made through research, clinical practice, teaching, leadership and professional service. The development of the profession is a collective effort, and the experiences of senior physicists provide valuable guidance for those who are shaping its next chapter.

The AFOMP Meet the Expert interview with Dr. W. Howell Round, conducted by Dr. Rajni Verma, is therefore not simply a conversation about one individual's career. It is a reflection on the growth of medical physics, the importance of professional development and the responsibility of today's medical physicists to build a stronger and more sustainable profession for future generations.

Prepared by Dr. Rajni Verma
AFOMP Meet the Expert Interview Series
Link: https://afomp.org/2026/08/24/meet-the-expert-dr-howell-round-interviewed-by-dr-rajni-verma-july-2026/

The Newsletter sub-committee Editorial team would like to acknowledge Dr. Rajni Verma and the Website sub-committee for their support in digitalizing the PULSE Newsletter.

WHAT'S NEW IN THE AFOMP JOURNALS?

Featured papers

Welcome back to our "Featured Papers" section!

01	02	03
Proton therapy from beam physics to smarter clinical delivery	Motion Management	How to?

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

For this September edition, our team has once again explored the AFOMP journals *: Physical and Engineering Sciences in Medicine, Journal of Medical Physics, and Radiological Physics and Technology*, and selected a range of topics, including some valuable contributions from authors across our beautiful region.

Our first topic focuses on proton therapy, an increasingly important modality across AFOMP countries. This emerging technique continues to evolve, with ongoing developments in precision dosimetry, advanced modelling, and clinical optimization. Our selection brings together three complementary studies highlighting different aspects of the field: from understanding and accurately measuring proton dose, to using simulation to characterize beam behavior, and ultimately to optimizing the allocation of limited proton-therapy resources to patients.

The second topic is one of my all-time favorites: motion management in radiotherapy. The first paper explores the use of adaptive techniques for patients undergoing SBRT for pancreatic cancer. As we know, the pancreas presents a particularly challenging anatomical site for treatment and can greatly benefit from a well-established motion-management strategy. The second paper examines the use of ultrasound for intrafraction organ-motion tracking during abdominal SBRT.

Finally, we are pleased to reintroduce our "How-to?" section, featuring practical tips on making use of expired EBT-XD radiochromic film, as well as exploring novel applications of the Machine Performance Check tool for linear accelerators.

Happy reading! As always, we welcome your suggestions for topics to explore in future issues and please let us know if you would like to see your next paper featured in this section.

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

1) Focus on proton therapy: from beam physics to smarter clinical delivery

- Wang W, Li W, Lin Y, Liu X, Qin B, Gao H. Optimizing allocation of limited proton fractions via NTCP-optimized combined proton–photon radiotherapy. Physical and Engineering Sciences in Medicine. 2026. doi:10.1007/s13246-026-01759-7. DOI: 10.1007/s13246-026-01759-7

This study by Wang W *et al.,* published in the *Physical and Engineering Sciences in Medicine*, focused on developing a more efficient way to use limited and expensive proton radiotherapy resources by developing an NTCP-optimised combined proton–photon radiotherapy (NTCP-CPPT) approach. The authors aimed at determining the minimum number of proton fractions needed for effective head-and-neck cancer treatment while still achieving a clinically meaningful reduction in normal-tissue complications, particularly xerostomia and dysphagia.

The main findings showed that incorporating NTCP directly into treatment planning improved organ-at-risk sparing without compromising target coverage, and that the proposed NTCP-CPPT method reduced the average number of proton fractions from 18 to only 3 compared with conventional combined proton–photon planning, while maintaining more than a 20% reduction in summed NTCP relative to conventional IMRT.

The benefits of this work are potentially substantial, including better utilisation of scarce proton therapy slots, lower treatment costs, increased patient access to proton therapy, and reduced predicted radiation-induced toxicities. However, the study also has important limitations: it included only 12 retrospective head-and-neck cases, used 16-field IMRT rather than clinical VMAT, applied different uncertainty-management strategies for IMRT and IMPT, and relied on NTCP models that may not be fully validated across different institutions and patient populations. In addition, the biological effects of different proton and photon fractionation schedules were not incorporated into the optimization. Overall, this work suggests that NTCP-guided planning may provide a clinically promising and cost-effective strategy for allocating limited proton therapy resources while preserving meaningful normal-tissue sparing.

- Chattaraj A, Mishra S, Selvam TP. Monte Carlo-based investigation of absorbed-dose energy dependence of thermoluminescent dosimeters in therapeutic proton and carbon ion beams. Journal of Medical Physics. 2024;49(2):148–154. doi:10.4103/jmp.jmp_25_24. DOI: 10.4103/jmp.jmp_25_24

Moving on the Monte Carlo world, the purpose of this work by Chattaraj A *et al*., published in the *Journal of Medical Physics*, was to evaluate how accurately commonly used thermoluminescent dosimeters (TLDs) measure absorbed dose in therapeutic proton and carbon-ion beams and to quantify the corrections required because their response is not perfectly water-equivalent. The authors investigated the absorbed-dose energy dependence of three TLD materials—LiF, $Li_2B_4O_7$, and Al_2O_3—using the FLUKA Monte Carlo simulation code. They calculated the relative absorbed-dose energy response correction factor (R) as a function of depth in water for monoenergetic proton beams (50–250 MeV/n) and carbon-ion beams (80–480 MeV/n), with particular attention to the flat region, dose-gradient region, and Bragg peak of the depth-dose profile.

The results showed that LiF and $Li_2B_4O_7$ behaved approximately like a water-equivalent material in the flat region, with R values generally within ±5% of unity, whereas Al_2O_3 exhibited larger deviations of about 6–10%. At the Bragg peak, all detectors showed significant energy dependence, with R values varying substantially according to beam energy, ion type, detector material, and detector thickness; overall the largest deviations were observed for Al_2O_3. The study further demonstrated that, in the flat region, detector response is mainly governed by differences in electronic stopping power between the detector material and water. Near the Bragg peak, however, low-energy ions may stop within the detector volume, causing the stopping-power approximation to break down.

Additional simulations with thinner Al_2O_3 detectors showed that reducing detector thickness improves water equivalence, particularly for lower-energy beams.

The main outcome of this work is the provision of beam-specific and depth-specific correction factors for LiF, $Li_2B_4O_7$, and Al_2O_3 TLDs used in proton and carbon-ion therapy. These findings can improve the accuracy of particle-therapy dosimetry, quality assurance procedures, and detector selection, while also highlighting the importance of considering detector thickness and beam energy in high-LET regions.

Overall, the authors concluded that TLDs cannot be assumed to be universally water-equivalent in proton and carbon-ion therapy, and that accurate particle-therapy dosimetry requires appropriate correction factors, particularly near the Bragg peak. The study provides a useful Monte Carlo benchmark for particle-therapy quality assurance and detector characterization, although its direct clinical applicability is limited by the use of idealised monoenergetic beams, a homogeneous water phantom, and the absence of experimental validation and intrinsic thermoluminescence efficiency measurements.

- Sholaiman M, Islam MR, Islam MR, Haque MM. Advancing proton beam dosimetry in water: A Particle and Heavy Ion Transport code System Monte Carlo simulation of depth dose, range characteristics, and linear energy transfer distributions. Journal of Medical Physics. 2026;51(1):49–58. DOI: 10.4103/jmp.jmp_258_25

Continuing on the topic of protons this study by Sholaiman M *et al*., published in the *Journal of Medical Physics*, investigated proton beam dosimetry using the PHITS Monte Carlo simulation code to evaluate depth-dose distributions, proton range, Bragg peak characteristics, proton fluence, and linear energy transfer (LET) in a water phantom for proton energies between 50 and 250 MeV. The simulations showed that increasing proton energy shifted the Bragg peak to greater depths and increased proton range, while LET remained low in the entrance region and increased sharply near the Bragg peak. The calculated proton ranges agreed closely with established ICRU and NIST reference data, with differences of approximately 0.6–1.6%, confirming the accuracy of the simulation model. The study demonstrated that PHITS can reliably reproduce clinically relevant proton dosimetric parameters, including full width at half maximum (FWHM) and peak-to-entrance ratio (PER), thereby improving understanding of proton beam behaviour and dose localization.

These findings may support treatment planning system commissioning, quality assurance, dose verification, and the development of LET-guided and biologically optimized proton therapy. In addition, the validated simulation framework provides a useful foundation for future investigations involving patient-specific geometries, relative biological effectiveness (RBE), adaptive proton therapy, and secondary particle dosimetry, with the potential to improve treatment accuracy, tumour control, and normal tissue sparing.

However, the study has several limitations. The simulations were performed in a homogeneous water phantom using ideal monoenergetic proton pencil beams rather than patient-specific CT-based geometries and clinical beam delivery conditions. The analysis focused on physical dose and LET, with LET evaluated only for selected energies, and did not include RBE modelling or biological response assessment. Furthermore, the results were validated against published reference data rather than independent experimental measurements, and secondary neutron or out-of-field doses were not assessed. Therefore, further studies incorporating heterogeneous patient anatomies, clinical treatment plans, biological modelling, and experimental validation will be useful before direct clinical application.

2) Focus on: motion management

- Young T, Lee M, Johnston M, Thwaites D, Holloway L, Nguyen T, Ko R, Arumugam S. Pancreas SBRT requires online adaptive treatment to adequately manage motion. Physical and Engineering Sciences in Medicine. 2026. doi:10.1007/s13246-026-01762-y. DOI: 10.1007/s13246-026-01762-y

This interesting work by Young T *et al.,* published in *Physical and Engineering Sciences in Medicine*, examines the challenges of pancreatic stereotactic body radiotherapy (SBRT), particularly the substantial motion of the pancreas caused by respiration, digestion, and normal abdominal organ movement. The study aimed at quantifying dosimetric variations during a simulated pancreatic SBRT course and to compare two motion-management strategies: exhale breath-hold (BH) and free-breathing internal target volume (ITV). It also evaluated three treatment approaches: conventional, daily adaptive, and online adaptive treatment regimes.

Ten healthy volunteers underwent repeated abdominal MRI scans over five days. A hypothetical pancreatic tumour volume was created, and treatment plans were generated for both BH and ITV techniques using RayStation. Dose–volume histogram metrics were used to compare target coverage and organ-at-risk (OAR) doses across all treatment scenarios. The study found substantial anatomical and dosimetric variations with both BH and ITV techniques. Conventional and daily adaptive approaches showed reduced target coverage and variable OAR doses, particularly for the duodenum. In contrast, online adaptive re-planning maintained target coverage more consistently and generally reduced doses to nearby OARs. The authors concluded that pancreatic SBRT is highly sensitive to day-to-day anatomical changes and that online adaptive treatment provides the most accurate dose delivery.

Important limitations include the use of healthy volunteers rather than patients with pancreatic cancer, so tumour-related and treatment-related anatomical changes were not represented, the small sample size, and the lack of assessment of breath-hold reproducibility and strict control of food and fluid intake.

Overall, this study provides quantitative evidence comparing breath-hold and ITV techniques under conventional, daily adaptive, and online adaptive treatment workflows, showing that online adaptive replanning provides the most reliable target coverage and better protection of nearby organs at risk. For radiation oncologists, medical physicists, and trainees, the study clarifies the limitations of single-plan and same-day replanning approaches and supports the rationale for MRI-guided online adaptive SBRT. It also highlights the importance of motion management, imaging frequency, and patient preparation in abdominal radiotherapy, making the findings directly relevant to treatment planning, quality assurance, and future research design.

- Yaegashi Y, Sasaki K. Methodology for intrafraction organ motion tracking using ultrasound for respiratory-gated radiotherapy. Radiological Physics and Technology. 2026.DOI: 10.1007/s12194-026-01087-1

This interesting work by Yaegashi Y *et al.,* published in *Radiological Physics and Technology*. Authors aimed to develop and demonstrate a non-invasive ultrasound-based method for tracking intrafraction organ motion during respiratory-gated radiotherapy (SBRT) for non-small cell lung cancer. The authors have proposed a system that automatically detects liver edges using the Shi–Tomasi method and tracks respiratory motion in real time using the Lucas–Kanade optical flow technique, with irradiation timing determined by predefined displacement and image-matching thresholds.

Phantom experiments showed successful tracking at respiratory rates of 12 and 15 breaths per minute, while tracking was not consistently maintained at 20 breaths per minute. In addition, tests in five healthy volunteers confirmed that liver motion could be successfully tracked during natural breathing, supporting the feasibility of the method in humans. The main benefits of this approach are that it is non-invasive, avoids implanted fiducial markers and additional X-ray exposure, provides real-time visualization of internal organ motion, and may offer more accurate respiratory gating than external abdominal marker systems.

However, the study also identified important limitations, including the challenge of reliably fixing the ultrasound probe on the abdomen during natural breathing, the fact that the method remains a surrogate for actual tumour position and therefore still requires confirmation with EPID or X-ray fluoroscopy before treatment, and the need for further research to address liver deformation and to evaluate applicability to organs other than the lungs.

3) Focus on: How to?

- García-Garduño OA, Ávila-Muñoz Y, Gamboa-deBuen I, Lárraga-Gutiérrez JM. Clinical applications with expired EBT-XD radiochromic film in radiotherapy. Physical and Engineering Sciences in Medicine. 2026. DOI: 10.1007/s13246-026-01773-9

This very interesting study by García-Garduño A *et al*., published in *Physical and Engineering Sciences in Medicine*, investigated whether expired EBT-XD radiochromic films can still be used for selected radiotherapy dosimetry applications. The work addresses an important clinical issue, as radiotherapy departments often accumulate expired film stock due to budget constraints, and the reuse of these films could provide both economic and environmental benefits. The authors compared two expired EBT-XD film batches with a non-expired batch using a 6 MV photon beam. They evaluated dose–response behaviour, small-field output factors, and patient-specific quality assurance (PSQA) for volumetric-modulated arc therapy (VMAT) and stereotactic radiosurgery (SRS). The results showed that expired films retain a measurable dose-dependent response but exhibit reduced sensitivity, particularly at low doses. After generating new calibration curves, the expired films demonstrated acceptable agreement with non-expired films for small-field output-factor measurements and high-dose SRS PSQA, with gamma pass rates generally exceeding 98%. In contrast, performance was less reliable for low-dose VMAT QA, where increased uncertainty and reduced sensitivity affected agreement with the planned dose distributions.

The study concludes that properly stored and recalibrated expired EBT-XD films may still be useful as relative dosimeters for selected moderate to high-dose radiotherapy measurements when used within the recommended dose range. However, caution is required for low-dose measurements and for films that have been expired for many years. A major strength of this work is that it provides clinically relevant evidence supporting the potential reuse of expired EBT-XD films in selected applications, offering possible cost savings, reduced material waste, and practical guidance for small-field dosimetry and high-dose SRS patient-specific QA.

The study also has several limitations. The low-dose VMAT analysis was based on only a small number of representative treatment plans and expired film samples, limiting the statistical robustness and generalisability of the findings. In addition, only three EBT-XD batches stored under controlled conditions were evaluated using a single 6 MV photon beam and one linear accelerator platform; therefore, the results cannot be directly extrapolated to other beam qualities, storage conditions, or dosimetric applications such as brachytherapy or leakage measurements. Finally, reduced sensitivity in older expired films may artificially improve gamma pass rates, particularly in low-dose regions, introducing additional uncertainty in the interpretation of PSQA results.

- Lee TK. Feasibility of Using Machine Performance Check-enhanced Couch Check as a Daily Surrogate for Multisphere Winston–Lutz Testing in Single-isocenter Multitarget Stereotactic Radiosurgery. Journal of Medical Physics. 2026;51(2):440–445. DOI: 10.4103/jmp.jmp_30_26

This feasibility study by Lee T.K published in the *Journal of Medical Physics*, was conducted to determine whether Varian's Machine Performance Check enhanced couch check (MPC-EC) could be used as a practical daily alternative to the multisphere Winston–Lutz (WL) test for single-isocenter multitarget stereotactic radiosurgery (SIMT SRS), where submillimeter geometric accuracy is critical. The need for this work arose because conventional WL testing, although considered the clinical gold standard for stereotactic isocenter verification, is labour-intensive and difficult to perform every treatment day in high-volume clinics. The authors compared paired WL and MPC measurements acquired on 23 SRS/SRT treatment days and found strong agreement between the two methods, with correlation coefficients greater than 0.86, mean biases below 0.04 mm, and 95% limits of agreement within approximately ±0.25 mm, all well within accepted SIMT SRS geometric tolerances. These findings indicate that MPC can reliably track daily isocenter stability and couch-rotation accuracy, even on days with the largest observed WL deviations. The main benefit of the approach is improved clinical efficiency, MPC can be completed in less than five minutes and is suitable for routine daily use, potentially reducing workload while maintaining stereotactic-level precision. However, the study was limited by its relatively small sample size, single-institution design, and evaluation over only 23 treatment sessions, and it did not replace the value of periodic WL testing for commissioning, baseline establishment, or detailed off-axis verification. Overall, the outcome of the work supports the feasibility of using MPC-enhanced couch check as a reliable surrogate for daily or high-frequency WL verification in SIMT SRS workflows, allowing clinics to streamline quality assurance without compromising geometric accuracy.

SCIENCE EXPLAINED

Marvellous science in action

AI-Powered Breakthroughs in Early Cancer & NCD Detection

MD Saib Hossain[1] and Prof. Dr. Hasin Anupama Azhari[1, 2]
[1]*United International University (UIU) &* [2]*South Asia Centre for Medical Physics and Cancer Research, Alo Bhubon Trust (ALO-BT)*

Healthcare is shifting from reactive treatment to proactive prediction. Artificial Intelligence is no longer a theoretical concept; it is actively reshaping the early detection of diseases, especially cancers and other non-communicable diseases, long before physical symptoms emerge.

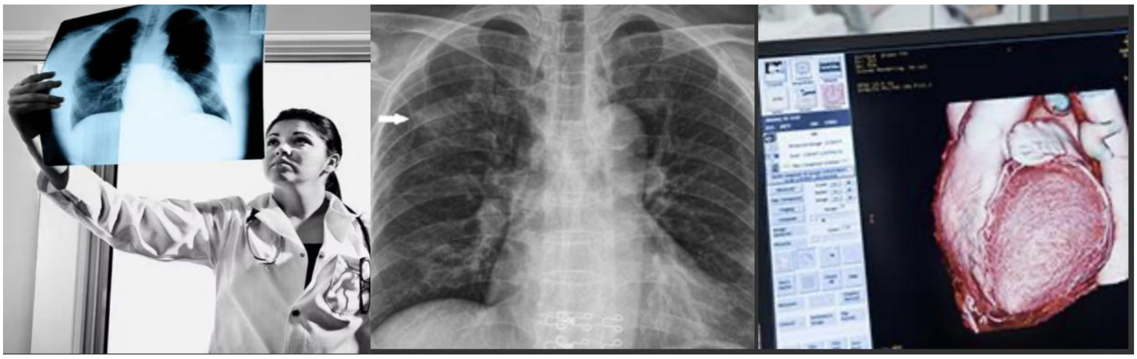

Figure 1: This image depicts a doctor examining a traditional X-ray, highlighting the manual diagnostic process. *Source: www.medicalnewstoday.com*

1. The Challenge of NCDs and Cancers

Before discussing artificial intelligence, first define the problem. The biggest threat to global health today comes from **Non-Communicable Diseases (NCDs)**. According to the World Health Organization (WHO), NCDs are chronic conditions that are not passed from person to person. They include cardiovascular diseases (like heart attacks and strokes), chronic respiratory diseases (like asthma), diabetes, and cancers. NCDs are responsible for a staggering 74% of all deaths worldwide [1]. Cancer is a primary category of NCDs and is a leading cause of death globally. Cancer is not just one disease. It is a large group of diseases that can start in almost any organ or tissue when abnormal cells grow uncontrollably. The most common and deadly types globally include: **Lung Cancer,** the leading cause of cancer deaths. Often linked to smoking and air pollution. **Breast Cancer** is the most common cancer globally among women. **Colorectal Cancer** affects the colon or rectum, which is heavily influenced by diet and lifestyle. **Prostate Cancer,** the most common cancer among men in many countries [2].

2. Decades of Data and How AI Helps Us Now

Over the years, the traditional methods generated something incredibly valuable: data. Every blood test, tumor registry, and clinical trial was recorded. This massive accumulation of historical medical data acts as the ultimate textbook for machine learning models.

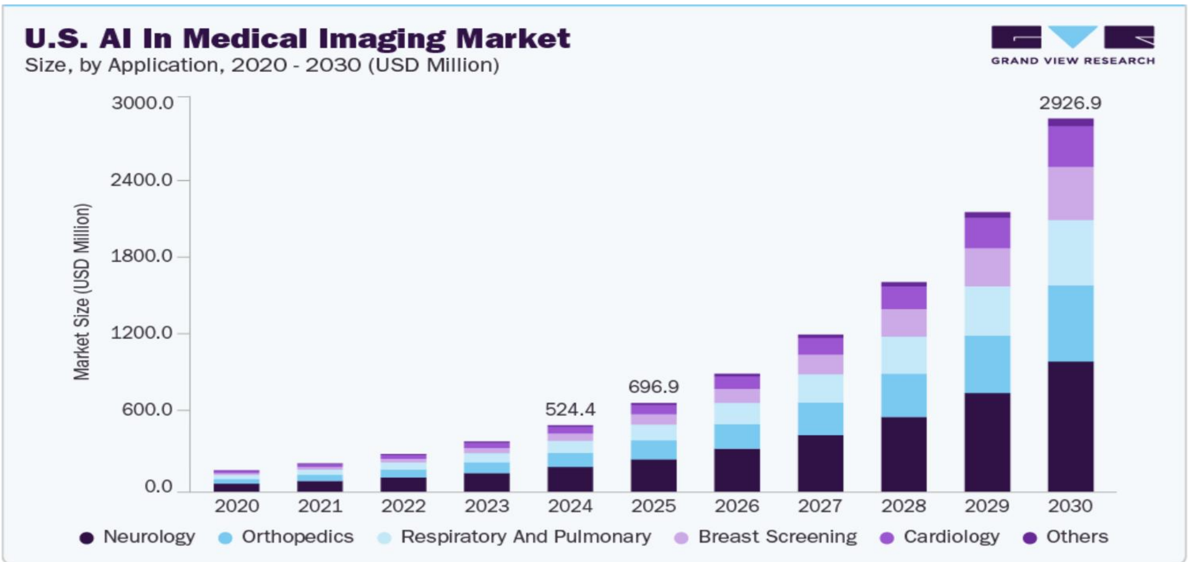

Figure 2: A stacked bar chart showing the growth of the U.S. artificial intelligence (AI) in the medical imaging market from 2020 to 2030, broken down by application categories. The market size is measured in USD millions, showing an exponential upward trend reaching $2,926.9 million by 2030. Source (https://www.grandviewresearch.com)

By feeding decades of patient records into AI systems, models are learning to see what the human eye cannot. Because humans have mapped the progression of diseases like diabetes and lung cancer so thoroughly, AI can now identify the hidden, subtle biological patterns that precede a diagnosis. Today's AI uses advanced architectures to assist doctors: **Image-Based Classifiers and Vision Models:** These models can process thousands of X-rays, MRIs, and pathology slides in a fraction of a second. They act as a tireless second pair of eyes. For instance, vision models are now used heavily in oncology to flag tiny anomalies in lung or breast tissue that a human might overlook. **Biology-Based Large Language Models (LLMs):** These models can instantly read and cross-reference a patient's entire medical history to predict outcomes faster and more accurately than human specialists. Recent benchmarking results of frontier AI models show unprecedented clinical capabilities. A June 2026 study highlighted in *Nature Medicine* tested top-tier models on the MedQA benchmark (a dataset of difficult medical questions). The results were astounding **Gemini 3.1 Pro** achieved a **97.4% accuracy rate**. Other frontier models like **Claude Opus 4.6** and **GPT-5.2** similarly outperformed specialized clinical AI tools [3]. These models do not suffer from fatigue, ensuring that the last scan of a 12-hour hospital shift gets the same rigorous, mathematically precise analysis as the first.

3. What's Next? The New Frontiers of Biological AI

While being able to answer complex medical questions is impressive, the next generation of AI is unlocking completely new possibilities in structural biology and patient care, for Example:

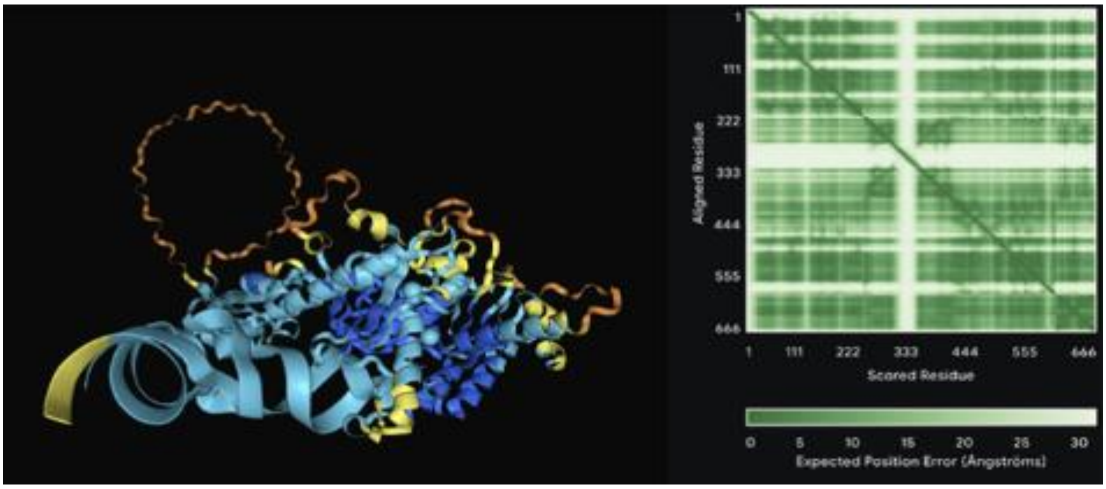

Figure 3 : Protein-RNA-Ion: PDB 8AW3 structure. (Image courtesy of Google DeepMind/alphafoldserver.com)

AlphaFold 3: Developed by Google DeepMind and Isomorphic Labs, AlphaFold 3 represents a monumental leap in computational biology. Moving beyond just predicting protein structures, it can predict the structures and interactions of nearly all biomolecules, including DNA, RNA, and small drug molecules. This capability is revolutionizing drug discovery by allowing researchers to simulate how a new cancer drug might bind to a specific cellular target with unprecedented accuracy, drastically speeding up the creation of new medicines [4].

Med-Gemini: Google Research has also detailed the capabilities of **Med-Gemini**, a multimodal AI designed specifically for healthcare. Unlike standard text models, Med-Gemini can digest a patient's entire medical history alongside genomic sequences and medical images all at once. Crucially, it features "uncertainty-guided search." If the AI is not confident in its diagnostic reasoning, it doesn't make a blind guess; instead, it actively searches trusted clinical literature to retrieve supporting evidence before making a recommendation to the doctor [5].

4. The Safety Bottleneck: Tech vs. Policy

AI labs compete fiercely to release the most capable models but face a critical bottleneck: the pace of AI safety and policy cannot keep up with technological advancement. As the medical field increasingly moves towards highly automated systems, ensuring the safe and consistent performance of these devices is becoming critically important.

Figure 4: Key dimensions of healthcare data privacy challenges. Sources (https://www.ijpsjournal.com)

5. The Blame Game: Who is Responsible?

This brings us to the most complex question surrounding AI in healthcare: liability and responsibility. If an AI system analyzes a patient's data, makes a mistake, and misses a microscopic early indicator of cancer,
Who is to blame? Is it the **AI lab** that developed and trained the model on potentially flawed data? Is it the **doctor** or the hospital that trusted the AI's recommendation instead of their own judgment? Is it the **government** or regulatory body that approved the AI tool for clinical use? Or does the responsibility lie with a **younger generation of users and practitioners** who have become overly reliant on automated systems?

According to researchers at Harvard Business School, medical liability for AI requires separating "AI-controllable errors" from natural disease progression, which is incredibly difficult to do in a court of law [6]. **I will leave the answer for the reader to ponder. As AI becomes an invisible partner in the examination room, how do humans balance the immense potential for saving lives with the profound weight of accountability?**

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FEATURE ARTICLE

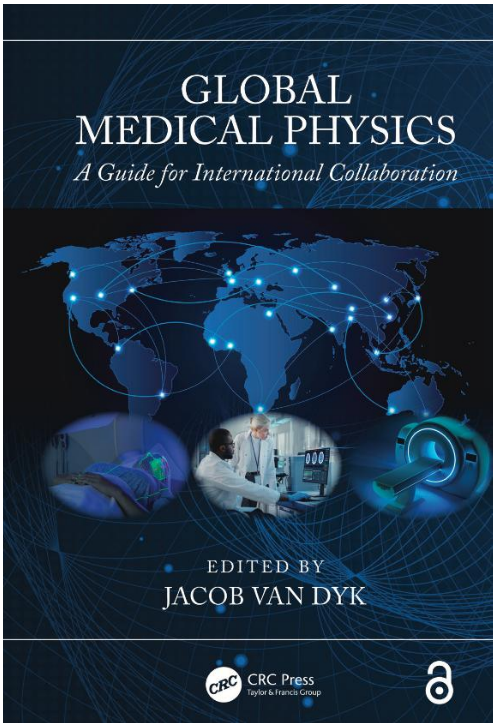
Book review

Global Medical Physics: A Guide for International Collaboration

Rajni Verma, Assistant professor, Department of Radiological Physics , SMS Medical College and Hospitals

I picked up Global Medical Physics: A Guide for International Collaboration expecting a fairly dry policy document and was pleasantly surprised to find something closer to a field manual written by people who have actually lived the work it describes. Edited by Jacob Van Dyk a name most of us in the international medical physics community already know from decades of outreach this newly released, open-access volume brings together 34 contributors from 21 countries across its 18 chapters. For AFOMP members working across some of the most diverse resource settings anywhere in the world, the book arrives at a genuinely useful moment. The chapters move through the full life cycle of a global partnership: building institutional relationships, engaging industry, mentoring, education and training, data sharing, ethics, and equity, diversity and inclusion, before closing with a summary of recommendations. It reads less like a textbook and more like a practical playbook for the exact work AFOMP exists to promote connecting institutions and individuals across the Asia-Oceania region and beyond, particularly where resources and training capacity remain thin.

The book's opening chapter, **Chapter 1,** by Jacob Van Dyk and Francis Hasford, does the quiet, unglamorous work that every good introduction has to do: it sets the tone for everything that follows. Before making any argument, the authors slow down and define their terms global health, global medical physics, Global North and Global South, colonialism and neocolonialism so that readers from very different backgrounds are, quite literally, speaking the same language by the end of the first few pages. That care pays off once the numbers arrive. Drawing on the 2023 IOMP workforce survey, the chapter reports close to 30,000 medical physicists across 93 countries, notes that roughly 30,000 more will be needed by 2035, and lays out per-capita disparities that fall hardest on low- and middle-income countries. None of this is new information to anyone who has worked in this field for long, but seeing it collected, footnoted, and stated plainly in the book's opening pages gives the rest of the volume its sense of urgency. It closes with ten recommendations that read almost like a table of contents in miniature a preview of the ethical, educational, and partnership themes the later chapters take up one by one.



That same thread of advocacy runs quietly through much of the book, and it surfaces directly in **Chapter 11,** written by Eva Bezak with Loredana Marcu and Ana Maria Marques da Silva. It makes a point worth sitting with: our profession does not advance on good equipment and good training alone, but also on the slower, less visible work of building relationships with policymakers, funders, and institutions. Bezak whose own IOMP workforce survey underpins much of the book's data elsewhere, writes with the authority of someone who has done this work, not just studied it, and the chapter's European, North

American, and South American case studies, from EFOMP's coordinated advocacy to Brazil's long campaign for professional recognition, are well chosen and instructive.

The chapters in between carry that same spirit into other territory worth a reader's time CERN's model of large-scale international scientific partnership, the ethics of working across very different healthcare systems, and the growing conversation around equity and inclusion in global teams building steadily toward the chapter I found myself returning to most, **Chapter 17,** by Arun Chougule and Mary Joan. If Chapter 1 tells you why this work matters and Chapter 11 tells you how to argue about it, Chapter 17 is the one that tells you, very concretely, who to call and it earns the extra time it takes to read properly. The chapter opens by sorting the organizational landscape into clear families: professional societies (IOMP, AAPM, IPEM, HPS, alongside clinically aligned bodies like ASTRO and RSNA), academic and training institutions (the Abdul Salam ICTP and the ASEAN College of Medical Physics), governmental and intergovernmental agencies (above all the IAEA, through its Human Health Division), non-governmental organizations (IUPESM, Medical Physics for World Benefit, Radiating Hope, the South Asian Centre for Medical Physics and Cancer Research, RAD-AID International), and industry partners (Elekta, IBA, Philips, PTW, Sun Nuclear, Siemens Healthineers and Varian). A separate section walks through accreditation specifically, tracing how bodies like CAMPEP, ACPSEM, and EFOMP's EBAMP sit alongside IOMP's own accreditation board and its International Medical Physics Certification Board, which steps in to certify individuals in countries where no national board yet exists.

What makes the chapter genuinely useful rather than a glorified directory is that it does not stop at naming organisations it evaluates them. The authors are candid about trade-offs: professional societies set standards and offer valuable networking, but their benefits can end up concentrated among members in already well-resourced regions; academic institutions drive research and innovation but depend on uncertain external funding; governmental agencies bring real financial weight but move slowly through bureaucratic and regulatory processes; NGOs are often the ones actually reaching underserved regions, but they live and die by unpredictable donor funding; and industry partners bring technology and technical training, but their priorities can tilt toward the most profitable markets rather than the neediest ones. The chapter then grounds all of this in specific, current examples the IOMP's triennial World Congress on Medical Physics and Biomedical Engineering and its annual International Day of Medical Physics, the Harvard Medical School Global Health Catalyst Summit's work on telemedicine-enabled cancer care, the IAEA's Human Health Campus and its Technical Cooperation Programme, the ICTP's joint Master's of Advanced Studies in Medical Physics run with the University of Trieste and over twenty partner hospitals, Radiating Hope's equipment donation and training work, the International Cancer Expert Corps' mentorship model, and Rayos Contra Cancer's digitally delivered courses for Latin America. For readers across Asia and Oceania, this section reads almost like a map with the doors already marked: here is where to look for accreditation support, here for fellowships, here for equipment donation, here for mentorship.

The chapter closes with two distinct sets of recommendations that I suspect will be the most photocopied pages in the book. One set is addressed to the organizations themselves to expand scholarships and grants for participants from developing countries, offer virtual participation options for conferences, standardize curricula and certification internationally, and improve coordination between organizations so that effort is not duplicated. The other is addressed to individual medical physicists, and it is refreshingly practical: identify the key organizations in your subfield and join them, volunteer for committees and working groups rather than staying a passive member, contribute to research collaborations and co-authored publications, take advantage of free training and webinars, write for organizational newsletters exactly like this one, and consider volunteer missions in disaster-affected or underserved areas. It is rare for a chapter this dense with organizational detail to end on something so immediately actionable, and it is the reason I expect readers will keep coming back to it long after they have finished the rest of the book.

Read cover to cover, *Global Medical Physics* builds a coherent argument that becomes especially clear once you notice how these three chapters sit in relation to one another. Chapter 1 makes the case for why global collaboration matters and where the gaps still lie; Chapter 11 shows how advocacy and diplomacy create the political and institutional space for that collaboration to actually happen; and Chapter 17, the chapter I would most readily hand to a colleague, supplies the practical directory of organizations, activities, and next steps through which that collaboration gets carried out in real life. Around them, the other fifteen chapters fill in the operational detail a working medical physicist will eventually need once those doors are open career pathways, mentoring models, industry partnerships, data-sharing frameworks, the growing role of artificial intelligence, and a good deal of hard-won, practical wisdom about sustainability and ethics. What stayed with me after finishing the book is not any single statistic or recommendation, but the sense that this really was written by and for people doing this work, not observing it from a distance. The open-access status, the CC BY-ND licensing of individual chapters, and the consistent attention to LMIC perspectives all make it an unusually accessible and genuinely useful resource rather than an academic exercise. For AFOMP members whether you are an early-career physicist looking for a mentor, a department head trying to negotiate an equipment donation, or a national society leader thinking through an advocacy strategy this is a book worth keeping close at hand, and one I would happily recommend to any colleague about to start their first international collaboration.

FEATURE ARTICLE

What's new? Key highlights from the editors

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

It's not your device, it's how you use it – Sensitivity and specificity of PSQA devices in the SEAFARER head and neck study

May L, Baeza-Ortega J, Hussein M et al
Radiotherapy and Oncology, 2026; 219
DOI: 10.1016/j.radonc.2026.111493

What inspired this study?

PSQA requires a lot of resources and its ability to identify clinical problems has been shown to be limited. (Kry et al 2014) Our earlier work identified large differences in the performance of clinical PSQA systems as well as in the robustness of the plans made by the participants using identical planning guidelines. (Lehmann et al 2022) In this study we centralised the creation of plans taking out this variable. (Baeza-Ortega JA et al 2025) We automated the processes and created a web interface for participants to request the audits and to submit their results. The system also allows centres to compare their results to those of peers, in an anonymized way in real time.

What were the key challenges in this research?

We initially anticipated that promoting the study and encouraging participants to take time to perform clinical measurements may be one of the key challenges. However, we were amazed by the strong enthusiasm of the radiotherapy community and the willingness for centres to participate. We even had people asking for additional plans they could deliver. Instead, we found the main key issue to be identifying and adapting our methodology to the wide range of equipment and treatment planning systems used. We also spent a considerable amount of time designing our treatment plans to be representative of practices for most of the community, however with the wide range of clinical practices in place this was not always possible.

What are the key takeaways from this study?

The study had several really interesting findings, but probably the most exciting takeaway is that all of the clinically used PSQA devices included were shown to be capable of achieving a 'perfect' result, that is being both sensitive and specific to clinically relevant delivery errors. This means that the performance of PSQA devices is strongly influenced by user procedures and not just inherent characteristics of the device. Secondly, this study illustrated the importance of sensitivity assessments of PSQA systems. We found that for the cohort tested, 48% of centres passed at least one plan with a clinically significant dose error, using their clinical PSQA system.

How does this research impact the future?

Several clinical centres have informed us that they have changed their PSQA following their participation in the study. In that sense we hope this work has contributed to improvement in patient care. We are currently able to offer additional centers participation in the study. If you are interested in assessing the sensitivity of your PSQA system for Head and Neck, SABR spine or SRS plans, please sign up here: https://seafarerapp2-aea6e3d0fdegagez.australiasoutheast-01.azurewebsites.net/request_account

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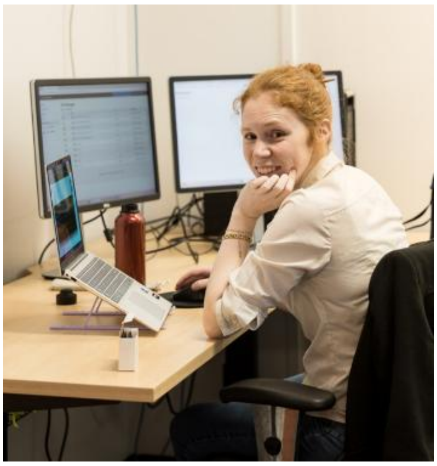

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NEWS & UPDATES

Professional News and Updates

Sustainability in Healthcare

In view of the IMPW 2026 on Sustainability in Healthcare - medical physics contribution and in conjunction with the ECMP 2026 with theme of sustainability (Advancing Healthcare through Physics: Bridging Science and Patient Care for a Sustainable Future), we have launched, in collaboration with Physica Medica, a special issue on sustainability:

https://www.sciencedirect.com/special-issue/336014/special-issue-on-sustainability-in-healthcare-medical-physics-contribution

📅 **Submission deadline: 15 December 2026**

Mark your calendar, get your ideas ready, and send them our way! ✨

🌟 **Meet Our Guest Editors**

We're delighted to welcome our guest editors, bringing expertise and perspectives from across the international medical physics community:

Eva Bezak
International Organization for Medical Physics (IOMP)

Efi Koutsouveli
European Federation of Organizations for Medical Physics (EFOMP)

Magdalena Stoeva
International Organization for Medical Physics (IOMP)

Optimization of Radiological Protection in Digital Radiology (ICRP Publications 154 & 160)

David Sutton, Chair, ICRP Committee 3 & Colin Martin, Chair, ICRP Task Group 108

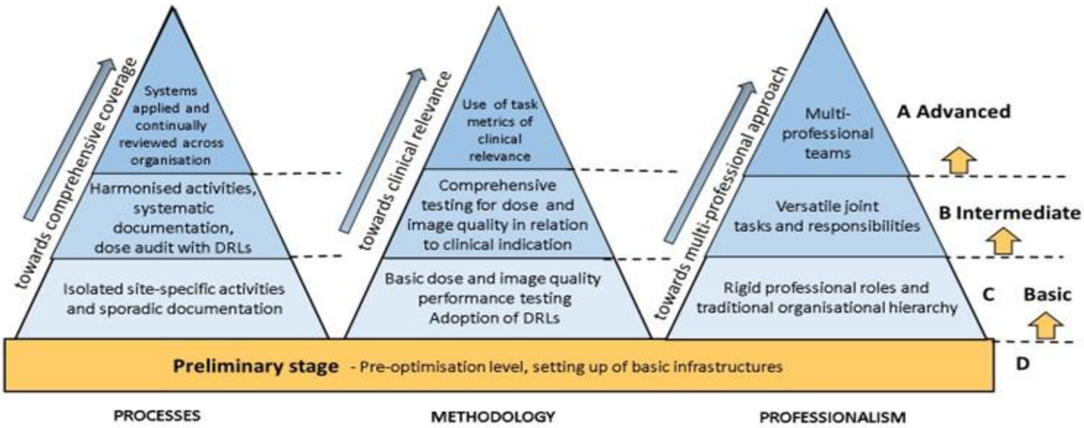
ICRP has very recently released Publication 160, 'Practical Aspects in Optimization of Radiological Protection in Digital Radiography, Fluoroscopy, and CT'. It is the second of two complementary publications, the first being Publication 154 'Optimization of Radiological Protection in Digital Radiology Techniques for Medical Imaging'

Taken together, ICRP Publication 154 and 160 provide a comprehensive approach to the optimizations of radiological protection in digital radiology. Publication 154 describes a strategic framework to assist radiology and management staff in optimizing radiological protection for imaging. Publication 160 deals with practical requirements for optimization of different digital radiology modalities, and builds on information provided in earlier modality specific ICRP publications.

Publication 154 explores concepts surrounding the various strategic components surrounding optimization of protection in digital radiology, namely Professionalism, Methodology and Process. It develops a framework that describes how imaging professionals should work together and details the benefits of having appropriate methodologies to monitor performance, together with the knowledge and expertise required to use them effectively. It describes how optimization can be developed from an initial level D when a facility is set up, to the basic requirements of optimization level C, through the intermediate level B, to advanced processes of optimization termed level A (see figure).

Publication 160 translates the strategic ideas of 154 into modality-specific, real-world requirements. It provides information on practical methods needed to carry optimization forward for different imaging techniques; radiography, fluoroscopy (including fluoroscopically guided interventional procedures) and CT. The publication acknowledges that there is a wide range in available equipment and training around the world, which presents challenges in communicating requirements for optimization. This publication attempts to address these challenges by providing information for facilities, within the broad categories, D, C, B and A developed in Publication 154.

The intention is that a continuum of facilities ranging from less well-resourced clinics to major academic centres can use the same framework, but at different levels of sophistication. The combined 154/160 framework provides a scalable, adaptable, and globally relevant approach to the optimization of radiological protection.



The three core components involved in developing and maturing optimization. Processes appear on the left, since once the system is established, they drive the execution of other tasks. The levels denote progressive stages of achievement, ascending from Level D to Level A. Level D marks the foundational infrastructure required before the optimization process can begin. Levels A, B, and C then describe the arrangements that will be in place for each component as that level is reached.

Both documents were authored / edited by Dr C Martin. Other contributing authors were (in alphabetical order). Dr K. Applegate, Prof J Damilakis Dr I. Hernandez-Giron, Dr D. Husseiny, Dr H Khoury, Prof M. Kortesniemi, Prof KH Ng, Mr D Pekarovic Dr M. Del Rosario Perez, Prof D.G. Sutton, Prof J. Vassileva

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A Breakthrough in the Operating Room: Prof. Jianrong Dai and China's IORT Robot

Jiayun Chen, *Department of Radiation Oncology, National Cancer Center / Cancer Hospital, Chinese Academy of Medical Sciences*
Nan Zhang, *Beijing Daily*

For nearly two decades, Prof. Jianrong Dai of the Cancer Hospital, Chinese Academy of Medical Sciences (CAMS), has led a mission to transform intraoperative radiation therapy (IORT) in China. In 2024, that vision materialized: the first domestically developed IORT robot prototype, assessed as world-leading by national expert panels, was unveiled after 17 years of persistent R&D.

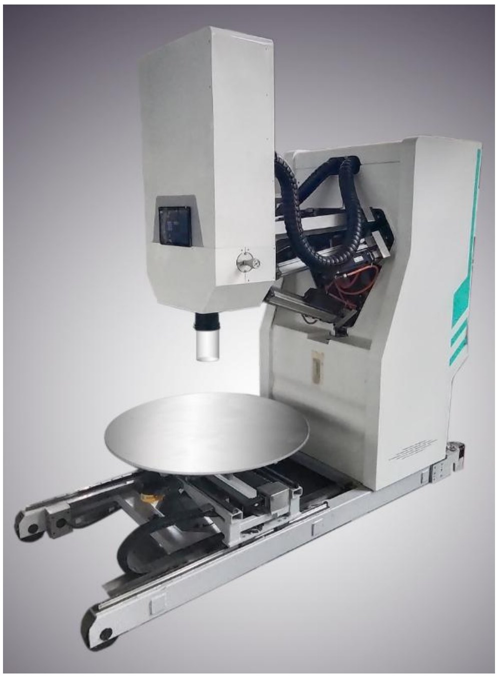


Fig. 1 The domestically developed intraoperative radiation therapy (IORT) robot prototype.

From Clinical Frustration to Innovation

Prof. Dai's journey began with a clinical problem. Since 2006, Chinese oncologists relied on imported IORT accelerators weighing over 1,600 kg and requiring multiple operators to manually position the treatment head. Dose calculation depended on visual estimation, making the procedure labor-intensive and highly experience-dependent. Prof. Dai recognized that true progress required an entirely new approach—one that combined robotics, precision engineering, and medical physics.

In 2015, he assembled a cross-disciplinary R&D team spanning CAMS Cancer Hospital, Tsinghua University, Beihang University, and six other institutions. As the clinical and scientific leader, Prof. Dai defined the system's core requirements from a clinical perspective, ensuring that every engineering decision served clinical needs.

Overcoming Engineering Barriers

The development path was arduous. Early prototypes suffered from software-hardware incompatibility and mechanical precision errors. During one critical test, a robotic arm deviated and collided with a support structure. Prof. Dai's team treated each failure as a learning opportunity, systematically refining synchronous control protocols, real-time compensation algorithms, and motion control systems. Through countless iterations, the team achieved stable, reproducible performance. In 2024, the system passed an authoritative national evaluation, with its technical capabilities recognized as world-leading.

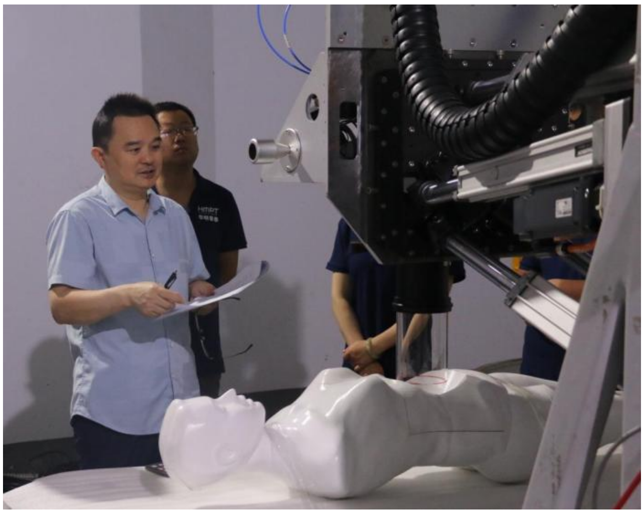


Fig. 2 Prof. Jianrong Dai conducting system testing and calibration on the IORT robot.

Key Innovations Led by Prof. Dai

The robot introduces six transformative features directly addressing Prof. Dai's original clinical vision:

1. **Lightweight Robotics:** The 250 kg treatment head—operated by a single person via a six-axis robotic arm with flexible force guidance—replaces the multi-operator manual positioning of 1,600 kg legacy systems.

2. **Intraoperative Optical Imaging:** After tumor resection, fluorescence imaging automatically delineates the target volume, enabling true three-dimensional "dose painting" based on real-time tumor morphology.
3. **Cystic Applicator:** Designed for cavity-based tumors (e.g., breast and brain), this applicator delivers dose conforming to the resection cavity’s curved surface.
4. **Scanning IORT:** Follows a pre-planned scan path, using a parallel platform to move the treatment head for precise scanning intensity-modulated electron therapy dose delivery.
5. **Flexible Force-Guided Positioning:** Uses multi-axis force sensors to sense operator force, adjusting head pose via the parallel platform to improve setup accuracy and efficiency while reducing workload.
6. **Clinical Efficiency:** A complete session requires only ~30 minutes, at roughly one-fourth the cost of conventional postoperative fractionated radiotherapy, while sparing surrounding healthy tissues.

Fig. 3 The interdisciplinary R&D team with the assembled mechanical prototype of the IORT system during early development, prior to its evolution into a fully integrated robotic platform.

Conclusion

Prof. Jianrong Dai's 17-year endeavor exemplifies how medical physicists can bridge clinical needs and engineering innovations. As the IORT robot advances toward clinical deployment, it stands as a testament to the impact of sustained, interdisciplinary leadership in radiation medicine. We welcome collaboration with AFOMP colleagues as this technology moves from the laboratory to the operating room.

AFOMP Bi-monthly webinar

The 26th Asia-Oceania Congress of Medical Physics

AOCMP 2026 · Busan, Republic of Korea

9-11 September 2026 · Busan Port International Exhibition & Convention Center (BPEX)

"Beyond Precision through Intelligent Innovation for Advanced Patient Care"

On behalf of the Korean Society of Medical Physics (KSMP) and the entire Organizing Committee, it is our great pleasure and privilege to invite the AFOMP community to the **26th Asia-Oceania Congress of Medical Physics (AOCMP 2026)**, to be held from 9 to 11 September 2026 in the beautiful coastal city of Busan, Republic of Korea. Hosted by KSMP under the auspices of AFOMP and IOMP, AOCMP 2026 will bri

together medical physicists, clinicians, researchers, and industry partners from across the Asia-Oceania region and beyond.

Under the theme ***"Beyond Precision through Intelligent Innovation for Advanced Patient Care,"*** the Congress explores how artificial intelligence, automation, and emerging technologies are reshaping medical physics - advancing our discipline from precision toward truly intelligent, patient-centered care. Over three days, delegates will share the latest advances and forge new collaborations across the region.

A Rich Scientific Program

The scientific program features three distinguished keynote speakers - **Prof. Tomas Kron** (Peter MacCallum Cancer Centre, Australia), **Prof. Seungryong Cho** (KAIST, Korea), and **Dr. Taku Inaniwa** (NIRS/QST, Japan) - together with 28 invited speakers across a broad spectrum of clinical and research topics. The program spans parallel scientific sessions in radiation therapy and radiological physics, an Advanced Technology track, multidisciplinary and satellite (luncheon) symposia, selected oral presentations, and an e-poster exhibition, complemented by a comprehensive industrial exhibition showcasing the latest technologies.

Education & Hands-on Training

A dedicated education program offers practical, high-impact learning. It opens with a **FLASH keynote and lecture series** - “FLASH Therapy: Biology, Physics, and the Path to the Clinic” - surveying one of the most exciting frontiers in radiation oncology. Delegates can also take part in **hands-on treatment-planning training and Plan Practice sessions** using leading commercial RTP systems, including **Varian, Elekta, and TomoTherapy** platforms - a valuable opportunity for early-career physicists to build practical planning skills directly with vendor systems.

Signature Sessions & Networking

AOCMP 2026 will host several flagship activities organized in partnership with AFOMP. The **Young Medical Physicists Network Meeting (AFOMP)** and the **Women in Medical Physics** session provide focused forums for the next generation and for advancing diversity and leadership in our field, alongside the **Young Investigator Competition**. The Congress will also host the **IMPCB certification examination** on 10 September and the presentation of AFOMP awards - among them the Inamura Orator and Lifetime Achievement Awards - celebrating excellence and service across our federation. The AFOMP ExCom Meeting will also convene during the Congress.

Why Busan

Busan, Korea’s dynamic second city, offers a spectacular setting where mountains meet the sea. Beyond the venue, delegates can enjoy pristine beaches, vibrant seafood markets, temples, and warm Korean hospitality. The city is also home to a state-of-the-art heavy-ion therapy center, reflecting the theme of innovation that runs throughout the Congress. A highlight of the social program will be a **Gala Dinner aboard a cruise ship**, set against Busan’s glittering night skyline with fireworks and live performances - a truly memorable evening of fellowship. Together with a Welcome Reception and excellent international access via Gimhae International Airport, AOCMP 2026 promises to be both scientifically rewarding and unforgettable.

Join Us in Busan

We warmly invite colleagues from across the Asia-Oceania region and around the world to join us in Busan. Full details on registration, abstract submission, and the program are available on the official Congress website, **www.aocmp2026.org**.

We look forward to welcoming you to Busan in September 2026 for an inspiring Congress that advances medical physics for the benefit of patients across our region and the world.

With warm regards,

On behalf of the Korean Society of Medical Physics (KSMP)

Kyo Chul Shin, Ph
Congress Chair, AOCMP 2026

Samju Cho, PhD
Secretary General, AOCMP 2026

Meet the Industry Partners of AOCMP 2026

Corporate & Exhibition News · AFOMP Pulse, September 2026 Issue

The 26th Asia-Oceania Congress of Medical Physics (AOCMP 2026) will be held on September 9–11, 2026 at the Busan Port International Exhibition & Convention Center (BPEX) in Busan, Republic of Korea. The congress is proudly supported by companies from across Asia-Oceania and beyond — spanning particle therapy, AI-driven planning and contouring, dosimetry and quality assurance, patient positioning and immobilization, and surface-guided radiation therapy. AFOMP extends its sincere gratitude to the sponsors and exhibitors whose support makes this congress possible. We invite all delegates to visit the exhibition hall and discover technologies shaping the future of medical physics. The participating companies are introduced below, ordered by sponsorship level.

X-Protom (MediNRod) · Korea · DIAMOND SPONSOR

X-Protom, associated with Korean company MediNRod, is the local partner introducing ProTom International's compact synchrotron-based Radiance 330 proton therapy system to Korea. Through the recent agreement to install Korea's first synchrotron-based proton therapy system at Keimyung University Dongsan Medical Center, the company is working to expand access to compact, cost-effective proton therapy in Korea and the wider region. *www.medinrod.com*

Varian, a Siemens Healthineers company · Palo Alto, USA · PLATINUM SPONSOR

Varian, a Siemens Healthineers company, is a global leader in radiation oncology, supplying medical linear accelerators, treatment planning and oncology information software, and proton therapy systems. Its technologies support the full radiotherapy workflow from imaging and planning through treatment delivery and adaptive therapy, pursuing integrated, data-driven approaches to comprehensive cancer care. *www.varian.com*

Vision RT · London, UK · PLATINUM SPONSOR

Vision RT is the pioneer of Surface Guided Radiation Therapy (SGRT), which uses 3D camera technology to track a patient's skin surface in real time during radiotherapy setup and treatment. Its systems support accurate patient positioning and continuous motion monitoring without additional imaging dose, including deep-inspiration breath-hold and open-mask treatments, and are installed in radiation oncology departments worldwide, supported locally by Vision RT Korea. *www.visionrt.com*

WITHUS MEDITECH · Goyang, Korea · PLATINUM SPONSOR

WITHUS MEDITECH is a leading provider of medical physics and radiation oncology solutions in Korea, specializing in SGRT, treatment QA, dosimetry, and advanced radiation therapy technologies, and delivering reliable products and professional technical support to hospitals and medical physicists.

www.withusmeditech.com

DawonMedax · Incheon, Korea · GOLD SPONSOR

DawonMedax is a Korean medical technology company working to commercialize accelerator-based boron neutron capture therapy (BNCT). The company has developed a linear-accelerator-based neutron source (A-BNCT) that can be installed in hospitals without a nuclear reactor, along with boron drug development and Korea's first BNCT dose-calculation treatment planning system, aiming to bring this targeted, cell-level radiation therapy into clinical use. *www.dawonmedax.com*

DK Medical Solution · Seoul, Korea · GOLD SPONSOR

DK Medical Solution is a Korean provider of medical imaging and radiation therapy equipment and services. Its portfolio spans diagnostic imaging systems such as digital radiography, fluoroscopy, angiography, CT, MRI, and mammography, as well as radiation oncology solutions for Korean hospitals, backed by installation, technical support, and after-sales services. *www.dkms.co.kr*

Elekta · Stockholm, Sweden · GOLD SPONSOR

Elekta provides precision radiation therapy solutions including medical linear accelerators, the Leksell Gamma Knife for stereotactic radiosurgery, MR-guided radiotherapy systems, brachytherapy solutions, and oncology software. Founded in 1972 by neurosurgeon Lars Leksell, the company focuses on image-guided and adaptive treatments used in clinics in more than 120 countries. *www.elekta.com*

EnergyFlow · Seoul, Korea · GOLD SPONSOR

EnergyFlow is a Seoul-based solutions provider serving the Korean radiation therapy market in collaboration with leading global manufacturers. The company supplies radiotherapy quality assurance and dosimetry technologies to Korean hospitals and research institutions, including advanced scintillation dosimetry systems, combining equipment distribution with technical support for clinical medical physics users. *www.energyflow.kr*

HDX Corporation · Seoul, Korea · GOLD SPONSOR

Founded in 1982, HDX is a leading provider of medical solutions specializing in radiation therapy distribution, isotope manufacturing, dental CT and chair production, hospital construction, and equipment leasing and maintenance. With headquarters in Seoul and branches in the U.S., Germany, Malaysia, and Vietnam, HDX holds a significant market share in cyclotron-based nuclear medicine and radiotherapy. *www.hdx.co.kr*

Oncosoft Inc. · Seoul, Korea · GOLD SPONSOR

Oncosoft develops AI-powered solutions for radiation oncology, including OncoStudio, a vendor-neutral, workflow-adaptive AI contouring solution designed to improve efficiency and support clinical workflows. *www.oncosoft.io*

RaySearch Laboratories · Stockholm, Sweden · GOLD SPONSOR

RaySearch Laboratories develops innovative software for radiation therapy, including the RayStation treatment planning system and the RayCare oncology information system. Its software supports advanced photon, electron, and particle therapy planning, adaptive radiotherapy, and machine-learning-based automation, and is used by cancer centers around the world, with local support provided through RaySearch Korea. *www.raysearchlabs.com*

Accuray Incorporated · Madison, USA · SILVER SPONSOR

Accuray develops, manufactures, and sells precision radiation therapy systems, including the CyberKnife robotic radiosurgery platform and the TomoTherapy and Radixact image-guided helical delivery systems. Its products are designed to deliver highly accurate, personalized radiation treatments and are used in cancer centers worldwide. *www.accuray.com*

Canon Medical Systems Korea · Otawara, Japan · SILVER SPONSOR

Canon Medical Systems is a global manufacturer of diagnostic imaging equipment including CT, MRI, ultrasound, and X-ray systems, together with healthcare IT and AI-based imaging solutions. Its imaging technologies are widely used in oncology workflows, from diagnosis and staging to radiotherapy simulation and follow-up, with Canon Medical Systems Korea serving Korean hospitals with sales, clinical applications, and service support. *kr.medical.canon*

GEV Co., Ltd. / Chiyoda Technol Corporation · Korea / Tokyo, Japan · SILVER SPONSOR

GEV Co., Ltd. is a Korean radiation-application company founded in 1995, operating a personal exposure dosimetry service for radiation workers alongside electron-beam sterilization and material processing businesses. It partners with Chiyoda Technol Corporation, a Tokyo-based company providing personal radiation monitoring since 1956, known for its Glass Badge dosimetry service and radiation safety products; together they offer individual dose monitoring services for radiation workers in Korea. *www.srsrad.com · www.c-technol.co.jp*

MVR Korea Co., Ltd. · Seoul, Korea · SILVER SPONSOR

MVR Korea is a Korean healthcare technology company that imports and distributes specialized medical devices to hospitals and clinics across Korea, supplying diagnostic and therapeutic equipment together with clinical and technical support. *www.mvrkorea.com*

AiRato Inc. · Sendai, Japan · BRONZE SPONSOR

Japan's first radiotherapy AI startup, AiRato develops the radiation AI “RatoGuide” with the mission of saving all cancer patients. The company works to improve treatment outcomes and ease clinical workloads, expanding non-invasive, low-burden cancer care. *www.airato.jp*

Shanghai APACTRON Particle Equipment (APTR) · Shanghai, China · BRONZE SPONSOR

Established in 2011, APTR is a high-end medical equipment enterprise dedicated to the industrialization of particle therapy. Working with United Imaging Healthcare, the Chinese Academy of Sciences institutes, and Ruijin Hospital, APTR covers the full lifecycle of proton and multi-ion therapy systems — from R&D and engineering to clinical translation. Since obtaining China's first registration license for its Proton Therapy System (SAPT-PS-01) in 2022, more than 1,500 patients across over 50 tumor types have been treated, and the first domestic 360° full-rotation gantry treatment room was approved in 2026.

www.aptr.com.cn

B&B Healthcare Co., Ltd. · Seoul, Korea · BRONZE SPONSOR

B&B Healthcare provides advanced solutions for radiation therapy, including CT simulation, 4DCT, treatment planning, and surface-guided radiation therapy (SGRT), supporting healthcare professionals with innovative technologies for accurate and efficient patient care.

www.bnbhealthcare.com

Brainlab · Munich, Germany · BRONZE SPONSOR

For over 30 years, Brainlab has advanced cancer treatment with a clear vision: improving access to and consistency of care. Its Elements planning software and ExacTrac Dynamic positioning and monitoring systems enable precise radiosurgery and stereotactic body radiotherapy with confidence. *www.brainlab.com*

CAS Ion Medical Technology Co., Ltd. (CASHIM) · Beijing, China · BRONZE SPONSOR

CASHIM was established in 2018 by Chinese Academy of Sciences Holdings, building on research from the CAS Institute of Modern Physics. The company develops ion radiotherapy products spanning heavy ion, proton, and neutron therapy, and delivered China's first domestically developed heavy-ion medical machine, which entered clinical use in 2020 and has since been deployed at multiple centers treating thousands of patients. *www.cashim.cn*

CHUNSUNG · Seoul, Korea · BRONZE SPONSOR

A partner in radiation therapy since 1988, Chunsung develops and supplies accessories, measurement equipment, and patient immobilization devices for radiation treatment. Beyond conventional X-ray-based therapy, the company manufactures customized equipment for proton, heavy-ion, and neutron therapy, along with a range of experimental phantoms and measurement instruments. *www.chunsung.co.kr*

FieldCure Co., Ltd. · Seoul, Korea · BRONZE SPONSOR

FieldCure makes electric-field cancer therapy personalized and measurable by uniting patient-specific treatment planning, multiphysics simulation, and precisely controlled field delivery. *www.fieldcure.com*

GE HealthCare · Chicago, USA · BRONZE SPONSOR

GE HealthCare is a global medical technology, pharmaceutical diagnostics, and digital solutions company. Its portfolio spans medical imaging — including CT, MRI, molecular imaging, and ultrasound — along with patient monitoring, imaging agents, and AI-enabled digital solutions that support diagnosis and therapy planning, including applications in radiation oncology. *www.gehealthcare.com*

Guangzhou Raydose Medical Technology Co., Ltd. · Guangzhou, China · BRONZE SPONSOR

Founded in 2012, Raydose specializes in radiotherapy quality assurance. Over the past decade the company has supported hundreds of therapy units and built a comprehensive product line covering machine QA, patient QA, and radioprotection. Driven by continuous R&D, Raydose keeps deepening innovation in QA for new treatment technologies — helping the industry improve clinical safety and performance. *www.raydose.com*

Jiyeon Medical · Korea · BRONZE SPONSOR

Jiyeon Medical is a Korean medical device supplier providing medical and radiation-related equipment and consumables to healthcare institutions in Korea.

Majung Solution Co., Ltd. · Goyang, Korea · BRONZE SPONSOR

Majung Solution is a Korean company headquartered in Goyang, Gyeonggi-do, supporting the radiation oncology and medical physics community in Korea with specialized equipment and solution services. *www.mjsltd.co.kr*

PAPRICALAB Co., Ltd. · Seoul, Korea · BRONZE SPONSOR

PAPRICALAB is a Korean radiotherapy R&D company founded by a radiation oncologist and a medical physicist, developing medical devices, dosimetry, and QA solutions to address unmet clinical needs. *www.papricalab.com*

Paragon Care Korea (Quantum Healthcare) · Seoul, Korea · BRONZE SPONSOR

Paragon Care Korea, operating through Quantum Healthcare Korea, is the Korean arm of Australia's Paragon Care Group, a healthcare equipment and consumables supplier active across the Asia-Pacific region. The company supplies nuclear medicine and radiation oncology equipment — including SPECT/CT systems, cyclotrons, and radiotherapy systems — as well as contrast injectors and related consumables to major Korean university hospitals. *www.paragoncare.co.kr*

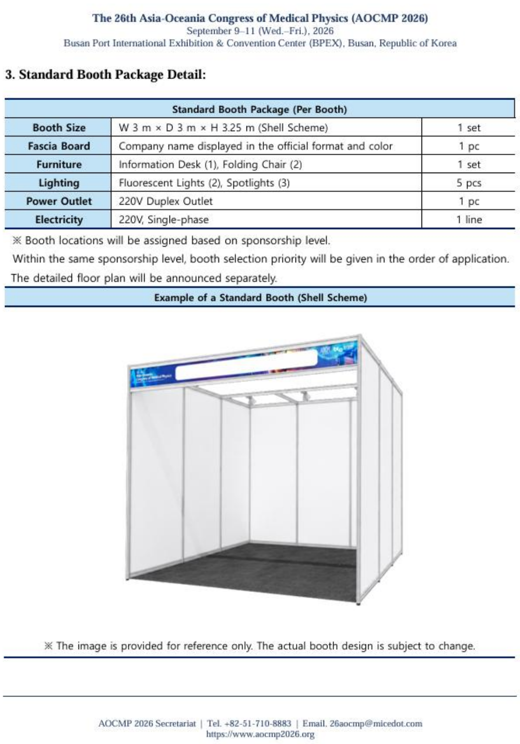
PTW-Asia Pacific Ltd. · Freiburg, Germany / Hong Kong · BRONZE SPONSOR

PTW Freiburg, established in 1922, is an internationally recognized leader in radiation measurement technology, dedicated to dosimetry equipment and software for radiation therapy, diagnostic radiology, and health physics. PTW-Asia Pacific, its wholly owned subsidiary, is the authorized regional representative for the registration, promotion, sales, installation, and servicing of PTW products across the Asia-Pacific region.*www.ptwdosimetry.com*

RaphaRAD Inc. · Seoul, Korea · BRONZE SPONSOR

RaphaRAD is a Korean radiation therapy technology startup founded in 2021 by medical physicists and radiation oncology specialists from major Korean medical institutions. The company develops quality assurance, shielding, and tumor-localization products for brachytherapy, linac-based radiotherapy, and proton therapy. *www.rapharad.com*

AFOMP thanks all sponsors and exhibitors of AOCMP 2026 for their generous support of the medical physics community in the Asia-Oceania region. Companies interested in partnering with AFOMP as corporate members are invited to contact the AFOMP Secretary General (sg.afomp@gmail.com) or visit afomp.org/corporate-members.



The 26th Asia-Oceania Congress of Medical Physics (AOCMP 2026)
September 9–11 (Wed.–Fri.), 2026
Busan Port International Exhibition & Convention Center (BPEX), Busan, Republic of Korea

3. Standard Booth Package Detail:

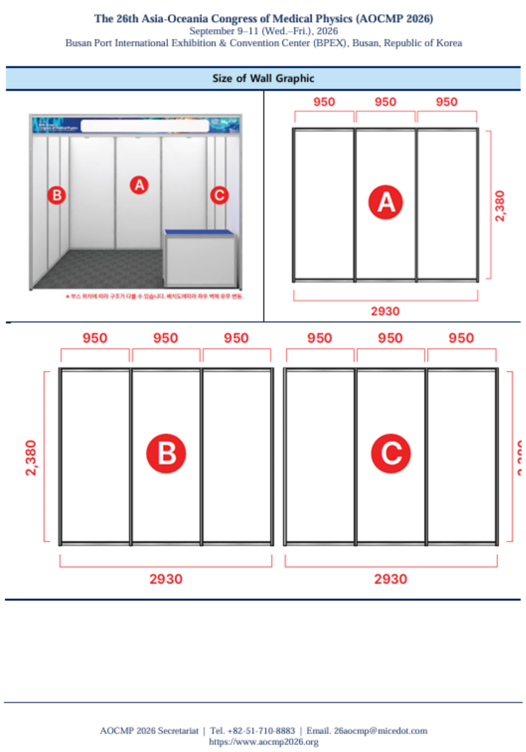
Standard Booth Package (Per Booth)		
Booth Size	W 3 m × D 3 m × H 3.25 m (Shell Scheme)	1 set
Fascia Board	Company name displayed in the official format and color	1 pc
Furniture	Information Desk (1), Folding Chair (2)	1 set
Lighting	Fluorescent Lights (2), Spotlights (3)	5 pcs
Power Outlet	220V Duplex Outlet	1 pc
Electricity	220V, Single-phase	1 line

※ Booth locations will be assigned based on sponsorship level.
Within the same sponsorship level, booth selection priority will be given in the order of application.
The detailed floor plan will be announced separately.

Example of a Standard Booth (Shell Scheme)

※ The image is provided for reference only. The actual booth design is subject to change.

AOCMP 2026 Secretariat | Tel. +82-51-710-8883 | Email. 26aocmp@micedot.com
https://www.aocmp2026.org



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Connect. Collaborate. Advance Medical Physics Across Asia-Oceania.

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Asia-Oceania Federation of Organizations for Medical Physics

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MEDICAL PHYSICISTS	NATIONAL MEMBER ORGANIZATIONS	OFFICIAL JOURNALS	AFOMP PULSE NEWSLETTER

Who We Are

Founded in 2000, the **Asia-Oceania Federation of Organizations for Medical Physics (AFOMP)** is the regional organization of the International Organization for Medical Physics (IOMP), uniting 18 national medical physics societies across Asia and Oceania — from Australia, China, India, Japan and Korea to the emerging communities of Southeast and South Asia. AFOMP advances the science and practice of medical physics through congresses, education and training programs, webinars, publications, and professional development activities across the world's largest and fastest-growing healthcare region.

Why Partner with AFOMP?

Regional Reach
Direct access to the medical physics community in the world's fastest-growing radiotherapy and imaging market.

Targeted Audience
Your message reaches the clinical scientists who evaluate, commission, and use your equipment every day.

Long-term Visibility
Year-round brand presence through the AFOMP website, newsletters, webinars, and scientific events.

What AFOMP Does

Congresses
The annual Asia-Oceania Congress of Medical Physics (AOCMP) and regional scientific meetings.

Education
Monthly, school, and industrial webinar series plus a regional postgraduate curriculum framework.

Publications
Three official journals and the biannual AFOMP Pulse newsletter.

Awards
Prestigious awards recognizing excellence and supporting young medical physicists.

Membership benefits & fees — see reverse side →

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Corporate Membership Benefits

AFOMP – CORPORATE MEMBERS PROGRAM

Homepage Advertisement
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Newsletter Advertising
A full-page color advertisement in the biannual AFOMP Pulse newsletter, distributed with global reach.

Scientific & Technical Articles
Publish 2–3 page scientific or technical articles introducing your products and innovations to AFOMP members.

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Preferential corporate-member rates on webinar advertising and industrial webinar sessions — 50% off standard pricing.

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Further Partnership Opportunities
- ✓ Sponsoring AFOMP awards & best paper publications
- ✓ Supporting travel grants for young professionals
- ✓ Hosting dedicated industrial webinars
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Advertising Rates at a Glance

Opportunity	Corporate Member	Non-Member
Monthly webinar video advertisement (per year)	USD 500	USD 1,000
Industrial webinar (per session)	USD 500	USD 1,000
Newsletter advertisement — 1 issue	Free of charge	USD 250
Newsletter advertisement — 2 issues (1 year)	Free of charge	USD 450
Newsletter advertisement — 6 issues (3 years)	Free of charge	USD 1,000
Newsletter advertisement — 10 issues (5 years)	Free of charge	USD 1,600

How to Join

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Join us in advancing medical physics across Asia-Oceania.
We look forward to welcoming your company as an AFOMP Corporate Member.

Dr. Aik Hao Ng
Secretary General, AFOMP
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Asia-Oceania Federation of Organizations for Medical Physics | www.afomp.org

NEWS & UPDATES

AFOMP ECMP: A Clinical Training Practice Spotlight

Clinical Medical Physics Training at the First Affiliated Hospital of Wenzhou Medical University

T.L.M. Peiris, MSc, Medical Physics Clinical Trainee (Sri Lanka)

1. Introduction

I am currently undertaking a clinical medical physics training programme at the hospital. This report records my progress from 7 July to 18 August 2026. It is prepared for my clinical training supervisor, **Prof. Jin Xiance**, and the clinical training arrangement committee to review practical exposure, competencies developed, equipment encountered and areas where additional supervised hands-on training would be valuable.

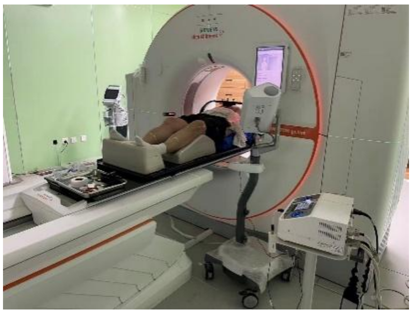
2. Training Schedule

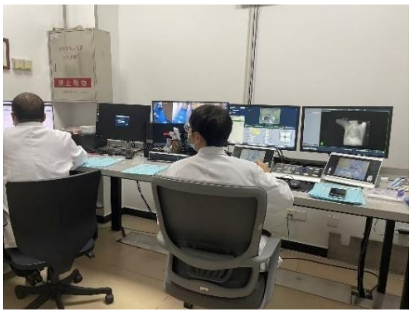
Date	Activities
2026/7/1-2026/7/15	Preparatory Training
2026/7/16-2026/7/31	Radiotherapy CT Simulation
2026/8/1-2026/8/15	Image Fusion
2026/8/16-2026/9/30	Treatment Plan Design
2026/10/1-2026/10/31	Radiotherapy Quality Assurance
2026/11/1-2026/11/15	Daily Positioning for Radiotherapy
2026/11/16-2026/12/15	Physicist Clinical Research
2026/12/16-2026/12/28	Subsequent Scientific Research Cooperation

3. Reflection

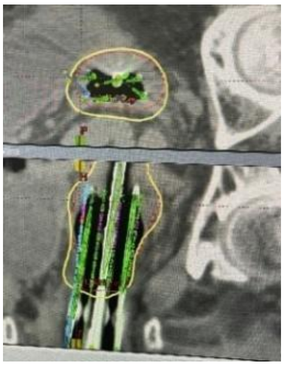
I sincerely thank **Prof. Jin Xiance** and all medical physicists, radiation oncologists, radiation therapists, CT staff, nurses and teachers who have supported my training. The teachers have been very helpful and have taught me within actual clinical workflows. They have answered my questions and explained machine operation, patient setup, treatment delivery and QA in detail. Despite language differences, they have made a strong effort to teach me clearly. I am very satisfied with the teaching environment and the support provided by all sections. Importantly, the rotations involved direct supervised patient setup and machine operation rather than observation-only training.

4. Summary





The training from 7 July to 18 August 2026 has progressed from intensive CT simulation to multi-platform LINAC practice, QA, brachytherapy exposure, and treatment planning. CT simulation has provided a strong hands-on foundation, while LINAC treatment and QA competencies continue to develop. The TPS rotation is now linking these clinical experiences to treatment planning and optimization. I sincerely appreciate the opportunity and look forward to continued supervised hands-on clinical practice and, if possible, to participating in a small research activity with the team.



ACROSS THE REGION

China / NMO • CSMP

National Cancer Center Southern Branch Proton Therapy Academic Symposium, ISOP 2026 China Summit will be held in Shenzhen, China

Jun Dang, Department of Radiation Oncology, National Cancer Center/ Cancer Hospital, Chinese Academy of Medical Sciences, Shenzhen

To promote the exchange and development of proton therapy technology and advance the innovation and progress of new radiotherapy techniques, the Southern Branch of the National Cancer Center, in collaboration with the Shenzhen Medical Association, and hosted by the Cancer Hospital of the Chinese Academy of Medical Sciences (CAMS), Shenzhen Center, along with the co-organization of IBA (Beijing) Particle Accelerator Technology Co., Ltd., will hold the "National Cancer Center Southern Branch Proton Therapy Academic Symposium, the International Symposium On Proton Therapy (ISOP) 2026 China Summit, and the 10th Shenzhen Radiation Oncology Forum, as well as the Particle Radiotherapy Advances and Practical Applications Training Course" from September 12-13, 2026, in Shenzhen, Guangdong. The conference will include various sessions such as gynecological oncology, head and neck oncology, thoracic oncology, abdominal oncology, nursing, physics quality control, and a proton therapy researcher meeting. The Cancer Hospital of the CAMS, Shenzhen Center is the first public hospital in southern China to operate a proton therapy system. The holding of this conference will further consolidate the hospital's leading position in cancer treatment in China.

The 5th Tumor Precision Radiotherapy Special Skills Training Project

Jun Dang, Department of Radiation Oncology, National Cancer Center/ Cancer Hospital, Chinese Academy of Medical Sciences, Shenzhen

The Cancer Hospital of the CAMS, Shenzhen Center stood out in the competition among 24 hospitals nationwide and was approved as the second batch of training hospitals for the "Tumor Precision Radiotherapy Special Skills Training Project" by the National Health Commission Talent Exchange Service Center. It is now recruiting students for the "Tumor Precision Radiotherapy Special Skills Training Project" (fifth phase) nationwide. The Cancer Hospital of the CAMS, Shenzhen Center is a top public oncology specialized hospital that was jointly established by the National Cancer Center (CAMS Cancer Hospital in Beijing) and the Shenzhen Municipal Government. As a national cancer regional medical center the hospital fully implements the development concept of "one hospital, two districts" and achieves deep homogenization with the Beijing General Hospital in terms of management team, expert strength, technical standards, and scientific research platform.

The department of radiation oncology has 6 X-ray based LINAC, including one CyberKnife, Tomotherapy, Varian VitalBeam, Elekta Infinity, etc. The center also installed IBA's 5 room Proton Therapy system. 4D-CT and 3.5 T MR simulator are also used in routine clinical practice. A spectral CT will soon be installed to support the Proton treatment planning. The Routine clinical treatment technology includes IMRT, VMAT, IGRT, SRS/SBRT, Lattice, etc.

The 2026 Guangdong Annual Academic Meeting on Medical Physics and Precision Radiotherapy held on August 6-9, in Lanzhou, Gansu Province, China

Jun Dang, Department of Radiation Oncology, National Cancer Center/ Cancer Hospital, Chinese Academy of Medical Sciences, Shenzhen

The Guangdong Cancer Association Medical Physics Committee Meeting and the Joint Academic Annual Meeting of Guangdong/Gansu provincial Radiation Therapy Quality Assurance Center was held from August 6 to 9, 2026, in Lanzhou, Gansu Province (Gansu Hospital of Sun Yat-Sen University Cancer Center). Concurrently, the founding meeting of 'Guangdong Biomedical Engineering Society Precision Radiotherapy Technology Branch' will also take place on this event.

The theme of this conference is "Silk Road Twin Hubs on the Silk Road - Intelligent Linking between Gansu and Guangdong - Precision and Progress Together."

This is the very first time that Sun Yat-Sen Cancer Center holds such a high level provincial academic meeting on medical physics jointly with Gansu province. Sun Yat-Sen Cancer Center is the long-famous top Cancer Center not only in China but also worldwide. While Lanzhou is widely known by the city's fully independently developed heavy ion cancer treatment system. The meeting content covers topics such as the application of Generative Large Models in Precision Diagnosis and Treatment / Adaptive Radiotherapy / Particle therapy / Current Cutting-edge Multimodal Imaging Guidance topic / the Training and Continuing Education for Medical Physicists, and a Special Half Day Guest Visiting Tour to the headquarters of Lanzhou Ion Therapy Co., Ltd.

Prof. Xiaoyan Huang
The Committee Director
(Sun Yat-Sen Cancer Center)

Prof. Li Chen
The Committee Deputy Director
(Sun Yat-Sen Cancer Center)

Prof. Guoping Shan
(Vice President, Zhejiang Cancer Hospital)

Recent Progress in BNCT Research and Translation at the Second Affiliated Hospital, Zhejiang University School of Medicine

The Department of Radiation Oncology at the Second Affiliated Hospital, Zhejiang University School of Medicine (SAHZU), led by Prof. Qichun Wei, has been actively engaged in Boron Neutron Capture Therapy (BNCT) research in recent years, focusing on boron delivery agent development, micro-dosimetry, and treatment planning optimization. This brief report shares recent progress from the SAHZU radiation oncology team.

Clinical Development in China

China's BNCT program has been gradually moving toward clinical application. With 13 BNCT centers nationwide at various stages of development, five have entered Phase I clinical trials, with Phase II trials expected to commence in the near future. Furthermore, in February 2026, the Boron Neutron Hospital began trial operation at the Boao Lecheng Pilot Zone in Hainan. The SAHZU team has contributed to patient care, treatment planning support, and dosimetry consultation.

Research Highlights: Boron Delivery Nanoplatforms

The team has published a series of studies exploring nanotechnology-enhanced BNCT. Some recent work includes:

- **Immune-activating manganese-boron nanoplatform.** In *Journal of Nanobiotechnology* (2026), the team reported BSA-BPA-MnO_2, a tumor-microenvironment-responsive manganese-enriched nanoboron agent that addresses a key limitation of BNCT therapy-induced immunosuppression. The nanoplatform combines efficient boron delivery with Mn^{2+}-driven Fenton-like catalysis and cGAS-STING pathway activation. By amplifying BNCT-induced oxidative stress and triggering immunogenic pyroptosis alongside robust type I interferon signaling, this dual mechanism transforms BNCT from a purely local therapy into a systemic immune activator. Notably, the platform achieves potent tumor suppression even at subclinical boron levels, and the MnO_2 component enables MRI-guided BNCT, realizing the vision of theranostic integration.

- **Senescence-targeting biomimetic nanoparticles.** In *Chemical Engineering Journal* (2026), the team introduced PLGA-CB@MM, a regulatory biomimetic nanoparticle system designed to simultaneously eliminate both non-irradiated tumor cells and radiation-induced senescent tumor cells. The study first demonstrated that radiation-induced senescent glioma cells promote tumor proliferation and invasion through enhanced exosome secretion, identifying senescent cells as a previously underappreciated therapeutic target. The biomimetic nanoparticle, coated with mixed membranes from both non-irradiated and senescent glioma cells, leverages homotypic adhesion molecules and the EPR effect for dual targeting. This approach addresses both the tumor bulk and the tumor microenvironment, enhancing BNCT's therapeutic efficacy against glioblastoma.
- **Tumor microenvironment modulation with cascade enzymes.** In *Nano Research* (2025), the team developed a cRGD-modified cationic liposome nanosystem carrying carborane, with lactate oxidase (LOX) and catalase (CAT) immobilized on the surface. Through a cascade enzymatic reaction—LOX consumes lactate to produce H_2O_2, and CAT further decomposes H_2O_2 into O_2—the system simultaneously reduces lactic acid concentration, generates oxygen, and downregulates HIF-1α expression. This TME-regulating BNCT nanosystem exhibited potent anti-tumor effects both in vitro and in vivo, and importantly, reduced tumor stemness—an effect associated with improved prognosis.
- **MRI-guided dual-functional nanoliposomes.** In *ACS Applied Materials & Interfaces* (2025), the team reported BPA-F&DOTA-Gd@LIPO-ANG, a gadolinium-boron integrated lipid nanocarrier for targeted boron delivery and MRI-guided BNCT of glioblastoma. Using a microfluidic mixing strategy—overcoming the challenge of encapsulating amphiphilic BPA—the formulation achieved high BPA loading with uniform particle size and long-term colloidal stability. Angiopep-2 modification enhances blood-brain barrier penetration and glioma targeting. In orthotopic glioma models, the nanoliposome significantly improved tumor-to-normal tissue (T/N) and tumor-to-blood (T/B) ratios while enabling real-time MRI visualization, advancing image-guided precision BNCT.

National Key R&D Program

As the leading institution of the National Key R&D Program of China, SAHZU has completed the project on "Long-Retention MRI-Visible Gadolinium-Boron Dual-Effect Capture Agents." Key outcomes include: gadolinium-boron dual-effect agents with favorable intra-tumoral retention and T/N ratios; a Monte Carlo micro-dosimetry model with multi-scale simulation capability; and an MRI-CT fusion treatment planning system with 3D dynamic boron distribution mapping and DVH analysis.

Closing Remarks

As BNCT continues to develop in China, the SAHZU radiation oncology team remains committed to advancing boron agent design, image-guided dosimetry, treatment planning optimization, and patient care. It is hoped that continued work in these areas will contribute to the advancement of precision radiotherapy and facilitate the clinical translation of BNCT.

ACROSS THE REGION

Hong Kong / NMO • HKAMP

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

During the year 25/26, the Hong Kong Association of Medical Physics (HKAMP) continued to support the continuous professional development of its members through the organization and co-organization of scientific seminars, workshops and lectures. This report provides an overview of the key activities undertaken.

Key Activities Organized:

1. **Workshop on 'Versatile QA with Revolutionary Film-class Resolution Measurement Tool' (28 June 2025)**

Two identical half-day workshops (morning and afternoon sessions) were held in Queen Mary Hospital. The invited speaker, Ms. Kuan-Chuan YEH from IBA Dosimetry (board-certified Medical Physicist by ABR and CSMPT with over 15 years of clinical experience), delivered presentations and practical sessions on the high-resolution film-class measurement tool. Topics covered included commissioning for small fields, SRS patient-specific QA, and extended applications of the detector.

2. **HKSBRTSG-HKAMP-HKART Annual Scientific Meeting 2026 (2 May 2026)**

This scientific meeting was co-organized with the Hong Kong SBRT Study Group (HKSBRTSG) and the Hong Kong Association of Radiation Therapists (HKART), and attracted approximately 230 attendees, including oncologists, medical physicists and radiation therapists. The programme focused on adaptive radiotherapy and the combination of SBRT with immunotherapy. Keynote lectures were delivered by overseas speakers including Prof. Suresh Senan (Amsterdam UMC), Prof. Mischa Hoogeman (Erasmus MC / HollandPTC) and Prof. Melvin Chua (National Cancer Centre Singapore), together with local experts. The meeting provided a valuable platform for multidisciplinary exchange and networking.

3. **HKAMP Engineering Physics Lecture 2026 (9 & 16 May 2026)**

A two-day lecture series was held at The Hong Kong Polytechnic University to prepare Resident Physicists for the HKAMP Part I & II Examination. Topics covered included fundamentals of the Varian linear accelerator and Halcyon system, CT simulator principles, HDR brachytherapy remote afterloader systems, Tomotherapy, electrical safety testing, clinical system network architecture, radiation protection essentials, and equipment project management. Lectures were delivered by experienced local medical physicists and the event was open to all HKAMP members.

Other Engagement

In addition to the events organised by the Association, HKAMP circulated information on 34 local and international scientific seminars, webinars and conferences throughout the year. Examples include various AFOMP educational webinars (addressing AI-guided radiotherapy, FLASH techniques, spatially fractionated radiotherapy and regional practice), International Medical Physics Week 2026 activities, AsiaSafe-IAEA sessions on theranostics and radionuclide dosimetry, HKRPS seminars, the 5th Annual Conference of PTCOG-AO, and programmes offered by local academic institutions. These announcements helped members stay informed of current developments in the field.

Conclusion

The HKAMP provides a wide variety of educational activities, and works together with different institutes and other disciplines (such as oncologists and radiation therapists) to keep up our professional standard.

ACROSS THE REGION

Bangladesh/ NMO • BMPS

Bangladesh Medical Physics Society Celebrates International Medical Physics Week 2026 with International Webinar Series

In celebration of **International Medical Physics Week (IMPW) 2026,** the **Bangladesh Medical Physics Society (BMPS)** successfully organized a four-day international webinar series from **20–23 April 2026.** The event brought together distinguished medical physics experts from **China, India, Australia, and Bangladesh,** highlighting recent developments in radiotherapy, professional development, quality assurance, and patient safety.

The webinar series was conducted virtually via **Zoom** and attracted participants from Bangladesh and abroad, including medical physicists, radiation oncologists, radiation therapists, academics, researchers, and students. The initiative reflected BMPS's continued commitment to promoting professional education and international collaboration in medical physics.

Contents

The scientific program featured four inspiring lectures:

20 April 2026: Prof. Xiance Jin (First Affiliated Hospital of Wenzhou Medical University, China) delivered an insightful presentation on **"Self-growth of Clinical Medical Physicist and Certification"** emphasizing professional development, competency building, and the importance of certification in advancing clinical practice.

21 April 2026: Dr. K. M. Rafic (Apollo Speciality Hospitals, India) presented **"Online Adaptive Radiotherapy: Are We There Yet?"** discussing current technologies, clinical implementation, challenges, and the future prospects of online adaptive radiotherapy.

22 April 2026: Dr. Robin Hill (University of Sydney, Australia) spoke on **"Self-managed Dosimetry Audits in Radiotherapy Departments"** highlighting practical approaches for strengthening quality assurance programs and improving treatment safety through independent dosimetry audits.

23 April 2026: Dr. Md. Akhtaruzzaman (Evercare Hospital Chattogram, Bangladesh) concluded the series with an engaging lecture titled **"Enhancing Patient Safety in Radiotherapy through Independent Dose Verification."** The presentation emphasized the growing role of independent dose verification systems in modern radiotherapy, showcasing how advanced verification technologies can improve treatment accuracy, strengthen quality assurance, and enhance patient safety.

Throughout the webinar series, participants actively engaged in discussions and interactive question-and-answer sessions, creating an excellent platform for knowledge exchange and professional networking. The lectures highlighted the rapid evolution of medical physics and reinforced the critical role of medical physicists in ensuring safe, accurate, and high-quality cancer care.

BMPS expresses its sincere appreciation to all distinguished speakers, participants, organizers, and volunteers for making the webinar series a great success. The society remains committed to organizing high-quality educational activities and strengthening international collaboration to advance the medical physics profession in Bangladesh and the Asia-Pacific region.

ACROSS THE REGION

AFOMP Endorsed Activity • SCMPCR

Insights from SCMPCR 9th Hands-on Workshop (HW-09): Bridging theoretical and clinical practice for integrated cancer care at TMSS Cancer Center

Md. Jabidul Islam, Junior Program Officer, South Asia Centre for Medical Physics & Cancer Research (SCMPCR)

The **South Asia Centre for Medical Physics and Cancer Research (SCMPCR)**, under Alo Bhubon Trust, successfully conducted its **9th Hands-on Workshop (HW-09)**, titled ***"Advances in Contemporary Cancer Care: Integrated Radiotherapy Practice for Medical Physicists and Radiation Oncologists."***

Designed to address the critical gap in skilled cancer care professionals across South Asia, the four-day intensive program focused on promoting collaborative clinical workflows between medical physicists and radiation oncologists to enhance treatment accuracy, safety, and efficiency.

- **Delegates: 39**
- **Global Faculty: 12**
- **CPD Points: 40**

Global Academic & Clinical Expertise

Led by SCMPCR Founder Chairman **Prof. Dr. Golam Abu Zakaria** and Director **Prof. Dr. Hasin Anupama Azhari,** the workshop convened a prestigious international faculty from Germany, Belgium, the Netherlands, India, Nepal, and the USA.

Key distinguished speakers included Dr. Robert Semrau (Germany), Prof. Dr. Ben Vanneste (Belgium), Asst. Prof. Dr. Leonard Wee (Netherlands), Prof. Dr. S. Ghosh Laskar (India), Shaju Pilakkal (India), Asst. Prof. Kanchan Sarga Nyaichyai (Nepal), and Charles Martel Ramota (USA), alongside clinical leadership from TMSS led by Chief Medical Physicist Md. Motiur Rahman.

- **Institutional Collaborations:** Organized in strategic cooperation with TMSS Cancer Center and supported by the International Cancer Expert Corps (ICEC), PTW, Beacon Pharmaceuticals PLC, Tradevision, Canon, and Radformation.

Day 1: Foundations & Tomotherapy Innovations

The workshop opened with technical lectures examining the medical, clinical, and physical principles of Tomotherapy compared to conventional Linacs. Experts detailed specialized commissioning, routine QA protocols, and multimodality imaging (CT-MRI-PET) integration for precise target delineation. An online presentation highlighted artificial intelligence applications in radiation medicine.

The formal inauguration was graced by Chief Guest Prof. Dr. MH Alamgir (Pavel) and TMSS Executive Director Prof. Dr. Hosne-Ara Begum, emphasizing regional clinical empowerment.

Figure 1: Inaugural Ceremony & lectures of Day-1

Day 2: Advanced Clinical Workflows & Planning

Day 2 emphasized high-precision strategies and treatment modalities:

- **TBI Physics:** Dosimetry, QA, and field planning for Total Body Irradiation.
- **Radiobiology:** Clinical rationale for Hypofractionation, SRS, and SBRT dose limits.
- **Motion Management:** Mitigating internal tumor motion risks during delivery.
- **SGRT v.s. Markers:** Transitioning toward surface-guided radiation therapy to reduce invasive localization.
- **Target Delineation:** Head, neck, breast, and pelvic nodal contouring standards to minimize OARs toxicity.

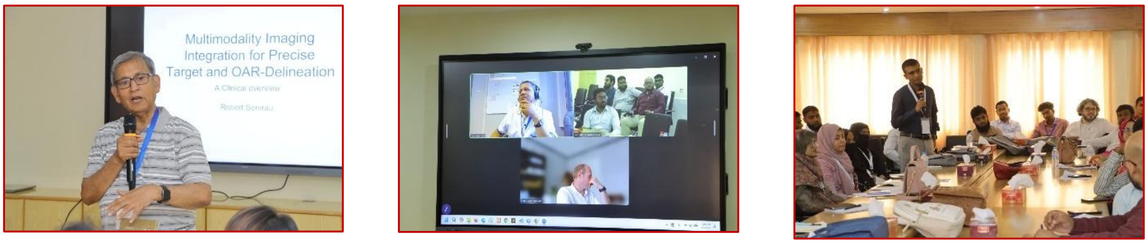


Figure 2: Both online & offline lectures of Day-2

Day 3: Hands-on Clinical Training

Participants transitioned into interactive, role-specific practical workstreams:

- **Group A (Radiation Oncologists):** Interactive live contouring exercises on complex clinical cases, guided by Dr. Robert Semrau and local faculty, focusing on target volumes and organ-at-risk sparing.
- **Group B (Medical Physicists):** Hands-on Tomotherapy commissioning, beam alignment verification, and quality assurance testing protocols utilizing TMSS facility infrastructure.

The session concluded with demonstrations on AI-driven treatment planning automation, followed by structured interdisciplinary panel discussions and a cultural excursion to the historic Mahasthangarh archaeological site.

Figure 3: Practical Sessions & Group Discussions of Day-3

Day 4: Evaluation & Outcomes

The final day featured a comprehensive clinical examination assessing delegates on integrated workflows, contouring precision, and Tomotherapy physics. Certified attendees received 40 European Board for Accreditation in Medical Physics (EBAMP) CPD points during the closing ceremony, which was attended by Chief Guest Dr. Md. Enamul Haque (DG, Health Economics Unit).

- **Participant Impact & Feedback:** Participant evaluations demonstrated overwhelming satisfaction (87%+ rating content and faculty expertise as excellent/good). Key attendee recommendations highlighted requests for expanded hands-on dosimetry modules, AI coding applications (Monte Carlo/Geant4), and bi-annual workshop cycles.

Figure 4: Evaluation, Certificate Distribution & Closing Ceremony of Day-4

Conclusion

HW-09 successfully reinforced interdisciplinary clinical collaboration, establishing actionable standards to advance radiotherapy accuracy and patient care across South Asia.

ACROSS THE REGION

Malaysian/ NMO • MAMP

Malaysian Association of Medical Physics (MAMP) in Borneo: Bridging the East-West Malaysia and Strengthening Radiological Emergency Preparedness

Persatuan Fizik Perubatan, Malaysian Association of Medical Physics (MAMP)

Malaysia presents a unique geographical area of Peninsular Malaysia (West Malaysia) on the Asian continent and the states of Sabah and Sarawak (East Malaysia) on the island of Borneo. One of the strategic initiatives of the Malaysian Association of Medical Physics (MAMP) is to bridge the professional gap between these two regions to ensure that the medical physics professionals, regardless of their location, have equitable access to high-level training, professional networking, and organizational support.

Recently in **July 2026**, MAMP conducted its first official activity in **Sarawak** in partnership with the Medical Radiation Surveillance Branch of the Sarawak State Health Department (JKN), Ministry of Health Malaysia. The programme entitled **"Comprehensive Strategy for Radiological and Nuclear Incident Response Workshop",** held from **July 23–24**, followed by the MAMP Borneo Retreat on July 25. The workshop, held at the Akademi Binaan Malaysia (ABM) Convention Centre in **Kuching**, successfully gathered 55 participants. This diverse group included medical physicists, radiologists, radiation protection officers (RPOs), and emergency paramedics, reflecting a multi-disciplinary approach to radiation safety.

The program was structured to balance theoretical foundations with practical expertise:

- Day 1: Sessions focused on the incident management, the distinction between safety and security in medical facilities, and the clinical management of radiation-related injuries.
- Day 2: Participants engaged in hands-on simulations, including spill response scenarios and table-top exercises, designed to test and refine real-world coordination strategies.

A pivotal component of the event was the MAMP Outreach Session, where the association's 25-year history and its future strategic roadmap were shared with local professionals. This session truly captured the Sarawakian spirit of "Segulai Sejalai" (Togetherness), effectively bridging the distance between practitioners in Peninsular Malaysia and their colleagues in Sarawak. The success of this outreach was clearly reflected in the growth of our professional community; MAMP membership in East Malaysia has increased following the workshop.

TECHNOLOGY AND INNOVATION

Technology and Innovation

Simulating Precision: How Monte Carlo GATE is Transforming Radiotherapy, Education, and Cancer Care

By: Siti Hajar Zuber (UKM)

In modern radiotherapy, the goal is elegantly simple yet technically challenging, deliver maximum radiation to the tumor while preserving surrounding healthy tissue. Achieving this level of accuracy requires advanced tools capable of modeling how radiation interacts with complex human anatomy. Monte Carlo simulations using the GATE (Geant4 Application for Tomographic Emission) platform offer a powerful bridge between theoretical physics, clinical quality assurance, and hands-on education.

Firing Millions of "Microscopic Bullets"

Monte Carlo simulations tackle complex radiation transport problems by asking a fundamental question: What happens if we repeat a random process millions of times? Instead of relying on broad approximations, Monte Carlo methods simulate radiation by tracking individual particles whether photons, electrons, or protons like millions of microscopic bullets passing through matter. Using the GATE platform, medical physicists can model complete clinical environments by simulating linear accelerators with complex beam delivery systems and multileaf collimators, with voxelized patient phantoms to track absorbed dose during the treatment and conducting patient-specific dosimetry to calculate exact energy deposition across varied tissue geometries.

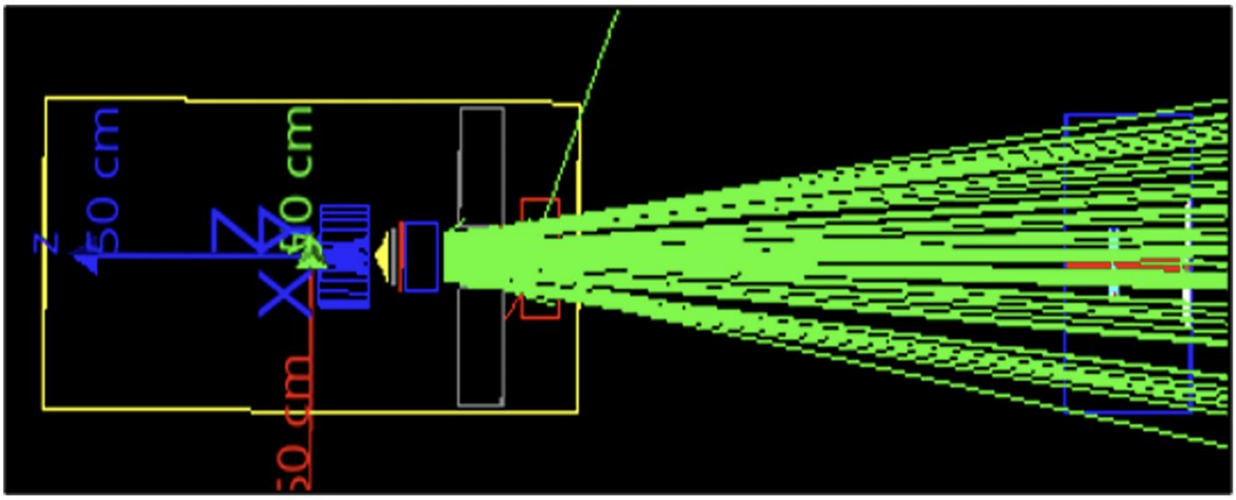


Figure 1: Full-scale Monte Carlo simulation model of the irradiation set-up in a linear accelerator setting

Bringing Code to Life in the Classroom

While Monte Carlo tools were traditionally utilized by medical physicists and researchers, there is a growing push to bring computational modeling into the classroom to support medical physics education. By converting static formulas into interactive visual simulations, students can watch radiation paths unfold in real time. To gauge initial attitudes, a survey was conducted among students at Universiti Kebangsaan Malaysia (UKM) to assess their receptiveness to the Monte Carlo GATE module prior to hands-on exposure. Out of 31 total survey responses evaluating whether the Monte Carlo GATE module may make learning coding more engaging, a strong majority of 71.0% expressed positive feedback, with 45.2% agreeing and 25.8% strongly agreeing. The remaining 29.0% of respondents held a neutral stance, while notably none selected disagree or strongly disagree, demonstrating broad support for the module's role in enhancing student engagement during coding instruction. Survey on Monte Carlo GATE module will make learning coding instructions.

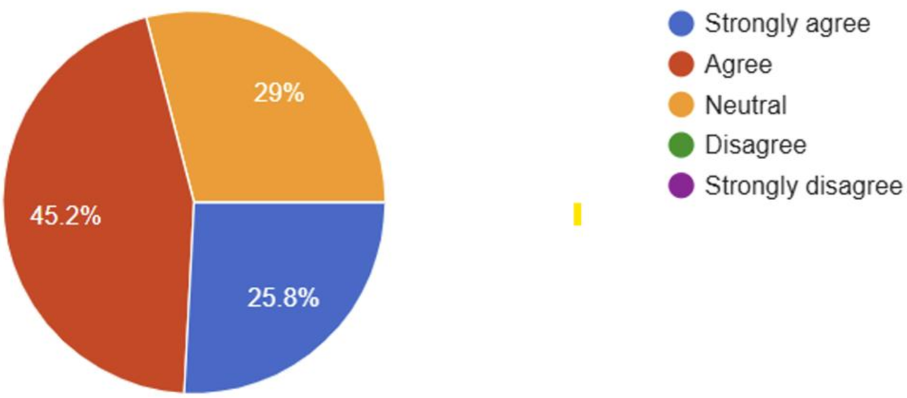


Figure 2: Survey on the Monte Carlo GATE module will make learning coding more engaging

Sustainable Science: Green Phantoms Meet Virtual Models

Simulations are only as powerful as their real-world validation. To verify computer-generated dose predictions without exposing patients to unnecessary radiation, physical phantoms that mimic human tissue are essential in daily clinical physics. While commercial solid water phantoms have long been the industry benchmark, the emergence of bio-based tissue-equivalent phantoms such as those fabricated from mangrove represents a major shift toward sustainable, accessible, and patient-specific quality assurance. These bio-based phantoms offer distinct practical advantages. Mangrove wood combined with natural binders closely mirrors the physical density, effective atomic number, and radiation attenuation properties of human soft tissue. Furthermore, utilizing renewable organic raw materials drastically reduces fabrication expenses compared to costly commercial synthetic blocks, making routine quality assurance tools far more affordable for regional or resource-limited oncology centers. Natural particleboards can also be customized to model patient-specific anatomies. When validated using Monte Carlo GATE simulations, dose distributions inside these eco-friendly phantoms matched standard water phantoms with high accuracy, comfortably passing the strict clinical 3%/3mm gamma index criteria. Ultimately, combining high-fidelity simulations with practical, cost-effective bio-based phantoms strengthens the technical foundation of national cancer care while promoting green, sustainable medical physics.

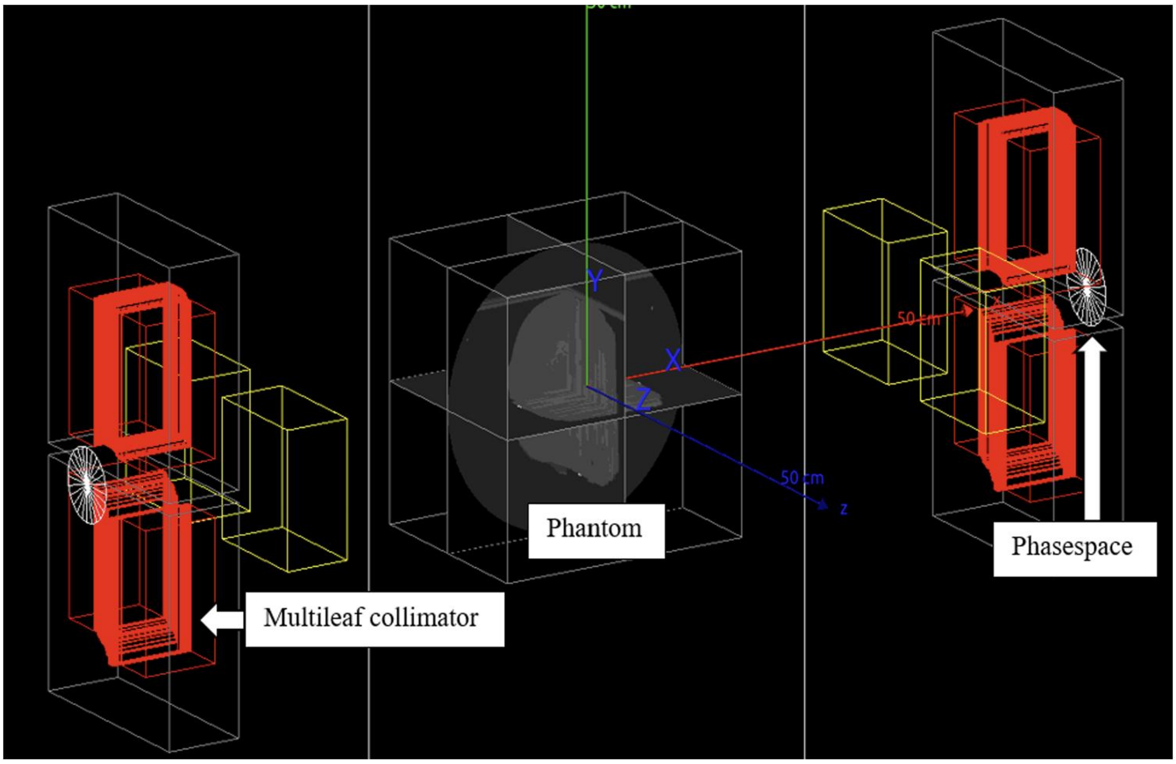


Figure 3: Phantom used to simulate measurements within the GATE environment

Elevating Regional Cancer Care

This integration of Monte Carlo GATE simulations and reproducible physical phantoms directly supports national health initiatives, such as Malaysia's National Strategic Plan for Cancer Control Programme (NSPCCP 2021–2025). By providing affordable, standardized validation workflows and accessible training tools, healthcare institutions can bridge resource gaps by allowing regional centers to adopt high-precision techniques safely, standardize multi-center quality assurance across different hospital facilities, and expand patient access to ensure equitable, safe, and effective radiotherapy across diverse populations. Through the synergy of advanced computing, green technology, and hands-on education, Monte Carlo GATE continues to shape the future of medical physics across the Asia-Oceania region and beyond.

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MCQ IN MEDICAL PHYSICS

Test your physics

Select the single best answer for each question

1. During a gamma-camera acquisition, gamma photons emitted from different locations within the patient may reach the detector. Which component provides the spatial information required to determine the probable direction of origin of the detected photons?

A. Scintillation crystal
B. Collimator
C. Photomultiplier tube
D. Pulse-height analyser
E. Positioning circuit

2. During a planar bone scan using a parallel-hole collimator, the technologist positions the detector 20 cm above the patient. The detector is subsequently moved as close as possible to the patient without changing any other acquisition parameter. What is the most likely effect on the acquired image?

A. Improved spatial resolution
B. Reduced intrinsic spatial resolution
C. Increased septal penetration
D. Increased scattered-photon rejection
E. Reduced radionuclide count rate

3. A patient is scheduled for a ^{99m}Tc bone scan. Before imaging, the gamma-camera count rate is found to be approximately half the expected value. Image quality must be maintained without changing the collimator, energy window, matrix size or patient positioning. Assuming negligible detector dead-time and patient movement, which action is most appropriate to obtain approximately the same total number of counts as originally planned?

A. Halve the acquisition time
B. Double the acquisition time
C. Double the matrix size
D. Widen the energy window by a factor of two
E. Increase the source-to-detector distance

4. A technetium-99m acquisition is performed using an energy window centred on its 140-keV photopeak. What is the principal reason for selecting this energy window?

A. To correct for patient movement during acquisition
B. To improve the intrinsic spatial resolution of the detector
C. To preferentially accept unscattered photons and reject many scattered photons
D. To prevent high-energy photons from penetrating the collimator septa
E. To compensate for non-uniform photon attenuation within the patient

5. Following a SPECT uniformity quality-control test, several areas of non-uniform detector response are identified. A patient SPECT acquisition is subsequently performed without applying the appropriate uniformity correction. Which artefact is most likely to appear in the reconstructed transaxial images?

A. Ring artefact
B. Truncation artefact
C. Respiratory-motion artefact
D. Partial-volume artefact
E. Misregistration artefact

Answers in page 89

SAVE THE DATE

Upcoming events

SEP 09-11	**AOCMP (see page 47)** Busan, South Korea
NOV 07	**IDMP 2026** online
NOV 01–24	**SCMPCR 2026** online
NOV 23–26	**EPSM 2026** Brisbane, Australia

SCMPCR 2026

EPSM
ENGINEERING + PHYSICAL SCIENCES IN MEDICINE
• CONFERENCE 2026 •
22nd – 25th November 2026
Brisbane Convention and Exhibition Centre (BCEC)

Experience the Future of Medical Physics and Biomedical Engineering at EPSM 2026

Join colleagues from across Australasia and around the world in vibrant Brisbane, Australia, for the **Engineering and Physical Sciences in Medicine (EPSM) 2026 Annual Scientific Meeting**, proudly hosted by ACPSEM.

As one of the region's premier scientific gatherings, EPSM 2026 will bring together medical physicists, biomedical engineers, researchers, clinicians, and industry leaders to explore the latest advances shaping the future of healthcare technology and medical science.

This year's meeting features an exceptional lineup of internationally renowned keynote speakers, including **Professor Ane Appelt, Professor Robert Jeraj, Professor Ehsan Samei, Professor Paul Keall, Professor Dale Bailey, and Professor Michael Hofman**. Their insights will complement a dynamic scientific program showcasing cutting edge research, emerging technologies, and innovative clinical applications.

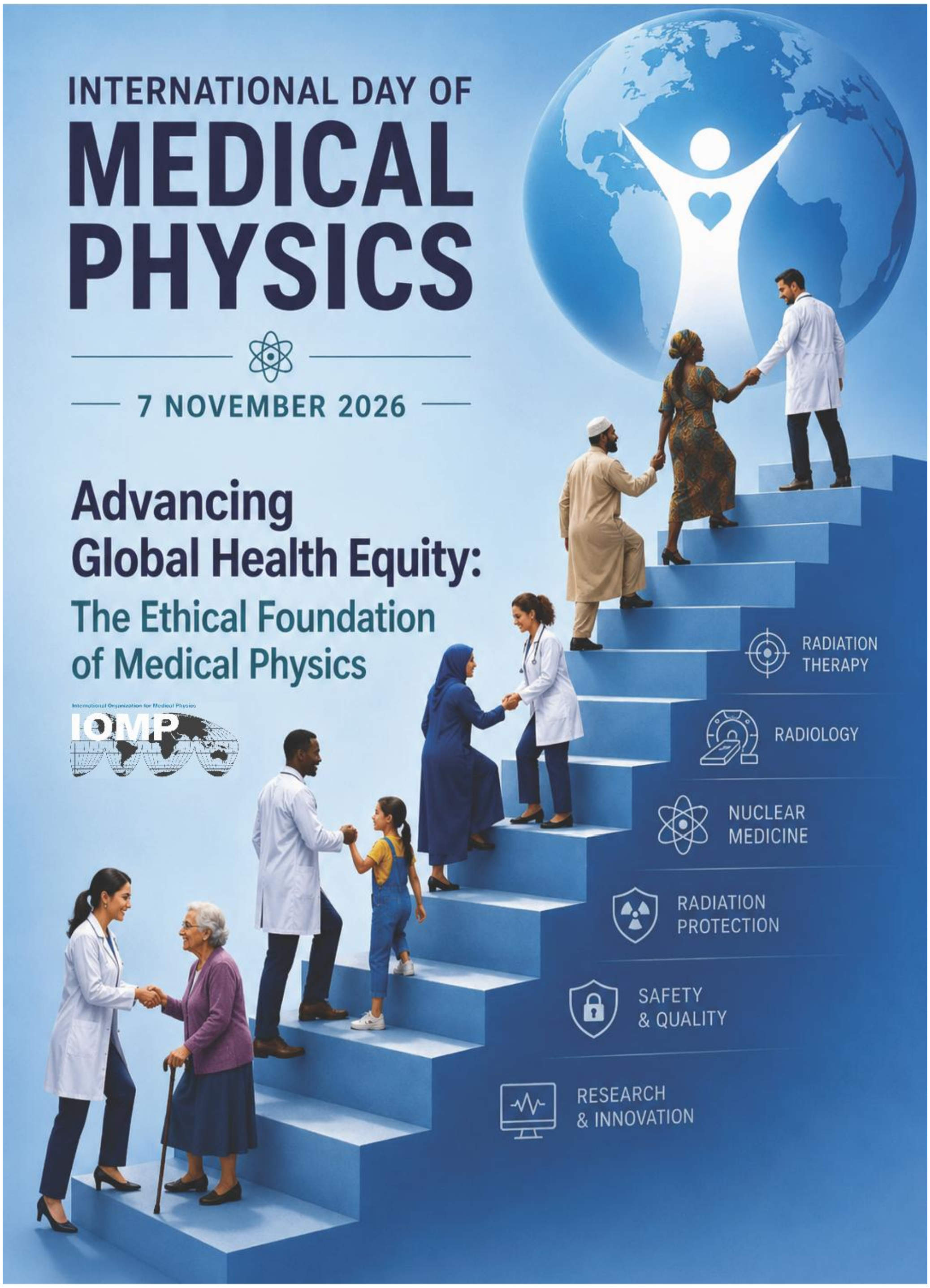
Beyond the conference sessions, delegates will have the opportunity to enhance their experience through a range of exciting events, including:

- **3D Printing Workshop**
- **Theranostics Symposium**
- **Innovation Pitch Competition**, with a chance to win **AUD $500**

Whether you are looking to learn from world leading experts, present your research, build new collaborations, or reconnect with colleagues, EPSM 2026 offers an outstanding platform for professional development and networking.

We warmly invite AFOMP members to join us in beautiful Brisbane to connect with colleagues, share ideas, and experience one of Australasia's leading scientific meetings.

Register and learn more:
https://epsm.org.au/



The upcoming International Day of Medical Physics (IDMP) 2026 poster, **designed by Francesca Vittorini, Camilla Petrucci, and the Health Physics Team from San Salvatore Hospital, L'Aquila, Italy, beautifully captures the theme of IDMP 2026, *'Advancing Global Health Equity: The Ethical Foundation of Medical Physics.'*** The ascending staircase symbolises progress, access, and our shared journey towards more equitable healthcare for all. The diverse patient–professional interactions reflect compassion, inclusivity, and the human-centred role of medical physicists in supporting safe, effective, and ethical medical care worldwide. Let us celebrate this achievement and proudly use the poster in our hospitals, academic centres, and outreach activities throughout the year.

PARTNER SPOTLIGHT

From Industry Partners

Radiation Therapy with Precision: LUNA 3D

Figure 1. UKM_LUNA_3D- Alicia Aschmann

In 2025, the Department for Radiotherapy and Radiation Oncology of the University Hospital Münster (UKM) in Germany introduced Surface Guided Radiation Therapy (SGRT) using LUNA 3D from LAP.

Modern radiotherapy increasingly relies on precise patient positioning and motion management to deliver highly conformal treatments while sparing healthy tissue. At the UKM, this challenge is now being addressed with the clinical introduction of LUNA 3D SGRT, to further enhance accuracy and patient safety, particularly for treatments affected by respiratory motion.

UKM Münster is one of Germany's leading university hospitals, combining research, teaching, and patient care across a wide range of medical disciplines. In radiation oncology, UKM is recognized for its strong integration of clinical expertise, medical physics, and technological innovation—an environment well suited for the clinical adoption of new surface-guided radiotherapy solutions.

Advancing Gentle Precision

The LUNA 3D system uses sensitive optical cameras to continuously monitor the patient’s surface in real time. By comparing the live surface data with the reference position from treatment planning, irradiation can be enabled when the actual position matches the reference position in predefined tolerances. This approach allows for precise positioning based on the patient’s actual anatomy rather than relying solely on external markers or surrogate signals. As a result, skin markings for patient setup can increasingly be avoided, improving both workflow efficiency and patient comfort.

Patients with breast cancer, lung cancer, and tumours affected by respiratory motion in the abdominal region can particularly benefit from this technology. During deep inspiration breath-hold (DIBH) treatments, patients can actively participate by monitoring their breathing on a visual display. This patient-centered approach supports reproducibility and enhances overall treatment quality.

From a clinical leadership perspective, the introduction of LUNA 3D marks an important milestone for UKM.

“With the LUNA 3D system, we are relying on state-of-the-art technology that enables particularly precise and gentle radiotherapy for our patients with tumours in the thoracic and abdominal regions. We are strengthening our leading position in oncological care and offering treatment at the highest international level,” explains Professor Hans Theodor Eich, Director of the Department for Radiotherapy and Radiation Oncology at UKM.

Turning Innovation into Clinical Impact

For LAP, the implementation of LUNA 3D at UKM represents more than a technology installation. It reflects a close and trust-based partnership with a leading academic institution, built on shared goals of clinical excellence and continuous innovation. By working closely with UKM’s clinical and physics teams, LAP supports the translation of advanced motion management concepts into daily clinical practice, contributing to safer, more precise radiotherapy treatments across Europe.

With the clinical implementation of LUNA 3D now at UKM Münster, patients benefit from increased precision, safety, and comfort, while medical physicists gain an additional tool for managing respiratory motion. This collaboration underscores LAP’s commitment to partnering with leading centres to shape the future of high-precision radiotherapy.

Hans Theodor Eich is a Professor of Radiation Oncology and Director of the Department of Radiation Therapy and Radio-Oncology at the University Hospital Münster, Germany. He specializes in modern radiotherapy and multimodal cancer treatment and is actively involved in international clinical research, particularly in the field of lymphoma and precision oncology. His work focuses on integrating advanced technologies and evidence-based strategies to improve treatment quality and patient outcomes.

Professor Hans Theodor Eich

Optimising Mammography Performance through advanced QA Technology

As mammography continues to evolve, new detector technology is redefining how kVp, HVL, dose, and other key parameters are measured with accuracy and efficiency.

Precision Matters: Elevating QA in Mammography

Mammography screening is uniquely demanding within diagnostic imaging since most of the patients are healthy with no disease in the exposed area. Designed to detect the earliest signs of breast cancer, it relies on exceptional contrast sensitivity to distinguish subtle variations in soft tissue. At the same time, it operates at relatively low X-ray energies, where even small inconsistencies can affect both image quality and patient dose.

This makes quality assurance (QA) not just a regulatory requirement, but a cornerstone of clinical confidence.

Unlike general radiography, mammography systems use a wide variety of target and filter combinations to shape the X-ray spectrum. From standard screening to contrast-enhanced techniques, beam qualities can vary significantly, typically spanning 18 to 49 kV. Ensuring consistent system performance across this range is one of the key challenges facing medical physicists and service engineers. See picture 1.

Picture 1. With the Ocean computer software all measured parameters can be seen at the same time, including waveform.

Measuring What Matters

Effective QA in mammography focuses on verifying both radiation output and beam quality. Core measurements include:

- Tube voltage (kVp)
- Dose and dose rate
- Exposure time
- Half-value layer (HVL)

These parameters directly influence image contrast and patient exposure. They also form the basis for calculating Average Glandular Dose (AGD), widely recognized as the most relevant dose metric in breast imaging.

Given the clinical importance of these values, accuracy and traceability are essential. International protocols such as ACR and EUREF place strong emphasis on reliable measurement methods and repeatable workflows.

Mako: Built for Mammography

RTI Group's Mako system introduces a new level of capability for mammography QA through its dedicated Mako Mammo Probe.

A defining advantage is its ability to cover the entire clinical kV range (18–49 kV) without requiring multiple detectors. This allows users to perform both standard and advanced QA tasks, with a single setup across all measurement parameters.

The Mako Mammo Probe advanced detector covers all existing mammography beam qualities on the X-ray Mammography market, covers older systems and the newest additions to the market, including emerging target/filter combinations such as titanium. See picture 2.

Picture 2, a) Mako Base Unit with Mako Mammo Probe, b) Mako Mammo Holder

Reducing Complexity in Daily QA

In practice, QA efficiency depends as much on usability as on accuracy. Mammography setups can raise practical questions: positioning relative to the chest wall, handling of the compression paddle, or adapting to different system geometries.

Mako addresses these challenges through intelligent design:

- Simply place and measure with the Mako Probe, no orientation-dependence. Reduces setup errors and makes Mako robust across systems and users
- No need to worry about the compression paddle. Mako has automatic compensation to reduce the user selections required
- No selections required to measure at all with Mako. The user always has the option just measure dose, HVL and time without any manual input

In some markets the meter should be at 40 mm or 45 mm hight. The RTI Mako Mammo Holder enables easy, precise positioning of the Mako Mammo Probe at both these heights, see Picture 2 b.

Supporting Advanced Imaging: Tomosynthesis

The increasing adoption of digital breast tomosynthesis (DBT) adds another layer of complexity. As the X-ray tube moves through multiple angles, maintaining accurate dose measurement becomes more difficult.

Mako's detector enables reliable measurements across wide angular ranges, supporting QA in both 2D and 3D imaging without repositioning for ±30° angle.

The Role of the Mako Display

Designed as a fully wireless, app-powered interface, the Mako Display removes the need for cables, external laptops, or complex setup. Measurements are streamed in real time directly to the user's device, providing immediate access to kVp, dose, HVL, waveforms, and other key parameters at the point of testing.

The app is available as a free download with no licenses or user restrictions, making it easy to deploy across teams and devices without additional cost or complexity.

Mako is also built for flexibility. When needed, the Mako Probe can be connected to the Base Unit via cable, to allow more delicate positioning. Mako can also connect to a full fleet of external detectors like mAs meters, light meters and ion chamber detectors. And when deeper QA work is needed with analysis, calculation and reporting, the RTI computer software Ocean Next can be used to automate QA routines.

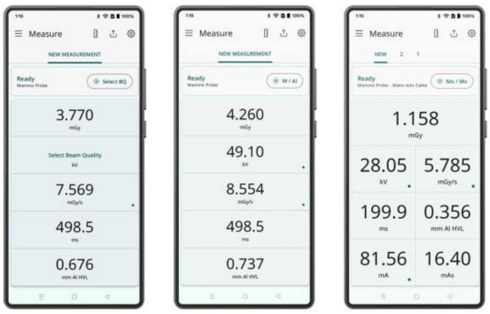


Figure 3: Mako Display a) No selected Beam Quality, b) Selected Beam Quality c) Mako Mammo Probe with mAs-meter connected (simultaneous tube & generator measurement)

More Reliable Mammography QA

As breast imaging technology evolves, QA must keep pace with increasing complexity and higher expectations. The combination of accurate measurement, simplified setup, and integrated software tools represents a more sustainable approach to quality assurance.

With Mako and its connected display environment, QA becomes not only more precise, but also more efficient and easier to manage. The result is a workflow that supports clinicians in delivering high-quality mammograms with confidence—every time.

Björn Cederquist is a Sweden-based medical physicist who joined RTI Group in 2008. Starting in R&D with detector design, he moved into sales and technical support in 2009. Today, he supports customers across mainland Europe, Japan, and South Korea, combining strong technical expertise with practical clinical insight.

Approaching Retreatment With Clarity

Tackling Complexity with Better Tools

Retreatment cases are a sign of progress for modern oncology – more patients are overcoming cancer and surviving longer after treatment. With this improvement in patient outcomes, the number of patients who require second (or even third, fourth, and beyond) rounds of treatment is increasing. Survivors are at risk for recurrence of the original disease and have a higher risk of new primary cancers [1]. A 2023 study across 8 clinics found that approximately 24% of patients were undergoing retreatment or palliative reirradiation, underscoring the growing importance of these complex clinical workflows [2].

Retreatment cases come with all the challenges of the initial course of treatment, and more. As these cases grow, there is a clear need for evidence-based, repeatable courses of action for different primary sites, as well as better planning that accounts for specific recovery rates for organs at risk [3]. Complexities such as anatomical changes, different image datasets, variable treatment intervals, and uncertainties associated with deformable registration add further complications to the mix. Clinicians have a responsibility to safely and effectively manage the complexity associated with retreatment cases.

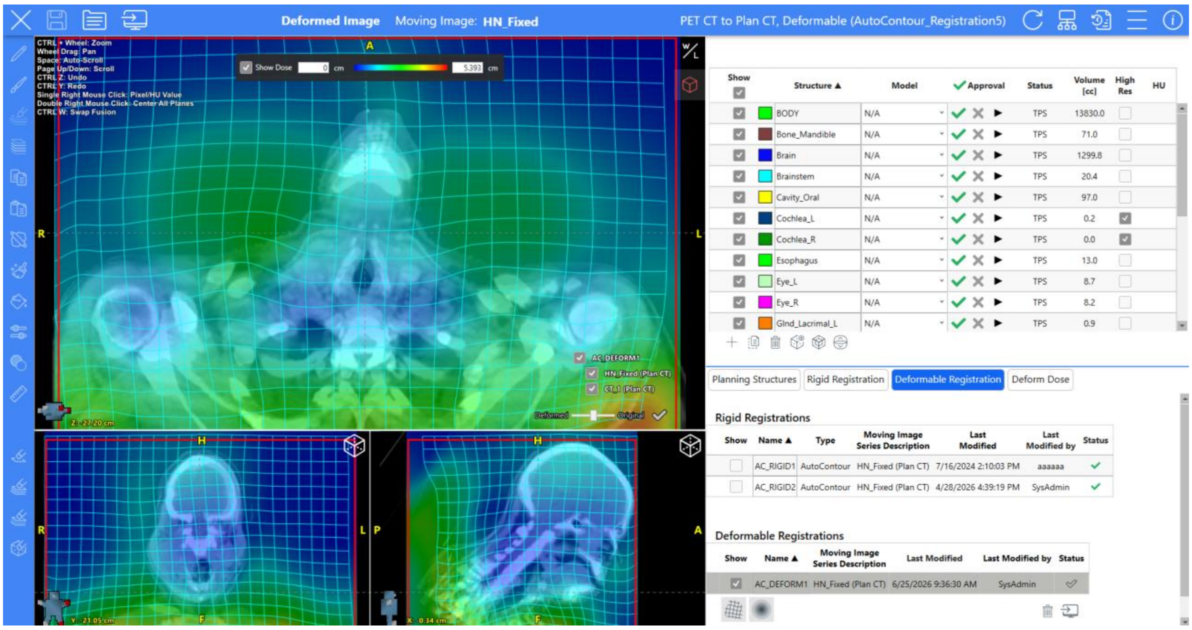
Retreatment Presents Unique Challenges

Prior treatment introduces increased uncertainty around treatment planning and delivery. Patient anatomy changes over time, which makes following accumulated doses more challenging. Tumor regression, weight loss, surgery, and normal anatomical changes all impact the relationship between targets and surrounding tissues.

In cases of retreatment, clinicians must account for the length of time between treatments and how that impacts the recovery of nearby OARs. Even when treating different primary sites, there can be overlap of OARs and affected tissues. The challenge is further compounded when patients have received multiple treatment courses with different fractionation schedules, making cumulative dose assessment more complex than simply summing physical dose distributions. The need to quantitatively plan around cumulative doses to maximize tumor control with the tolerance of previously irradiated tissues remains one of the most significant challenges in modern retreatment practice [4].

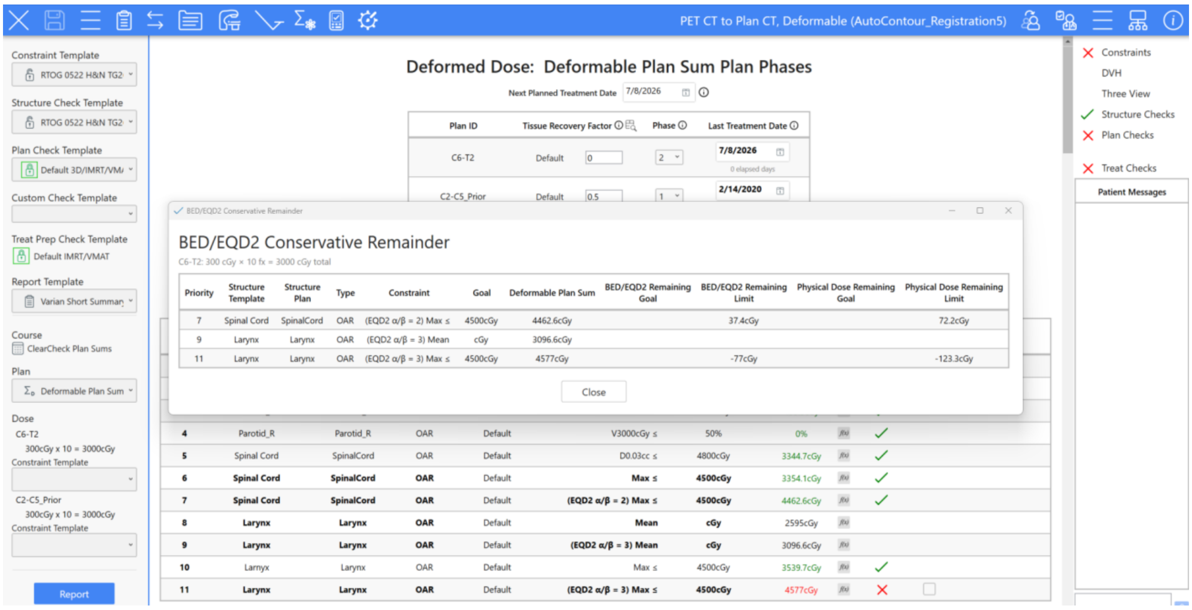
Software That Meets the Current Moment

Advances in imaging, deformable registration, and biological dose evaluation help address many of the challenges associated with retreatment. Radformation has expanded the capabilities of AutoContour and ClearCheck to improve workflows around anatomical alignment, cumulative dose assessment, and plan evaluation. The recent merger with Limbus Contour vastly expands the number of models available for automatic, reliable AI-driven contouring for CT, MR, and CBCT workflows. Beyond automated contour generation, AutoContour includes rigid and deformable image registration along with integrated visual quality assurance tools. This empowers clinicians to follow anatomical changes between treatment courses and review registrations before they are used for downstream dose assessment. Further, deformed image datasets can then be transferred directly to ClearCheck for cumulative dose evaluation. AutoContour equips teams with the tools they need to follow patient anatomy over time in complex retreatment cases.



AutoContour's workspace includes visual QA tools, including grid and heat map overlays, that help clinicians review deformable image registrations before cumulative dose assessment.

The latest ClearCheck version includes new tools to better handle the nuances of retreatment. Create plan sums using the deformed dose information imported from AutoContour, compare plans, and evaluate the impact of cumulative dose using organ-specific recovery factors obtained from the leading research out of the University of Michigan [5]. Follow your plan phases carefully with automatically loaded treatment dates and previous plans. ClearCheck always offers an extensive list of constraint, structure, plan, collision, and prescription checks, so every plan you review is comprehensive. With added visualization tools for BED/EQD2 dose delivery, you can track and review cumulative dose plans more clearly than ever.



ClearCheck displays cumulative biological dose and the remaining physical dose available after BED/EQD2 conversion, supporting review of complex retreatment plans.

Complex Cases Made Clearer

As the number of patients undergoing retreatment continues to rise, these cases grow more common and require tools to help handle the inherent complexity. AutoContour and ClearCheck support the evaluation of cumulative dose in complicated retreatment cases. Equip your radiotherapy department with manageable, automated workflows that enable reproducible approaches to contouring and planning for reirradiation cases.

If you're interested in learning how AutoContour and ClearCheck will transform your retreatment workflows, book a demo with a Radformation team member today.

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MCQ IN MEDICAL PHYSICS

Test your physics

Answers

Number	Answer	Rationale
1	**B**	The collimator provides directional information by accepting photons travelling along specific trajectories.
2	**A**	Parallel-hole collimator resolution improves as the distance between the patient and collimator decreases.
3	**B**	Total counts are the product of count rate and acquisition time. If the count rate decreases by half, the acquisition time must be doubled to obtain approximately the same total counts and preserve image count statistics.
4	**C**	The photopeak energy window preferentially accepts primary photons and rejects many photons that have undergone Compton scattering.
5	**A**	Detector non-uniformities are reproduced at different projection angles and may form ring artefacts after SPECT reconstruction.

From Serial Checks to a Single Session: Early Clinical Evidence for an Integrated Daily Linac QA Platform

Dayna Bodensteiner, RT(R)(T), CMD *Clinical Marketing Manager, Sun Nuclear, a Mirion Medical company*

Modern linear accelerators are more capable, and more geometrically demanding, than the machines daily QA programs were originally built to check. SRS and SBRT margins have contracted to 1–3 mm, patient-specific QA is increasingly satisfied by calculation-based methods rather than measurement, and the AAPM's own guidance (TG-198, MPPG 8.b, TG-100) now points toward a daily check that is both more comprehensive and more clinically relevant. Two independent academic centers, Cedars-Sinai Medical Center and NYU Langone Health, recently presented their evaluations of a new integrated daily QA platform, Daily QA™ 4 Pro (Sun Nuclear, a Mirion Medical company), at AAPM (American Association of Medical Physicists) in Vancouver, British Columbia. This article summarizes their findings, evaluating whether an integrated, single-session approach belongs in their own QA programs.

Why Integration Matters

When dosimetric, geometric, and imaging checks are performed as separate tests on separate devices, the interaction between them is invisible. Published work cited in the Cedars-Sinai evaluation illustrates the cost of this blind spot: a 1 mm isocenter error has been reported to cost 5–6% of SRS target coverage, a 0.5 mm setup error has been linked to a 20% loss in GTV D99% for sub-centimeter targets, and a 0.19 mm MLC offset has been associated with more than 5% coverage loss in multi-target SRS. Because geometric and dosimetric measurements are traditionally acquired on different phantoms and stored in different databases, none of these interactions are visible to a program running serial, single-purpose tests. Additionally, the underlying hardware was never built to run active or imaging Winston-Lutz tests. Daily QA 4 Pro was designed specifically to remove that compromise, combining multiple checks in a single QA platform.

The Platform

Daily QA 4 Pro combines three upgrades on a single, indexed phantom: eight off-axis tungsten fiducials visible on kV, MV, and CBCT with an SGRT-optimized surface (imageable); a six-degree-of-freedom adapter, CT-scannable and plannable to ±1.5° roll/pitch/yaw (indexable); and a 3D diode array — 229 SunPoint 2 diodes across the main board plus two side boards — that enables active Winston-Lutz via 2×2 fields. From one indexed setup, the device runs four tests in automate mode in roughly 15–20 minutes: positioning/repositioning (kV/MV/CBCT and SGRT versus treatment isocenter), active Winston-Lutz (radiation isocenter coincidence), open-field dosimetry (output, symmetry, flatness, beam center, penumbra, field size), and — as a weekly, ten-minute add-on — imaging Winston-Lutz (imaging isocenter accuracy, gantry/collimator/couch accuracy, imager offset, SID, and MLC accuracy). Active Winston-Lutz reconstructs a star shot in 3D from gantry, collimator, and couch rotations without a separate BB phantom, using the diode array itself as the reference; imaging Winston-Lutz treats the eight fiducials as a single rigid body and maps each detected error — panel offset, gantry/couch/collimator angle, gantry pitch, MLC accuracy — back to its source.

Sensitivity, Reproducibility, and TPS Agreement at Cedars-Sinai Medical Center

Maria Bellon, MS, DABR, and colleagues at Cedars-Sinai Medical Center characterized the device's measurement floor and sensitivity on a Varian TrueBeam with a Millennium MLC with 6 FFF. Repeatability and reproducibility testing, which included three runs at nominal setup, with the device fully removed and replaced between each — showed variation below 0.1 mm across every parameter tested, including active Winston-Lutz minimum tangent radius measurements (gantry, couch, and collimator) and open-field beam centers. Sensitivity testing applied couch shifts of 0.5, 1, 1.5, and 3.0 mm in all three axes simultaneously, showed accuracy levels

(<0.1mm) that approached typical SRS tolerance, confirming that the device resolves clinically meaningful displacement rather than measurement noise. Additionally, beam-center tracking accuracy was consistent across field sizes from 2cm × 2cm to 20 × 20cm (average tracking error approximately 0.1 mm), and output factors agreed with the treatment planning system to within 0.64%. Lastly, a small-field profile comparison provided further validation that a single session can plausibly support dosimetric, radiation-geometric, and imaging verification together.

First Clinical Experience and Workflow Impact at NYU Langone Health

David Barbee, PhD, DABR, and the radiation oncology physics team at NYU Langone Health reported the first clinical experience with Daily QA 4 Pro across six linear accelerators, integrated with the SunCHECK environment. Active Measurement Winston-Lutz demonstrated a noise floor of 0.07 mm and a minimum detectable shift of 0.14 mm (95% CI) for isolated positional shifts up to 1.5 mm, with composite isocenter results comparable to two years of monthly BB-based Winston-Lutz history on the same machines. Imaging Winston-Lutz performed even better on positioning sensitivity, with a 0.05 mm noise floor and 0.10 mm minimum detectable shift (N = 36), and additionally quantified kV/MV panel offset, gantry pitch and roll, and MLC field center/width per gantry angle. The team's evaluation carried one important caveat: because active measurement Winston-Lutz derives the Z isocenter position from lateral diode arrays under an assumption of ideal gantry delivery, a gantry angle error is geometrically magnified into an apparent Z-axis shift. Based on this relationship, NYU Langone recommends keeping gantry angle error below ±0.2° to stay within a 0.5 mm goal, and below ±0.5° to stay within a 1.0 mm hard limit — a practical calibration point for programs adopting the technique. On workflow, replacing serial IGRT, beam constancy, and off-axis Winston-Lutz measurements with the integrated sequence reduced total measurement time from roughly 32 minutes to 16 minutes per linac in NYU Langone's comparison, with SGRT included only in the integrated workflow.

Implications for Practice

Taken together, the two evaluations support a QA model consistent with current AAPM guidance: a single indexed device runs the comprehensive daily suite, executed by radiation therapists in automate mode, while the qualified medical physicist retains responsibility for test selection and sign-off (TG-198). Because the daily measurement set is richer, monthly QA can be scaled back to checks that are genuinely additive rather than duplicative, and tests can be selected by clinical risk rather than by habit (MPPG 8.b; TG-100). The resulting shift lets physics staff spend relatively more time interpreting trends and setting action limits and relatively less time on data acquisition itself. This direction, multiple authors have described as a maturing of the physicist's role from technology caretaking toward a more clinically- and scientifically-oriented service (Medical Physics 3.0).

Conclusion

Independent data from Cedars-Sinai Medical Center and NYU Langone Health show that daily dosimetric, geometric and imaging verification can be performed with a single indexed setup, in less time, without sacrificing robustness. Programs considering adoption should assess how an automated daily suite fits their workflow and staffing and verify their machines meet its performance assumptions. As per-patient measurement shifts toward calculation-based methods, daily QA becomes the primary measurement-based verification of machine performance — the role Daily QA 4 Pro is purpose-built to fill.

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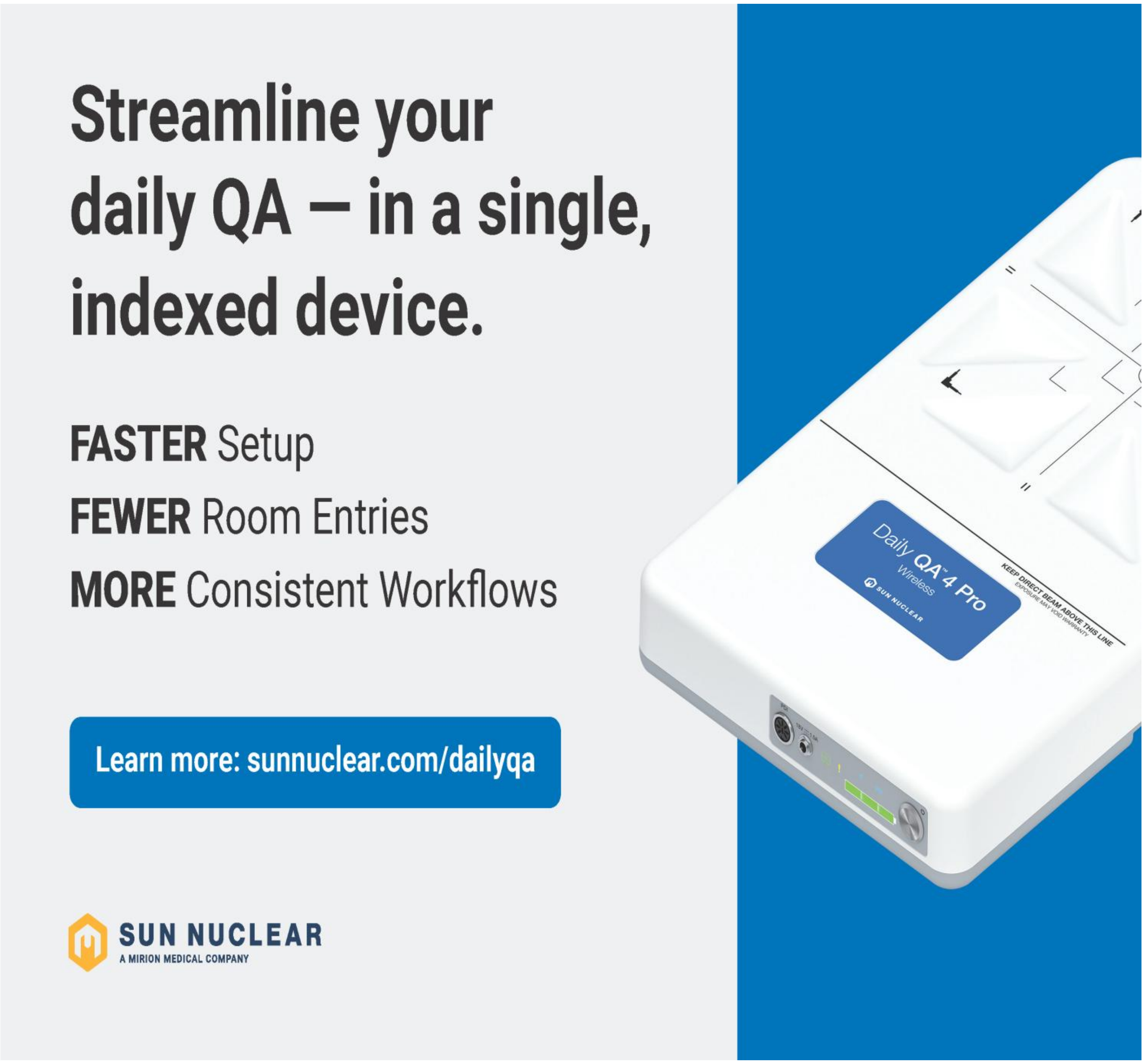

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P a g e | 95

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