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SPECIAL ISSUE

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IOMP School Webinars, June 2022 – September 2025

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Inspiring and Energizing the Next Generations of Medical Physicists - Why medicine (still) needs physics: A tour de force on the frontiers of medical physics	Ehsan Samei	https://youtu.be/KFWvZEBOZd4
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IMPW 2025, Day 3: Innovating Medical Physics Education with Artificial Intelligence	El Naqa, Issam M Maryellen L. Giger	https://youtu.be/7vw9wGHJwAs
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IMPW 2025, Day 1: AI vs. Human Expertise in X-ray Dosimetry	Madan M. Rehani Prof. M. Mahesh	https://youtu.be/PeYhSI99sdc
International Women's Day with Medical Physics Professionals Across the Continents	Chai Hong Yeong Loredana Marcu	https://youtu.be/d8V0cjWRXug

	Jennifer Pursley Oleksandra Ivashchenko	
Meet the industry: Unlocking radiotherapy's potential through innovation	Daniela Eulenstein Hui Khee Looe	https://youtu.be/xbZI6T0qjFM
The Use of AI to Improve Access to High-quality Radiation Therapy Treatment Planning in Low- and Middle-income Countries	Christoph Trauernicht Barbara Marquez Laurence Edward Court	https://youtu.be/t9J02bgayOg
IDMP 2024 Around the world in 24 hours: Celebrating Medical Physics	Arun Chougule Bernard Le-Guen Bibb Allen Cameron Jeffries Claire Louise Chapple Colin Martin Donald P. Frush Ibrahim Duhaini Eva Bezak Francis Hasford John Damilakis Kwan Hoong Ng Luz Eliana Franco Olarte M. Carrara Madan M. Rehani Mario Djukelic Szucsich Martina Madan M. Rehani Magdalena Stoeva Ferid Shannoun Emilie Van Deventer Chai Hong Yeong	

Why Radiation Oncology Clinical Trials need Medical Physicists	Søren M. Bentzen Tomas Kron	https://youtu.be/w2UitHq3tKo
Advancing Radiation Safety in Medicine: Insights from IOMP and UNSCEAR on Ionizing Radiation Exposure	John Damilakis Peter Thomas	https://youtu.be/OK_TuyHaH-w
(1) Advancements in Imaging for Radiation Therapy and (2) Patient Specific QA in IMRT	Hassaan Alkhatib Sudesh Deshpande	https://youtu.be/5edeJgr0m8g
Quality Assurance in Radiation Therapy	Alexandru Dasu	https://youtu.be/qp7amr_EWqE
Radiation Protection in Nuclear Medicine	S. Somanesan Pankaj Tandon	https://youtu.be/KHj_GN1IH4o
Development and Implementation of Structured Clinical Training Programs for Medical Physicists in Latin America: A Comprehensive and Practical Review from the Experience of the Integral Oncology Center of Leben Salud in Patagonia, Argentina	Ricardo Ruggeri	https://youtu.be/G4B4pZj7pJ0
Introducing Radiotherapy in Africa through Network Collaborations	Christoph Trauernicht George Acquah	https://youtu.be/VJz8rDb54YQ
Medical Physics in the Middle East	Hassan Kharita Meshari Alnuaimi Rabih Hammoud	https://youtu.be/ZJ_l9JABJq8
The new EFOMP Protocol for the Quality Control of Dynamic Imaging Systems	Annalisa Trianni Nicholas Marshall	https://youtu.be/_sBhwqWgN-I

Celebrating International Women's Day with early career medical physicists	Ashleigh Hull Ashley Cetnar Leticia Irazola	https://youtu.be/yLdzOIn6-kw
Patient Radiation Safety: Meet the IOMP Corporate Members	Greg Martin Delena Hanson	https://youtu.be/cE9ADtez0OA
From Pixels to Patients: The Influence of Gaming and Smartphone Developments on Radiation Oncology	Michael Douglass	https://youtu.be/xDP7qsG3ByQ
IOMP's Focus: Early Career in Medical Physics and the most recent trends in diagnostic imaging and radiotherapy	Choirul Anam	https://youtu.be/IE_U4jiU_yw
IOMP Anniversary Webinar. November 07, 2023: The 60th Anniversary of IOMP – Personal Memories and Some Thoughts on the Future of Medical Physics	Azam Niroomand-Rad Fridtjof Nüsslin Colin Orton	https://youtu.be/ODhZlLC_dzM
Radiopharmaceutical Therapy (RPT)	Rob Hobbs George Sgouros Ana Kiess	https://youtu.be/vdDvJlW7t1c
Physics and Technology for Cancer Care – Meet the IOMP Corporate Members	Axel Hoffmann Alex Pegram	https://youtu.be/WpPMmb8QKxA
IOMP-IUPESM-ISC Joint Webinar: Practical Deep-Dive on ChatGPT	Nick Scott	https://youtu.be/B0D9Y4UvtN8
IOMP-AAPM Webinar: Open-Source Tools in Medical Physics webinar	Heather Whitney Kevin W Eliceiri Robert Finnegan	https://youtu.be/uWiau4rL42o
Radiation Doses and Risk in Imaging – to Know or Neglect?	Tomas Kron Anchali Krisanachinda	https://youtu.be/yG04RYYu3P8

Radiogenomics/Radiomics-Guided Personalized Radiation Therapy: Current Status, Challenges, and Opportunities	Subramani Vellaiyan	https://youtu.be/5YF2DiYbW-Q
IMPW 2023, Day 5, Upright Radiotherapy: Challenges and Opportunities	Tracy Underwood	https://youtu.be/j7tmIQWFysU
IMPW 2023, Day 4, Leadership in Medical Physics	Colin Orton	https://youtu.be/Zzy6ZNpFMCg
IMPW 2023, Day 3, Cumulative Dose: What, Why, When, How, and How Much?	Madan Rehani	https://youtu.be/gLhKHe5xdPQ
IMPW 2023, Day 2, Micro-X CNT emitters, x-ray tubes, and unique Imaging applications	Brian Gonzales	https://youtu.be/pruQwpuRsaY
IMPW 2023, Day 1, Radiation Protection When Imaging Pregnant Patients: An ICRP Perspective	Kimberly Applegate	https://youtu.be/0kh5tKB8Pmg
Women in Medical Physics, on the occasion of IWD 2023	Virginia Tsapaki Huda Al Naemi Iuliana Toma-Dasu	https://youtu.be/ba37Hpo-X40
Carbon-ion Radiotherapy: Current Status and Future Perspective	Taku Inaniwa	https://youtu.be/VIbPoPNbmiY
Safety blinded or safety minded – don't learn safety by accident	Christoph Trauernicht	https://youtu.be/LP31GeYHg64
Radiation Biology updates: from low doses to ultra-high doserates	Nolan Esplen Andrea Abril	https://youtu.be/IbTat_B9_II
Growing Professional Recognition for Medical Physicists: Raymond Wu and IMPCB	John Damilakis Adel Mustafa Colin Orton	https://youtu.be/4BuqGa8h61w

	Raymond Wu Ibrahim Duhaini	
IOMP Webinar on International Day of Medical Physics (IDMP) 2022: Medical Physics for Sustainable Healthcare	Paddy Gilligan Chai Hong Yeong Patricia Mora Arun Chougule Meshari Al Nuaimi Christoph Trauernicht J. Daniel Bourland Boyd McCurdy	https://youtu.be/mfnlMJdUn4w
IOMP-IFMBE Webinar on Clinical Engineering Day 2022: Management and maintenance of medical technologies	Ernesto Iadanza Magdalena Stoeva	https://youtu.be/oaeJqEd0MjM
IOMP - WHO Joint Webinar on World Patient Safety Day 2022	John Damilakis Emilie Van Deventer Erik Briers	https://youtu.be/1n91fdwTVuc
Fractionated radiotherapy and its synergistic relationship with immunotherapy	Rebecca D'Alonzo	https://youtu.be/DNiONkxjOTo

Global Perspective for Advancement in Radiation Oncology

18 Aug 2025 at 12 pm GMT; Duration 1 hour

Organizers: Simone Kodlulovich Renha, Arun Chougule, Ibrahim Duhaini

Moderator: Arun Chougule

Speakers: Dr. Dayanand Sharma, Helio A Salmon Jr, Rabih Hammoud

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Topic 1: Adaptive Proton Therapy

Abstract:

Adaptive proton therapy (APT) aimed at optimizing treatment by adapting to anatomical and physiological changes during the course of therapy. Its clinical rationale stems from the proton beam's susceptibility to tissue density changes, which can alter dose distribution and range. APT workflows rely on 3D-imaging modality, deformable image registration, and dose accumulation to maintain target coverage and minimize exposure to healthy tissues. Despite its promise, implementation poses challenges due to the proton's range uncertainties, resource demands, and the absence of standardized criteria for adaptation and its clinical impact. Nevertheless, adaptive strategies offer a pathway to improve clinical outcomes and reduce toxicity, especially in anatomically complex or variable tumour sites.

The learning objectives of adaptive proton therapy (APT) are to understand:

Clinical rationale of APT;

Image-guided adaptive workflows, including tools for daily imaging, deformable image registration, and dose accumulation;

Challenges in implementing APT emphasising on unique sensitivity of proton range and dose distributions to changes in tissue density;

Adaptive strategies in improving clinical outcomes and minimizing toxicity in patients.

Speaker: Dr. Dayanand Sharma PhD, Dip R P, MCMPI

Professor and Head, Department of Medical Physics, Apollo Proton Cancer center, Chennai

28 years of professional experience with enrich knowledge of clinical medical physics required for planning, setting-up and running of radiotherapy facility.

Publications:

56 full length original articles in peered reviewed journals + Counting

Two Book Chapters

More than 200 abstracts in various journals & conference proceedings

Membership:

Scientific committee member “Particle Therapy Co-Operative Group-Asia Oceania (PTCOG-AO)”

Past Education and Training Committee (ETC) Member, “Asia-Oceania Federation of Organizations for Medical Physics (AFMOP)”

Past Registrar & current executive member of “College of Medical Physics of India (CMPI)”

Member Particle Therapy Co-Operative Group (PTCOG)

Executive committee member of Association of medical physicist of India (AMPI) 2009-2011.

Life member of AMPI,

Life member of AROI (Association of radiation oncologist of India)

General Secretary – AROI Maharashtra Chapter

Past Editorial board member, JCRT

Member ESTRO

Achievement: First Medical Physicist to clinically commissioned the first Proton therapy Facility in South East Asia and Middle East

Awards: Recipient of many best paper awards in different international and national conferences

Leadership role: Organizes various International and national conferences in different capacity

Teaching:

Visiting faculty to various Institute of national repute (BARC, Anna University etc)

Teaching of MD in Radiotherapy, Radiology and Nuclear Medicine

Invited Plenary Talks: Most sought speaker in Medical Physics and Radiation Oncology. Deliver more than 200 invited talks covering various topic related to clinical medical physics at various international and national conference/workshop/training program.

Topic 2: Brazilian Experience: Steps to Organizing a Proton Therapy Project

Abstract:

This presentation will address the challenges of a proton therapy project in Brazil and its impact on society.

Learning Objectives:

Reimbursement

Legislation

Clinical Protocols

Project management

Speaker: Helio A Salmon Jr

Chief Medical Physicist and Executive Director, Fusve – RJ – Brasil

Executive Director in Mario Kroeff Hospital

Mr Helio Salmon, is a medical physicist and radiotherapy specialist with a proven track record in implementing and managing operational efficiency in medical, outpatient, and hospital units. Responsible for strategic planning, process structuring, routine development, business development, and partnerships.

Success in radiotherapy operations and services, leading projects (end-to-end) in Brazil and abroad, including the approval of over 110 bunker projects and CNEN licenses for construction authorization, ensuring safe and sustainable growth.

Executive Director

Main achievements:

Medical Physicist for the Oncology Unit at DASA, COI Group and Oncoclinicas Group for 18 years; Director of Radiotherapy at Vassouras University (since August 2022); and shared management of the radiotherapy unit at the Mário Kroeff Hospital (since March/2022).

Leading Medical Physics and Radiotherapy projects, setting indicators for tracking, developing action plans, and creating management reports for client updates.

Participation in merger and acquisition (M&A) projects, from diagnostic analysis and implementation to business management.

Topic 3: AI in Medicine: Opening the Black Box for Patient-Centered Care

Abstract:

This presentation aims to explore various applications of artificial intelligence (AI) in healthcare, with a particular focus on radiotherapy. It also highlights the key challenges and open questions that must be addressed to enable the widespread adoption of AI in this field.

Learning Objectives:

Understanding the basics of what artificial intelligence entails

Gain insight into the historical development of AI in healthcare

Explore the potential applications of AI in radiotherapy

Identify the benefits of AI and the key challenges to its implementation

Speaker: Rabih Hammoud, PhD., DABR

Chief Medical Physicist, NCCCR – HMC, Qatar

Assistant Professor of Medical Physics Research in Radiation Oncology – WCM-Q

Dr. Rabih Hammoud presently holds a position as Chief Medical Physicist at National Center for Cancer Care & Research, Hamad Medical Corporation and an Assistant Professor of Medical Physics Research in Radiation Oncology at Weill Cornell Medicine – Qatar. He is an American Board Certified Medical Physicist since 2004.

He obtained his Master of Sciences Degree in Medical Physics from Wayne State University in US and completed his PhD at Universite De Bretagne Occidentale, in France in the same field.

He is an active member of several Medical Physics Societies locally and internationally like ASTRO, AAPM & ESTRO and acts as Vice President of the Middle East Federation of Organizations of Medical Physics (MEFOMP). He has been invited as Faculty & Speaker of various activities of the medical and scientific societies as well as within HMC. He has also published numerous papers, book chapters & abstracts. Further, he is actively involved in IAEA activities as a participant to regional workshops and scientific meetings and an auditor for QUATRO expert mission. He hosted more than one IAEA Radiotherapy Courses. In addition, Dr. Hammoud is an examiner for the International Medical Physics Certification Board (IMPCB). Dr. Hammoud received the International Day of Medical Physics (IDMP) award for the year 2022 from the International Organization of Medical Physics (IOMP). Dr. Hammoud has also made significant contributions to teaching and research in the field of medical physics. He has mentored numerous students, guiding them through complex concepts and inspiring them to pursue excellence in radiation oncology. His research focuses on advancing technologies and methodologies in medical physics, with a particular emphasis on improving cancer treatment outcomes through innovative image guided approaches.

Meet the industry: Streamlining Radiation Oncology - Automated planning and QA

30 July 2025 at 12 pm GMT; Duration 1 hour

Organizer: Magdalena Stoeva, IOMP Secretary General

Moderator: John Damilakis, IOMP President

Speakers:

1. Mercedes Riveira, Clinical Success Manager (EMEA), Radformation
2. Greg Martin, MSc

Topic 1: Accelerating Breast Planning: Radformation's Automated Solution for Enhanced Efficiency

Abstract:

The growing number of breast cancer patients and the labour-intensive nature of manual planning make efficient treatment management increasingly complex. Radformation addresses these challenges with a suite of automated tools designed to streamline workflows and elevate the quality of patient care. AutoContour accelerates the contouring process by automatically generating accurate, editable structures, reducing the time clinicians spend on manual segmentation. EZFluence simplifies 3DCRT planning for breast cases, producing consistent, homogeneous dose distributions while minimizing hotspots and reducing planning complexity, whether using electronic compensation or field-in-field techniques. ClearCheck automates plan evaluation by verifying compliance with clinical protocols through checks on dose constraints, structure integrity, and other key metrics. ClearCalc provides fast, accurate secondary dose calculations, with features like log file analysis to further enhance treatment precision. Collectively, these solutions improve planning efficiency, reduce the potential for errors, and support high-quality radiation therapy.

Speaker:

Mercedes Riveira

Clinical Success Manager (EMEA), Radformation

Mercedes Riveira studied Physics and a Master's in Biomedical Physics at the Complutense University of Madrid, where she also earned a PhD through her research conducted at the Meixoeiro Hospital, as part of the European Commission-funded SINFONIA project. Her doctoral work focused on personalized dosimetry in Nuclear Medicine and AI applications in medical imaging. She then started her industry journey as Clinical Product Specialist at Limbus Contour and currently works as Clinical Success Manager for EMEA at RadFormation. She also serves as an Associate Editor for the British Journal of Radiology | Artificial Intelligence.

Topic 2: SunCHECK®: The Connected Workspace for Higher Quality

Abstract:

At Sun Nuclear, we go beyond isolated QA tasks by offering a comprehensive Quality Management System through SunCHECK®. This connected solution unifies QA processes with a single database, centralized data, and standardized workflows—streamlining operations and improving efficiency. Automation reduces time spent on repetitive tasks, while enabling remote work, oversight for new staff or clinics, and simplified peer review.

SunCHECK also enhances reporting for audits, compliance, and accreditation, ensuring teams have immediate access to the documentation they need. More than just meeting regulatory requirements, this system supports a proactive approach to quality. By analyzing QA data, users can identify trends—such as machine performance issues or training needs—that drive continuous improvement.

The result is a smarter, more responsive QA environment that enhances treatment quality, improves outcomes, and elevates patient care across the board. With SunCHECK®, quality becomes an ongoing pursuit, not just a checkbox to complete.

Speaker:

Greg Martin, MSc

Registered clinical scientist in the UK, with 5 years clinical experience working in a 10 linac, NHS radiotherapy center, UK. Honorary Lecturer. Number of poster publications at international conferences including AAPM and ESTRO.

Inspiring and Energizing the Next Generations of Medical Physicists - Why medicine (still) needs physics: A tour de force on the frontiers of medical physics

30 May 2025 at 12 pm GMT; Duration 1 hour

Organizer: Simone Kodlulovich, Professional Relations Committee, IOMP

Moderators: Simone Kodlulovich and Stephanie Parker

Speaker: Ehsan Samei, Reed and Martha Rice Distinguished Professor, Duke University

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Learning Objectives:

Understand the essential expertise that physics brings to medicine

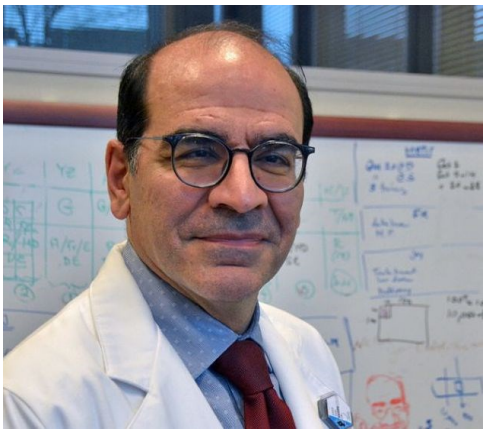
Understand where lies the frontiers of medical physics science and practice

Understand how the stratified components of medical physics serve as an integral whole to serve patient care

Abstract:

Physics has been and remains an instigator and an integral component of the disciplines of radiology, radiation oncology, and nuclear medicine. While this role was primarily initiated due to science and technological backbone of these disciplines, the scientific mindset of physicists has also informed how these two disciplines have formed and reformed over decades of development and application, a progression that can likewise influence other subspecialities of medicine. This lecture offers a holistic view on the role of physics in medicine, and further delineates the forefront of the Medical Physics profession in terms of its science, clinical practice, educational endeavors, and professional aspirations.

Speaker: Ehsan Samei, Reed Distinguished Professor, Duke University



Ehsan Samei is the Reed and Martha Rice Distinguished Professor at Duke University. He directs the NIH-sponsored Center for Virtual Imaging Trials (CVIT) and co-directs the FDA-sponsored Triangle Center of Excellence in Regulatory Science and Innovation (Triangle-CERSI). His expertise includes clinical physics, smart use of AI, and quantitative imaging. His passion is to position in silico methods to generate and accelerate patient-centric care in design and practice. He is authored over 370 referred papers, is a fellow of five professional societies, and the recipient of the 2022 Marie Sklodowska-Curie Award by the International Organization of Medical Physics.

IMPW 2025 - Day 5: Potential of AI on Nuclear Medicine Imaging and Therapy

Friday, 9 May 2025 at 12 pm GMT; Duration 1 hour

Organizer: Chai Hong Yeong, IOMP MPWB Chair

Moderators: Ibrahim Duhaini and Francis Hasford

Speakers: Kuangyu Shi, Ph.D and Axel Rominger, M.D.

Abstract:

Recent advances in instrumentation and radiopharmaceutical therapy (RPT) present new opportunities for nuclear medicine. However, the increasing complexity and data volume of these advancements makes fully exploring their potential more challenging. Artificial intelligence (AI) offers a promising tool to address these challenges. AI can assist in optimizing signal processing and image reconstruction, enhancing imaging quality while reducing radiation exposure. It can also improve diagnosis and prognosis in nuclear medicine imaging, facilitating tasks such as differential and early diagnosis. Additionally, AI has the potential to support the development of treatment planning tools for RPT, including simplified dosimetry procedures and pre-therapy dose prediction. This talk will explore the role of AI in imaging optimization, diagnostic assistance, and treatment planning from several developments from Bern. We will also discuss the challenges of AI implementation in nuclear medicine and the transformative potential of knowledge-guided AI in theranostics.

Learning Objectives:

Understand the potential of AI in the optimization of nuclear medicine imaging.

Understand the potential of AI in personalized radiopharmaceutical therapy.

Understand the concept of knowledge-guidance for trustworthy AI.

Speaker 1: Kuangyu Shi, Ph.D

Prof. Kuangyu Shi is the Chief Medical Physicist and Head of the Lab for Artificial Intelligence and Translational Theranostics at the Department of Nuclear Medicine, University of Bern, Switzerland. Additionally, he is a senior lecturer at the Computer-aided Medical Procedure, School of Computation, Information & Technology at the Technical University of Munich, Germany. He did his Master and PhD at Max-Planck Institute for Informatics (2003-2008), Germany. Then he moved to Dept. Nuclear Medicine, Technical University of Munich for postdoctoral research and worked as subgroup leader from 2012 to 2018. On May 2018 he completed habilitation at Dept. Informatics, Technical University of Munich. His research is centered on advancing artificial intelligence and computational modeling techniques for nuclear medicine imaging, dosimetry and therapy, aiming to link the outcomes with underlying pathophysiological processes. Additionally, he is dedicated to developing both in vivo and ex vivo experimental methods, pushing the boundaries of microscopic nuclear imaging. His work has been recognized with the young investigator award of the Society of Nuclear Medicine and Molecular Imaging (SNMMI) and the Roger Perez Award of the European Association of Nuclear Medicine (EANM). He is currently a member of the AI committee of EANM, Task Group 36 of the International Commission on Radiological Protection (ICRP), and serves as an associate editors of Eur J Nucl Med Mol Imaging, EJNMMI Physics, IEEE TRPMS and Nuklearmedizin.

Speaker 2: Axel Rominger, M.D.

Axel Rominger, MD, is a Full Professor of Nuclear Medicine at the University Hospital in Bern, as well as Chairman of the Department of Nuclear Medicine at Inselspital. From 2007 until 2018 he worked at Ludwig Maximilian's University of Munich, where he served as deputy director for 5 years. During this period he won several national and international research awards.

His research interests focus on the constant improvement of PET imaging capabilities with emphasis in the neurological and oncological fields. To fully translate developments into clinical practice, he has established interdisciplinary research groups for artificial intelligence, biomedical engineering, and radiopharmaceutical research within the Department of Nuclear Medicine.

In 2020, his department received the world's first large axial field-of-view PET scanner from Siemens, which provides new opportunities for research and clinics due to its high sensitivity, axial coverage, and fast time of flight performance. To accelerate research on total body PET imaging, he has established numerous international collaborations.

He serves as the principal investigator and co-principal investigator on several grants, both preclinically and clinically, in the fields of oncology and neuroscience. He is author of more than 300 peer-reviewed publications and he serves as associate editor of the EJNMMI journal.

IMPW 2025 - Day 4: AI and its Ethical and Legal Implications in Medical Physics

Thursday, 8 May 2025 at 12 pm GMT; Duration 1 hour

Organizer: Kwan Hoong Ng, IOMP Awards and Honours Committee Chair

Moderators: Magdalena Stoeva and Simone Kodlulovich

Speakers: Sharon Kaur, Kwan Hoong Ng, Egor Eitovich

Talk 1: Basic Legal and Ethical Issues relating to the use of AI in Medicine

Abstract:

I will present some of the potential legal and ethical challenges posed by the use of AI in medicine, I will focus on the use of AI in the delivery of healthcare and also touch on some issues relevant to the use of AI in health research.

Speaker: Assoc. Prof. Dr. Sharon Kaur, Faculty of Law, Universiti Malaya, Kuala Lumpur, Malaysia

Sharon is an Associate Professor at the Faculty of Law, Universiti Malaya, where she has designed modules on healthcare law and ethics at both undergraduate and postgraduate levels, including a number of modules on the Masters of Health Research Ethics (MOHRE) at the Faculty of Medicine. Her education includes an undergraduate law degree (Cardiff University), master's degree in Medical Law and Medical Ethics (Kings College, London) and PhD in Bioethics (University College London). Sharon's research interests primarily revolve around medical research ethics and global health issues. She is the PI on a

Wellcome funded project, “Developing a Southeast Asia Bioethics Network”. One of the thematic research areas of this project is to explore challenges and opportunities presented by emergent health and biomedical technologies.

Talk 2: Ethical Issues in the Deployment of AI in Medicine

Abstract:

Integrating AI into medicine introduces ethical challenges, including data privacy, autonomy, trust, and accountability. Algorithmic and data biases may perpetuate healthcare disparities and inequality. Developing ethical frameworks and regulations is essential to guide AI deployment in upholding patient dignity and societal equity. I will introduce several current guidelines for ethical AI development and provide some examples of ethical issues of AI development in medical imaging and medical devices.

Speaker: Emeritus Professor Dr. Kwan Hoong Ng, Department of Biomedical Imaging, Faculty of Medicine, Universiti Malaya, Kuala Lumpur, Malaysia

Dr. Ng is an Emeritus Professor at the Department of Biomedical Imaging, Universiti Malaya. He graduated with an MSc (Medical Physics) University of Aberdeen and a PhD (Medical Physics) Universiti Malaya. He qualified with the American Board of Medical Physics. He received the Marie Skłodowska Curie Award by the IOMP (2018) for his outstanding contribution to research, education and leadership. In 2013 he was listed as one of the top 50 medical physicists in the world by IOMP. He contributes to research in medical imaging, radiological safety, computer applications in medicine, and risk communication. He has co-authored over 300 papers in peer-reviewed journals and more than 15 books.

Professor Ng has been a consultant/ expert with the IAEA and WHO. He established the ASEAN College of Medical Physics (ACOMP) and the South East Asian Federation of Organizations of Medical Physicists (SEAFOMP), co-founded the Asia-Oceania Federation of Organizations of Medical Physicists (AFOMP), and the AsiaSafe (AOSR). He is the chair of the Awards and Honours Committee (IOMP).

Talk 3: AI and Ethics in Medical Physics, and the Context of IAEA Activities

Abstract:

This presentation explores the intersection of artificial intelligence and ethics in medical physics, as advanced through IAEA and other international organisations activities. It outlines the evolving roles and responsibilities of clinically qualified medical physicists in safely implementing AI-based tools in radiation medicine. Emphasis is placed on the theoretical foundations, rigorous risk management, adequate quality assurance, and ethical safeguards. The discussion highlights the need for appropriate education and continuous professional development to ensure AI's safe, responsible, and effective clinical implement.

Learning Objectives:

Understand the Ethical and Legal Challenges of AI in Medicine.

Appreciate the Legal Implications of AI Deployment in Healthcare.

Be Acquainted with Legal and Ethical Guidelines for AI in Healthcare.

Explore the intersection of AI and ethics in medical physics, as advanced through the IAEA.

Speaker: Dr. Egor Titovich, Dosimetry and Medical Radiation Physics Section, Division of Human Health, Department of Nuclear Sciences and Applications, International Atomic Energy Agency (IAEA)

Dr. Titovich has over 15 years of experience advancing cancer treatment through radiation technology. With a background as a biomedical engineer, an MSc in Medical Physics, and a PhD in Dosimetry, he has managed more than 50 professionals and oversaw the installation of high-tech RT equipment worth 30 million euros. Egor has trained over 300 specialists across Europe and Asia and conducted thousands of dosimetric measurements. Currently serving as the Database Officer in Medical Physics at the IAEA in Vienna, he has significantly enhanced data workflows and quality in the Dosimetry Audit database, improving collaboration with hospitals and laboratories worldwide. His involvement in AI applications includes contributing to a pioneering IAEA publication in AI in MP and co-directing a major AI workshop.

Egor envisions accessible, high-quality, safe and equitable radiotherapy services for all patients, regardless of geographic location or economic status.

IMPW 2025 - Day 3: Innovating Medical Physics Education with Artificial Intelligence

Wednesday, 7 May 2025 at 12 pm GMT; Duration 1 hour

Organizer: Arun Chougule, IOMP Education and Training Committee Chair

Moderator: Madan Rehani

Speakers: Issam El Naqa and Maryellen L. Giger

Part 1: Leveraging Artificial Intelligence in Training Next-Generation Medical Physicists

Abstract:

Artificial Intelligence (AI) and Machine Learning (ML) are revolutionizing various disciplines, including medical physics in both diagnostic and therapeutic areas. This presentation will showcase the current applications of AI/ML in medical physics and their impact on the profession. In light of this, we will highlight the necessity of updating current curricula to incorporate AI as key component. Throughout, we will emphasize the notion that "AI will not replace medical physicists but medical physicists who know AI will replace medical physicists who don't know AI."

Learning Objectives:

Role of AI in modern medical physics

Impact of AI on the profession of medical physics

Incorporation of AI into medical physics curric

Speaker: Issam El Naqa, PhD, DABR, FAAPM, FIEEE, FAIMBE

Dr. Issam El Naqa is a distinguished expert in medical physics, oncology, and machine learning. He is the Chair of the Machine Learning Department at Moffitt Cancer Center and a Professor at the University of South Florida. Holding a Ph.D. in Electrical & Computer Engineering, he has contributed extensively to radiotherapy, radiomics, and AI in oncology. He has secured numerous research grants, published over 200 papers, and mentored many students. A fellow of IEEE, AAPM, and AIMBE, he has received prestigious awards and holds editorial roles in major scientific journals. His research focuses on AI-driven clinical decision-making and adaptive radiotherapy.

Part 2: Perspective on How AI Could Impact Medical Physics Education and Practice

Abstract:

Artificial Intelligence in medical imaging involves development of quantitative analyses for task-based discovery, predictive modeling, and robust clinical translation, as well as methods to improve the efficiencies of the clinical practice workflow. In these AI developments, curated and representative data are essential so that the training data sets match the testing datasets as well as the intended population for the AI. This presentation will give a perspective on how AI could impact the education and clinical practice of medical physicists. In addition, it is essential for the medical physicist to be educated in AI and how it may affect routine clinical practice of medical physics. Also, it is beneficial to understand how AI could potentially change the current practice of medical physics.

Learning Objectives:

Appreciate the role of data in the development, testing, and use of AI in medical imaging.

Understand the impact that AI could have on medical physics education an clinical practice

Learn the role of the medical physicist in clinical practices utilizing AI

Speaker: Maryellen Giger, PhD

Dr. Maryellen L. Giger is the A.N. Pritzker Distinguished Service Professor of Radiology at the University of Chicago, specializing in medical physics, imaging science, and AI applications in radiology. A leader in computer-aided diagnosis, she has contributed extensively to breast cancer detection and risk assessment. She has held numerous leadership roles, including past President of AAPM and SPIE. A fellow of IEEE, AIMBE, and RSNA, she has received multiple prestigious awards. Dr. Giger has published extensively, secured significant research funding, and mentored many students, making significant contributions to radiomics, quantitative imaging, and AI-driven precision medicine.

IMPW 2025 - Day 2: AI vs. Human Expertise in Radiotherapy

Tuesday, 6 May 2025 at 12 pm GMT; Duration 1 hour

Organizer & Moderator: Eva Bezak, IOMP Vice President

Debaters:

Joerg Lehmann (against), Calvary Mater Hospital, Australia

Michael Douglass (for), Royal Adelaide Hospital, Australia

Title: AI and Personalized Medicine in Radiation Oncology: Enhancing or Replacing Medical Physicists

This debate examines the evolving role of artificial intelligence (AI) within the field of radiation oncology medical physics. While AI promises to enhance treatment planning and personalised radiotherapy, its integration raises important questions about the future dynamics of the medical physics profession.

Rather than posing a threat, AI is increasingly seen as a complementary tool that could support medical physicists by automating routine tasks and allowing them to focus on complex clinical and scientific decisions. However, the potential shift towards a more technology-driven approach invites a critical discussion on how to balance innovation with the irreplaceable value of human expertise.

This debate will explore whether AI serves as an empowering assistant to medical physics or if its advancement might eventually lead to a redefinition of traditional roles. We'll examine how AI innovations can streamline tasks like image segmentation, treatment planning optimization, and quality assurance, thereby boosting workflow efficiency and accuracy. At the same time, the session will consider concerns that these advances might diminish the hands-on expertise and clinical decision-making central to medical physics.

Learning objectives:

Assess AI Integration: Understand how AI-driven tools are currently used to streamline tasks like image segmentation, treatment planning, and quality assurance.

Evaluate Impact on Expertise: Analyse how these innovations can complement clinical decision-making while addressing concerns about the potential loss of hands-on expertise.

Redefine Professional Roles: Discuss the evolving skill sets required in medical physics and explore the future balance between technology and human oversight in radiation oncology.

Panelist 1: Joerg Lehmann

Professor Joerg Lehmann is a Radiation Oncology Medical Physicist. He holds a PhD and is clinically accredited in Australia and the USA (DABR). Joerg works at Calvary Mater Newcastle, Australia as Principal Medical Physicist and Lead Physicist for Research. He is affiliated with the University of Sydney and the University of Newcastle, Australia and his research interests include dosimetry, quality assurance, image guidance for radiotherapy treatments and data mining.

Joerg is a fellow of the American Association of Medical Physics (AAPM) and a member of the several international working groups, including a joint task group of the AAPM and the European Society for Radiotherapy and Oncology (ESTRO) on "Performance validation of surrogate assessment systems in the context of medical physics applications (TG 360)". He is member of the AAPM Global Research and Scientific Innovation Committee and Vice Chair of the Global Clinical Trials Subcommittee. Joerg is active in radiotherapy dosimetry audits, he works as quality assurance (QA) physicist for the Transtasman Radiation Oncology Group (TROG) and he has served as chair of the Global Quality Assurance of Radiation Therapy Clinical Trials Harmonisation Group (GHG), a collaborative group of international Radiation Therapy Quality Assurance (RTQA) Groups harmonizing and improving RTQA for multi-institutional clinical trials.

Joerg is a third generation photographer, holding Master of Photography and Photographic Craftsman degrees from the Professional Photographers of America (PPA). He has co-founded "Photography in Medical Physics" (PMP), a photography competition celebrating the joy and excitement of Medical Physics (www.photographyinmedicalphysics.com).

Panelist 2: Michael Douglass

Michael Douglass is a principal medical physicist at SA Health and a medical physicist at Australian Bragg Centre for Proton Therapy at SAHMRI, with over 10 years of clinical and research experience in radiation oncology physics. He holds a PhD in Radiation Physics from the University of Adelaide and is certified by the Australasian College of Physical Scientists and Engineers in Medicine.

His research interests include Monte Carlo simulations, proton therapy, deep learning, and optical 3D scanning. He has published more than 30 peer-reviewed scientific papers in international journals and has received multiple awards, such as the 2021 ACPSEM Boyce Worthley Early Career Award and the 2021 Simpson Prize for Cancer Research. He is also an associate professor at the University of South Australia and a skilled scientific illustrator, producing 2D and 3D figures for publications and books. He is passionate about advancing the field of medical physics and improving patient outcomes.

IMPW 2025 - Day 1: AI vs. Human Expertise in X-ray Dosimetry

5 May 2025 at 12 pm GMT; Duration 1 hour

Organizer: John Damilakis, IOMP President

Panelists: John Damilakis, M. Mahesh, Madan Rehani

Abstract:

Artificial Intelligence (AI) is rapidly transforming medical imaging and dosimetry. However, the role of human expertise remains critical for the accurate, safe, and ethical application of AI-driven tools. This debate, AI vs Human Expertise in X-ray Dosimetry, will critically examine the strengths and limitations of AI in medical X-ray dose estimation, dose optimization, quality assurance, and clinical decision-making. Panelists will identify the key advantages AI offers in dose estimation and optimization, recognize the potential risks, biases, and interpretability challenges associated with AI-driven dosimetry, discuss the irreplaceable contributions of human judgment, and explore strategies for integrating AI-powered dosimetry into clinical practice.

Learning Objectives:

To understand the capabilities of AI in X-ray dosimetry

To analyze the limitations and challenges of AI in X-ray dosimetry

To evaluate the role of human expertise in X-ray dosimetry

Panelist 1: John Damilakis, IOMP President

Dr. John Damilakis is a professor and director of the Department of Medical Physics, School of Medicine, University of Crete and director of the Department of Medical Physics of the University Hospital of Heraklion, Crete, Greece. He is the current President of the IOMP and was President of EFOMP, President of EURAMED, and President of the 'Hellenic Association of Medical Physics'. His body of research work encompasses a wide range of research areas, including medical dosimetry, medical radiation protection, and the application of artificial intelligence in medical imaging. He has played significant roles as an editor, author, or co-author in several books within the field. Professor Damilakis has published 272 research articles listed on PubMed, accompanied by 10380 citations, and an h-index of 54 as documented on Google Scholar (February, 2025). He contributes to international initiatives, serving as an elected member of the ICRP Committee 3, Chair of the IUPAP AC4 and member of the steering committee of the 'EuroSafe Imaging Campaign'. He has shared his expertise as a Visiting Professor, delivering lectures on medical dosimetry and medical radiation protection at Boston University in the United States.

Panelist 2: M. Mahesh, IOMP Science Committee Chair

Dr. M. Mahesh is a Professor of Radiology and Cardiology at the Johns Hopkins University School of Medicine, Baltimore, MD, USA. Dr. Mahesh also has a joint appointment at the Johns Hopkins Bloomberg School of Medicine Department of Environmental Health. His research interests are in medical physics and imaging, particularly in areas of MDCT, interventional fluoroscopy and digital mammography. Prof. Mahesh has authored numerous articles and a textbook in MDCT technology and radiation doses in medical imaging and has lectured extensively in the U.S. and internationally. He has served on the editorial boards of several journals, including the Journal of the American College of Radiology, the Journal of the American Association of Physicists in Medicine, Academic Radiology, and RadioGraphics. He is currently the President of the AAPM, elected member of the ICRP and NCRP. Dr Mahesh is a fellow of AAPM, ACR, ACMP, SCCT and currently the associate editor of the Journal of American College of Radiology.

Panelist 3: Madan Rehani, IUPESM President

Dr. Madan Rehani is Director, Global Outreach for Radiation Protection at the Massachusetts General Hospital, Boston, Professor of Radiology at Harvard Medical School, Boston, MA, and an adjunct professor at the Duke University Medical Center, Durham, NC, US. He was President, IOMP (2018- 2022) and is currently President IUPESM. He worked earlier for over 11 years at the IAEA, Vienna, Austria. He was professor and head of medical physics at the All India Institute of Medical Sciences (AIIMS), New Delhi, India, before joining the IAEA in 2001. He was also head of the WHO's Collaborating Centre on Imaging Technology & Radiation Protection, which he established in 1997. Prof. Rehani is an Emeritus Member, ICRP, having been an active member for 24 years. He is the author of 9 Annals of ICRP. He is Senior editor Br J Radiology, Assoc Editor, Eur. J Medical Physics, was earlier Associate Editor Am J Roentgenology, and on editorial board of several journals. He has more than 200 publications, has written 40 chapters in books and edited 5 books.

International Women's Day with Medical Physics Professionals Across the Continents

7 March 2025 at 12 pm GMT; Duration 1 hour

Organizer: Loredana Marcu

Moderators: Loredana Marcu and Eva Bezak

Talk 1: Status of Women Medical Physicists in the US and the AAPM

Speaker: Jennifer Pursley, Mayo Clinic Department of Radiation Oncology

Dr. Pursley received her PhD in experimental particle physics from Johns Hopkins University working on the Collider Detector at Fermilab and spent three years as a postdoc on CDF before entering the Harvard Medical Physics Residency Program. After residency, she joined as faculty in the Department of Radiation Oncology at Massachusetts General Hospital and Harvard Medical School. At MGH, Dr. Pursley served as the physics lead of photon treatment planning and started the CT-guided online adaptive therapy program. Dr. Pursley is now a faculty physicist in the Department of Radiation Oncology at the Mayo Clinic in Rochester, MN. She has been a member of the American Association of Physicists in Medicine (AAPM) Women's Professional Subcommittee (WPSC) since 2014 and became Chair of the WPSC in 2023.

Abstract:

In this talk, I'll give an overview of the history and growth of women medical physicists in the US, with statistics from AAPM, the American Association of Physicists in Medicine. Although the number of women medical physicists continues increasing, their representation in various leadership positions is not keeping

pace. The AAPM's annual salary survey also shows evidence of a gender pay gap. I'll discuss some possible contributing factors to these findings and suggestions for how current leaders can make a change. The Women's Professional Subcommittee (WPSC) of the AAPM was formed in 2010 to support women's career development and I will highlight the efforts of this group and their impact.

Talk 2: Empowering Women's Leadership in Medical Physics: Challenges and Opportunities in Asia

Speaker: Chai Hong Yeong, School of Medicine, Faculty of Health and Medical Sciences, Taylor's University, Malaysia

Dr. Yeong is a Professor of Medical Physics at Taylor's University. She is the current President of the Southeast Asia Federation of Organizations for Medical Physics (SEAFOMP), Chair of the Medical Physics World Board (MPWB) of the IOMP, IOMP Accreditation Board Member, Committee Member of the Professional Relations Committee of the Asia-Oceania Federation of Organizations for Medical Physics (AFOMP), and a co-Founder of the ASEAN College of Medical Physics (ACOMP). She is also an IAEA expert for multiple IAEA Task Groups and regional activities. She was a member of the IOMP Women Sub-Committee from 2018-2021. She received the IUPAP Early Career Scientist Award in 2021, SEAFOMP Young Leader Award in 2017, and Taylor's President Award in 2019. Her research areas focus on theranostic nuclear medicine, interventional radiology and radiation protection. She currently owns 4 patents and has published more than 100 journal articles, 2 academic books and 2 book chapters. She is the Editor of the e-Medical Physics World (eMPW) Bulletin and IOMP Newsletter. She also serves as a reviewer for several international renowned journals.

Abstract:

The representation of women in medical physics in Asia has grown significantly, yet challenges remain in achieving gender equity in leadership and research. This talk will explore the current status of women in the field across the region, highlighting both the progress made and the barriers still faced. Drawing on

experiences from SEAFOMP, AFOMP, and international collaborations, I will discuss how regional organizations play a crucial role in empowering women through mentorship, networking, and professional development. Success stories of women leaders in medical physics will be shared, along with strategies to foster greater inclusion and representation in leadership positions. Finally, I will outline actionable pathways for supporting the next generation of women scientists and medical physicists in Asia, ensuring a more equitable and innovative future for the profession.

Talk 3: Leading with Purpose: Navigating Challenges and Embracing Opportunities as a Young-Career Medical Physicist in Europe

Speaker: Oleksandra Ivashchenko, University Medical Center Groningen, The Netherlands

Dr. Oleksandra Ivashchenko is a medical physicist specializing in nuclear medicine and molecular imaging. She earned her MSc in Applied Physics from Taras Shevchenko National University of Kyiv in 2012, followed by a PhD in Applied Physics from TU Delft in 2017. Currently, she works at the University Medical Center Groningen in the Netherlands, focusing on personalized dosimetry and radiation safety within nuclear medicine. Beyond her research, Dr. Ivashchenko is deeply involved in humanitarian efforts. In 2022, she co-founded the #ScienceForUkraine initiative, which supports Ukrainian scientists and students affected by the war. This volunteer-driven organization has provided assistance to over 1,000 individuals, including employment and academic transfers. Her contributions have been recognized with several awards, including the 2022 MCAA Social Impact Award and the 2024 IUPAP Early Career Scientist Award in Medical Physics.

Abstract:

Join me for a talk on the unique challenges and exciting opportunities of being an early-career female medical physicist in Europe. I'll discuss how navigating leadership roles as an international professional

requires resilience, adaptability, and balancing scientific excellence. We'll explore how embracing leadership can drive innovation, foster inclusivity, and inspire future generations of physicists. I'll also share how my humanitarian work, particularly co-founding the #ScienceForUkraine initiative, has shaped my career, emphasizing how giving back strengthens networks, builds leadership skills, and enriches our sense of purpose.

Meet the industry: Unlocking radiotherapy's potential through innovation

29 January 2025 at 12 pm GMT; Duration 1 hour

Organizer: Magdalena Stoeva, SG IOMP

Moderator: John Damilakis, President IOMP

Speakers: Dr. Daniela Eulenstein, Dr. Hui Khee Looe

Title: RUBY – the modular QA phantom meets online adaptive radiotherapy

Speaker: Dr. Daniela Eulenstein, Research Scientist, PTW

Daniela Eulenstein has a Master's degree in physics and a PhD in medical physics. She worked as a medical physicist at the radiotherapy department of the Pius Hospital in Oldenburg, Germany headed by Prof Bjoern Poppe. Since 2018, she works at PTW as a Research Scientist as part of the Product Management Team and is responsible for the RUBY Phantom.

Abstract: Online adaptive CT-based radiotherapy has rapidly expanded in recent years. These systems combine CBCT, automatic contouring, and automatic plan optimisation. This complex treatment technique requires robust quality assurance, especially an end-to-end test that accounts for its unique features. To address this challenge, PTW has developed a phantom for quality assurance of online adaptive CT-based radiotherapy systems. This phantom includes a new insert for the RUBY product family, facilitating the insertion of different organ sets and positioning of anthropomorphic structures within the

RUBY phantom. In the webinar, based on the example of the Varien ETHOS system, a possible workflow of an online adaptive end-to-end test will be presented to demonstrate the possibilities of the new RUBY adaptive phantom.

Title: LAP LUNA 3D Surface Guided Radiotherapy System

Speaker: Dr. Hui Khee Looe, Deputy Head of Medical Physics, Pius-Hospital, Oldenburg, Germany

Dr. Looe is the Deputy Head of Medical Physics at Pius-Hospital in Oldenburg, Germany and a scientist in the “Medical Radiation Physics” group at the University of Oldenburg. As part of this working group, he undertakes clinical, teaching and research activities, leading the research group focusing on mathematical and computational methods in dosimetry. He also improves patient positioning using Surface Guided Radiation Therapy (SGRT). As part of these activities, he works with the LUNA 3D SGRT system from LAP.

Abstract: Surface-guided radiation therapy (SGRT) has evolved into standard-of-care in modern radiotherapy practices. Besides offering dose-less, marker-free patient positioning guidance, such a system allows for real-time monitoring and advanced respiratory motion management. Recently, a new SGRT system has been launched. This presentation will describe the testing, implementation, and clinical evaluation of the novel SGRT system LUNA 3D (LAP, Germany). The system was installed at a C-arm linac (Synergy, Elekta). The acceptance tests were implemented according to the ESTRO-ACROP guideline. Both static and dynamic accuracies have been evaluated using the EASY CUBE phantom in combination with a translational and dynamic platform. The End-to-End (E2E) testing using the RUBY phantom (PTW, Germany) was adapted to accommodate the laser-free positioning. Clinical evaluations were performed by comparing the patient positioning using LUNA 3D and lasers and the necessary CBCT-based corrections. All test results lie within the manufacturer’s specifications and ESTRO guideline tolerances. A clinical comparison of LUNA 3D with lasers and CBCT positionings shows the system can provide accurate patient positioning guidance.

The Use of AI to Improve Access to High-Quality Radiation Therapy Treatment Planning in Low- and Middle-Income Countries

11 December 2024 at 12 pm GMT; Duration 1 hour

Moderator: M. Mahesh, MS, PhD. Chair of IOMP Science Committee

Speakers:

Laurence Court, PhD, University of Texas MD Anderson Cancer Center, USA

Barbara Marquez, University of Texas MD Anderson Cancer Center, USA

Christoph Trauernicht, PhD, Tygerberg Hospital / Stellenbosch University, South Africa

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Abstract:

Advances in artificial intelligence (AI) are going to affect all aspects of radiation therapy, including contouring, treatment planning, and quality assurance. This presentation will describe our efforts to develop and expand these tools specifically for clinics in low- and middle-income countries. We will describe the expected quality (clinical acceptability, efficiency gains) of these tools, as well as possible risks in deployment and how to mitigate them. Finally, we will describe lessons learned in clinical deployment.

Learning Objectives:

To be able to describe how AI is likely to improve access to high-quality radiotherapy planning across the world.

To understand risks when implementing AI into clinical practice, and possible ways to reduce them.

To understand challenges in implementing these tools into clinical practice in LMICs.

Laurence leads a team who are focused on the development and clinical deployment of AI-based tools to support radiotherapy teams in low- and middle-income countries. Their flagship product is the Radiation Planning Assistant, which received FDA 510(k) clearance in 2023, and is currently starting clinical use in South Africa.

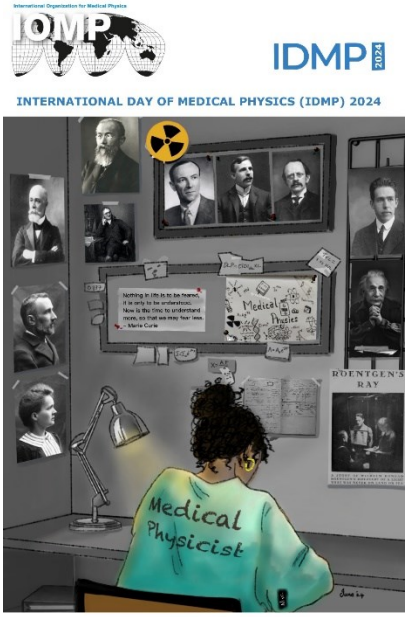
Barbara Marquez is a PhD candidate at the University of Texas MD Anderson Cancer Center. Her research leverages artificial intelligence to improve peer review of CT-based contours for radiotherapy in head & neck and gynecological cancers. Barbara is interested in the enhancement of the full value of physics in radiation oncology practice.

Christoph Trauernicht is the Head of the Medical Physics Division at Tygerberg Hospital, Cape Town, South Africa, and a Senior Lecturer at Stellenbosch University. He leads a team of five medical physicists, two radiographers and a mould room, together with a couple of medical physics clinical training posts.

IDMP 2024 – Around the World in 24 Hours:

Celebrating Medical Physics

7 November 2024



Inspiring the next generation of Medical Physicists

Start Time, GMT	Event
1:00 AM	AFOMP – Regional Organization and NMOs
3:00 AM	SEAFOMP – Regional Organization and NMOs
8:00 AM	MEFOMP – Regional Organization and NMOs
10:00 AM	FAMPO – Regional Organization and NMOs
11:30 AM	IOMP Panel
1:00 PM	IOMP Partner Organizations PanelIUPESM, ICRP, IAEA, WHO, IRPA, ISR
3:00 PM	EFOMP – Regional Organization and NMOs
6:00 PM	ALFIM – Regional Organization and NMOs
8:00 PM	AAPM
9:00 PM	Summary of the day, IDMP awards and Closing Ceremony

Why Radiation Oncology Clinical Trials need Medical Physicists

28 October 2024 at 12 pm GMT; Duration 1 hour

Moderators:

Wayne Beckham, PhD, FCCPM, FCOMP, British Columbia Cancer, Victoria, Canada

Kwan Hoong Ng, PhD, DABMP, FIOMP, FIUPESM, Universiti Malaya, Kuala Lumpur, Malaysia

Speakers:

Søren M. Bentzen, Ph.D., D.M.Sc., FBIR, FASTRO, University of Maryland, Baltimore, USA

Tomas Kron, OAM, Ph.D., FCCPM, FACPSEM, FIOMP, Peter MacCallum Cancer Centre, Melbourne, Australia

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Abstract:

Randomized controlled trials (RCT) remain the gold standard for establishing causality between an intervention and a clinical outcome. Leading into an RCT is a hierarchy of early phase clinical trials. While trial data are typically generated under highly controlled conditions in selected patient populations, the data are prospectively acquired and of high quality which is important to establish a proof-of-concept. Radiation Oncology has a proud history of conducting clinical trials and medical physicists play an essential role in reducing the patient-to-patient variability in exposure that is not attributable to the intervention itself. Some key roles for medical physicists in trials are:

Defining the technical details of the radiotherapy approach used in the trial

Independent credentialling of centres participating in the trial

Developing a quality assurance program to ensure collection of high quality data

Supporting (automated) data collection, curation, and evaluation

Developing trial questions that could help to identify the role of techniques or technologies in improving patient outcomes.

Many medical physicists are not aware of the importance of trials and the opportunities they provide to create relevant evidence and engage with clinicians. The presentation aims to provide background, examples, and motivation for this.

Learning Objectives:

Be aware of different approaches to clinical trial

Understand the importance of clinical trial for generation of evidence in radiation oncology

Appreciate the multiple roles medical physicists can have in clinical trial

Explore where this can result in more than a supporting role

Søren M. Bentzen, Ph.D., D.M.Sc., FBIR, FASTRO

Søren is Professor and Director of the Division of Biostatistics and Bioinformatics, and Professor of Radiation Oncology at University of Maryland School of Medicine. He was born and educated in Denmark and started out as a hospital physicist in radiation oncology. He earned a PhD in medicine (quantitative medical imaging) and later a Doctor of Medical Science in clinical radiobiology. Søren spent his research career at the interface between radiation biology, medical physics, biostatistics and evidence-based radiation oncology, working previously at University of Aarhus, Denmark; MD Anderson Cancer Center; the Gray Laboratory, University College London; University of Wisconsin – Madison. Søren has published 550 papers and book chapters and presented 400 invited lectures. His papers have been cited 50,000 times and his h-index is 112 (Google Scholar). He received 34 awards and honours and is one of only 3 individuals awarded both the ASTRO and ESTRO Gold Medals.

Tomas Kron, OAM, Ph.D., FCCPM, FACPSEM, FIOMP

Tomas Kron was born and educated in Germany. After his PhD he migrated to Australia in 1989 where he commenced his career in radiotherapy physics. He now is Director of Physical Sciences at Peter MacCallum Cancer Centre in Melbourne leading a team of some 50 engineers and physicists. Tomas has an interest in education of medical physicists, dosimetry of ionising radiation, image guidance and clinical trials, which is demonstrated by more than 100 invited conference presentations and 350 papers in refereed journals. He has been principal investigator in several clinical trials aiming at demonstrating feasibility of various technical approaches to radiotherapy treatment and has received an Order of Australia Medal for services to science and medicine.

Advancing Radiation Safety in Medicine: Insights from IOMP and UNSCEAR on Ionizing Radiation Exposure

3 July 2024 at 12 pm GMT; Duration 1 hour

Organizer: John Damilakis, President IOMP

Moderator: John Damilakis, President IOMP

Title 1: Setting the stage: A short introduction to IOMP's role in enhancing radiation safety in medical practices

Speaker: John Damilakis, MSc, PhD, FIOMP, FIUPESM

President, IOMP

John Damilakis is a professor and director of the Department of Medical Physics, School of Medicine, University of Crete and director of the Department of Medical Physics of the University Hospital of Heraklion, Crete, Greece. He holds the position of President within the 'International Organization for Medical Physics' (IOMP) and has previously held leadership roles, including President, in organizations such as the 'European Federation of Organizations for Medical Physics' (EFOMP), the 'European Alliance for Medical Radiation Protection Research' (EURAMED), and the 'Hellenic Association of Medical Physics'. Professor Damilakis also contributes to international initiatives, serving as a member of the International Commission on Radiological Protection (ICRP) Committee 3, Chair of the International Union of Pure and Applied Physics (IUPAP) AC4 and participating in the steering committee of the 'EuroSafe Imaging

Campaign' organized by the European Society of Radiology. He has shared his expertise as a Visiting Professor, delivering lectures on medical dosimetry and medical radiation protection at Boston University in the United States.

His body of research work encompasses a wide range of research areas, including medical dosimetry, medical radiation protection, and the application of artificial intelligence in medical imaging. He has played significant roles as an editor, author, or co-author in several influential books within the field. Professor Damilakis has published 260 research articles listed on PubMed, accompanied by 9728 citations, and an h-index of 53 as documented on Google Scholar (May, 2024). His contributions to the field have garnered him numerous awards and recognitions for his scientific achievements.

Title 2: Insights and future directions in medical radiation exposure: A detailed analysis from UNSCEAR's 2020/2021 Report

Speaker: Peter Thomas

Dr Peter Thomas is the director of the Medical Imaging section at the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). The section runs the Australian National Diagnostic Reference Level Service, provides educational material and advice, contributes to codes and safety guides, and promotes optimal use of medical radiation. Dr Thomas served as the chair of the UNSCEAR Expert Group on Medical Exposures from 2019 to 2020 and was a lead writer for the 2020/2021 UNSCEAR report summarising the global level of ionizing radiation exposures in medicine. Dr Thomas was a member of the Australian delegation to UNSCEAR in 2005 and from 2019 to 2024. Dr Thomas has a PhD in Chemistry from Monash University and has worked at ARPANSA since 2000.

Abstract:

This webinar focuses on critical developments and findings in the field of medical exposure to ionizing radiation. The webinar will begin with a brief introduction by IOMP, presenting IOMP's role in enhancing

radiation safety across medical practices globally, key areas of focus in ionizing radiation medical exposure, and the importance of collecting data related to frequency, distribution, and trends of radiation usage in medical diagnostics and treatment. Following this, a detailed presentation by UNSCEAR will focus on the comprehensive “Evaluation of Medical Exposure to Ionizing Radiation” report. The webinar aims to equip participants with insights into the global state of medical radiation practices, advancements in the field, and upcoming evaluations by UNSCEAR.

Learning Objectives

For IOMP’s presentation:

To understand the role of IOMP in promoting radiation safety and effective practices in medical imaging.

To identify key areas and recent advancements in radiation protection in medical settings.

To discuss the importance of global collaboration in improving patient and staff safety.

For UNSCEAR’s presentation:

To present key findings from the UNSCEAR 2020/2021 Report regarding medical exposure to ionizing radiation.

To discuss trends in radiation exposures in medicine noted by UNSCEAR and any research needs

To present UNSCEAR’s plans for a future evaluation.

(1) Advancements in Imaging for Radiation Therapy and (2) Patient Specific QA in IMRT

20 June 2024 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak

Moderator: Ibrahim Duhaini

Title 1: Advancements in Imaging for Radiation Therapy

Speaker: Hassaan Alkhatib, PhD, FAAPM, DABR, AABMP

Chief Physicist at South Carolina Oncology Associates, Columbia, South Carolina, USA

Dr. Hassaan Alkhatib is the Chief Physicist at South Carolina Oncology Associates, Columbia, South Carolina. He earned his doctorate degree from the University of North Dakota and completed his Medical Physics Residency at the University of Minnesota. Subsequent to his doctorate degree in Health Physics in 1996, Hassaan has accumulated considerable academic and professional experience. His medical physics educational activities include his educating and training of medical physics students, residents, dosimetrists, and radiation therapists for about 20 years. He continues his teaching and training activities at Richland Memorial Hospital, Columbia, South Carolina, where he has been Chief of Medical Physics since 2005 and Associate Professor at the University of South Carolina since 2010. He obtained board certification from American Board of Medical Physics (AABMP) and American Board of Radiology (ABR).
Dr. AlKhatib has contributed significantly through teaching, clinical service, research, administration, and participation in the AAPM professional and educational activities. He is also Physics Advisory Board

Member in Oncology Data Systems Inc. He is expertise as a scientist, a teacher and author/co-author of many scientific publications.

Abstract:

This seminar explores the latest developments in imaging technologies for optimizing radiation therapy treatments. From traditional methods to cutting-edge innovations, participants will gain insights into how imaging enhances precision, accuracy, and patient outcomes in radiation oncology. The seminar will cover key concepts, practical applications, and future directions in the field.

Learning Objectives:

Knowledge:

Understand the fundamentals of imaging modalities used in radiation therapy, including X-ray, CT, MRI, PET, and ultrasound.

Explore the principles behind image acquisition, reconstruction, and processing techniques specific to radiation therapy planning and delivery.

Gain insights into emerging imaging technologies such as image-guided radiation therapy (IGRT), adaptive radiotherapy, and functional imaging for treatment response assessment.

Skills:

Develop proficiency in utilizing imaging data for target delineation, treatment planning, and dose optimization in radiation therapy.

Acquire skills in image registration, fusion, and co-registration methods to integrate multiple imaging modalities for comprehensive treatment planning.

Learn techniques for image-guided setup verification, motion management, and real-time monitoring during radiation treatment delivery.

Competences:

Enhance critical thinking and problem-solving abilities in assessing imaging data quality, interpreting anatomical and functional information, and adapting treatment strategies accordingly.

Foster effective communication and collaboration between radiation oncologists, medical physicists, radiation therapists, and imaging specialists to optimize patient care and treatment outcomes.

Cultivate a mindset of continuous learning and staying updated with advancements in imaging technology, radiation therapy techniques, and clinical evidence through research, education, and professional development initiatives.

Title 2: Patient Specific QA in IMRT

Speaker: Dr. Sudesh Deshpande, Ph.D.

Chief Medical Physicist, P.D. Hinduja National Hospital and Research Center, Mumbai

Education:

• B.Sc. (1993), M.Sc. (1996), Ph.D. (2016) – Amravati University, Maharashtra

• D.R.P. (1997) – Mumbai University, Maharashtra

Total experience 27 years in the field of Medical Physics

Appointments:

• Jr. Medical Physicist, Cancer Hospital and Research Institute, Gwalior (1997-1999)

• Jr. Medical Physicist, P.D. Hinduja National Hospital, Mumbai (2000-2001)

• Medical Physicist, Kailash Cancer Hospital, Goraj (2001-2002)

• Medical Physicist, Tata Memorial Hospital, Mumbai (2003-2006)

• Chief Medical Physicist, P.D. Hinduja National Hospital, Mumbai (2006-present)

Areas of Interest:

• Clinical: Advancing external beam therapy, implementing 3D treatment planning, IMRT, SBRT.

• Research: Imaging dose optimization.

Publications: 25

Professional Services:

• Executive Committee, AMPI (2011-2013, 2024-2027)

• Member, AERB Safety Review Committee (2017-2023), Standing committee for Document development

• Member of Education and training committee of AFOMP (2023-2025)

• Reviewer for multiple scientific journals

Academic Activities:

• Guest lecturer for Dip R P BARC students

• Invited speaker at national and international conferences

• Course Coordinator for VMAT-IMRT and TrueBeam physics courses at Hinduja Hospital

• Member of task group for standardisation of QA procedure for advanced radiotherapy

Specialized Work:

• Commissioning of various accelerators and treatment planning systems

• Implementation of advanced radiotherapy techniques and technologies

Affiliations:

• Life member, Association of Medical Physicist of India

• Life member, Indian Brachytherapy Society

Abstract:

Patient-specific quality assurance (PSQA) in Intensity-Modulated Radiation Therapy (IMRT) is important step to ensure treatment accuracy and patient safety. The importance of patient-specific QA lies in its ability to detect and correct errors specific to the treatment plan, machine performance thus enhancing the precision and effectiveness of IMRT. PSQA contains point dose measurement and two-dimensional (2D) dose distribution measurements for point dose measurements, the choice of detector is crucial. Ionization chambers are often preferred due to their high accuracy and stability, making them ideal for absolute dose verification. For 2D dose distribution measurements, arrays of ionization chambers, diodes, or electronic portal imaging devices (EPIDs) are commonly used. These 2D detectors provide comprehensive spatial resolution, enabling the detection of dose discrepancies across the entire treatment field.

The AAPM's Task Group 218 (TG-218) provides recommendations to standardize and improve patient-specific QA procedures. It emphasizes the use of gamma index analysis with criteria of 3% dose difference and 2 mm distance-to-agreement (3%/2 mm) for evaluating dose distributions. TG-218 also suggests thresholds for passing rates to ensure high-quality treatments.

Tips and tricks for effective QA include regular calibration of detectors, verification of treatment plan calculations, and cross-validation with multiple QA tools. Additionally, integrating software solutions for automated analysis can enhance the efficiency and reliability of QA processes. Adopting these strategies ensures robust patient-specific QA, ultimately contributing to the success of IMRT treatments.

Learning Objectives:

To understand importance of Patient specific QA in IMRT

Choice of detectors for point dose and 2D dose distribution measurements

Use of AAPM TG 218 for PSQA analysis

Tips and Tricks for PSQA

New trends in PSQA in IMRT

Quality Assurance in Radiation Therapy

29 May 2024 at 12 pm GMT; Duration 1 hour

Organizer and Moderator: Eva Bezak, Vice President IOMP

Speaker: Alexandru Dasu

The Skandion Clinic, Uppsala, Sweden.

Department of Immunology, Genetics and Pathology, Uppsala University, Uppsala, Sweden.

Alexandru Dasu is the Chief Medical Physicist at the Skandion Clinic, the national proton therapy centre in Uppsala, Sweden and academically affiliated to Uppsala University. Alexandru Dasu studied Medical Physics at Umeå University, Sweden, where he also received a Ph.D. degree in 2001. He became a certified medical physicist in 2003 and throughout his career combined clinical activities with research and education. His main research interests include proton therapy, the evaluation of the risk for stochastic effects following radiation therapy, the modelling of the tumour response to radiation therapy, radiation dosimetry and quality assurance.

Abstract:

Radiation therapy is a multi-disciplinary, multi-step treatment using complex equipment and techniques to deliver ionizing radiation generally for cancer patients. Each step in the process can be subject to constraints and variation that can affect the fine balance between delivering enough dose to the target while keeping the doses to the normal tissues at acceptable levels. Indeed, variations above 5% of the dose can lead to significant changes in local control or complication rates, this worsening the effectiveness of the treatment. A rigorous quality assurance system is therefore needed to ensure that the accurate doses have been delivered in the defined volume within the scheduled time and with limited dose to surrounding normal tissues.

This presentation will review the rationale for quality assurance in radiation therapy, the particular requirements of radiation therapy versus radiation protection, the steps to build a quality assurance as well as examples of the steps allowing a continuous improvement of quality in radiation therapy.

Learning Objectives

After the presentation, the attendees should be able to understand the rationale for quality assurance in radiation therapy and the methodology for setting up a quality assurance program, as well as the relationship between quality assurance and quality controls.

Radiation Protection in Nuclear Medicine

Friday, 26th April 2024 at 12 pm GMT; Duration 1 hour

Moderator: Prof. Dr. Chai Hong Yeong, IOMP MPWB Chair

Speakers:

Dr. Pankaj Tandon

Assoc. Prof. Somanesan

Part 1: Radioactive Waste Management and Associated Radiation Protection in Nuclear Medicine

Abstract:

In nuclear medicine, mostly short-lived radionuclides are used. Therefore, radioactive waste arising from nuclear medicine procedures is easier to manage. The basic objective of waste management is to ensure that radiation exposure to the public and environment does not exceed the prescribed dose limits. Radioactive waste needs to be managed safely because it is potentially hazardous to human health and the environment. Through good practices in the production and use of radionuclides, the amount of waste may be significantly reduced but not fully eliminated. In some cases, uncontrolled radiation exposure has been lethal. It is important that safe waste management, in full compliance with all relevant regulations, is considered and planned for at the early stages of any projects involving radioactive materials. Safe management of radioactive waste requires a proper national infrastructure, which should include appropriate legislation, a regulatory organization, a competent operational body and properly trained staff. The protection of the Public and Environment is best achieved by (a) facility design (Isolation Measures-Zones, discharge control) (b) licensing (discharge procedures, limits) and (c) monitoring and inspection.

Learning Objectives:

To deal with radioactive waste in a manner that protects human health and the environment, now and in the future, without imposing an undue burden on future.

Speaker: Dr. Pankaj Tandon

Dr Pankaj Tandon is presently holding the post of Head, Regulatory Interface and Stakeholders Engagement Section (RISES) of Directorate of Regulatory Affairs and External Relations (DRA&ER) of AERB and having more than 30 years of experience in nuclear medicine.

He has more than 150 publications to his credit in various journals of medical physics and nuclear medicine.

He is also a “Lead Assessor” of National Accreditation Board for Testing and Calibration Laboratories (NABL) and Principal Assessor of National Accreditation Board for Hospital and Health Care Providers (NABH).

He is a fellow of Indian College of Nuclear Medicine (ICNM), College of Medical Physicist of India (CMPI) and Union for International Cancer Control (UICC).

He is a faculty for nuclear medicine and internal dosimetry for students pursuing medical physics or nuclear medicine technology course.

He is also a recipient of following prestigious awards like:

Homi Bhabha Oration from Society of Nuclear Medicine India (SNMI).

Ernest O. Lawrence Oration from Nuclear Medicine Physicist Association of India (NMPAI),

Special Recognition Award by India Express Health Care for promoting radiation safety for patients and

Seven Group Achievement Awards from Atomic Energy Regulatory Board (AERB) for his outstanding contribution in various fields.

Part 2: Practical aspects of Targeted Radionuclide Therapies

Abstract:

The evolution of radionuclide therapy is directly linked to great advances in the field of radiopharmacy, the sciences of physics and radiobiology and are an integral part of these complex procedures. The clinical impact of radionuclide therapy on the course of disease in patients is greatly enhanced by well-applied techniques with the focus on personalised medicine.

The use of radionuclide therapies is revolutionizing nuclear medicine. It is also time to expand our knowledge and expertise in this area to meet the needs for well-trained staff. To aid colleagues, especially medical physicist in facing the challenges ahead, I will prioritize and talk about the management of radionuclide therapies over describing the specific use and applications of the relevant radiopharmaceuticals.

Learning Objectives:

To gain an understanding of the advancements in the evolution of radionuclide therapy.

To comprehend the clinical impact of radionuclide therapy on the course of cancer care in patients.

To realise how radionuclide therapy is greatly enhanced by dosimetry techniques with the focus on personalised medicine.

To aid medical physicist in facing the challenges ahead, about the management of radionuclide therapies over describing the specific use and applications of the relevant radiopharmaceuticals.

Speaker: Assoc. Prof. Somanesan

Assoc. Prof. Somanesan currently works as the Senior Principal Medical Physicist, at the Department of Nuclear Medicine and Molecular Imaging of the Singapore General Hospital (SGH) for over 3 decades.

His secondary appointments are Hospital Radiation Safety Officer and being the Operations & QA Manager, Cyclotron Facility of the Positron Tracers Pte Ltd, besides being the chief of the Radiation Response Team at SGH. He chairs several committees' in radiation safety and medical physics education both within Singapore, the regional countries and for the IAEA.

He is an active visiting lecturer and expert in Nuclear Medicine, radiation physics besides the Quality Management in Nuclear Medicine, the production of PET radiopharmaceuticals for the IAEA for the last 2 decades. He is actively involved in the local universities as adjunct lecturer and the residential training of Nuclear Medicine and Radiology residents, physicist, radiographers and nurses in Singapore.

Development and Implementation of Structured Clinical Training Programs for Medical Physicists in Latin America: A Comprehensive and Practical Review from the Experience of the Integral Oncology Center of Leben Salud in Patagonia, Argentina

Thursday, 25th April 2024 at 12 pm GMT; Duration 1 hour

Moderator: Prof. Dr. Arun Chougule, IOMP Education and Training Committee Chair

Speaker: Dr Ricardo Ruggeri

Abstract:

This presentation, based on the pioneering experience of the Integral Oncology Center of Leben Salud in Patagonia, Argentina, will address the implementation of Structured Clinical Training Programs (SCTPs) for medical physicists in Latin America. We will highlight the successful journey of the first residency in medical physics in the region, recognized by the Nuclear Regulatory Authority of Argentina and accredited by the University of Comahue and the IOMP in its academic and supervised clinical training components. Throughout the presentation, a comprehensive review of essential literature for creating SCTPs harmonized with the guidelines of the Latin American Association of Medical Physics (ALFIM) and the recommendations of the International Atomic Energy Agency (IAEA) will be provided. Participants will gain practical tools to initiate the implementation of SCTPs, considering institutional and regional peculiarities. We will delve into the training, assessment, and competency-based monitoring, following the guidelines of the Academic and Clinical Training for Medical Physicists in Latin America. Additionally, specific recommendations from the IAEA through key documents such as HHR No. 1 and HHS No. 25 will be addressed, adapting them to the Latin American reality with a focus on the experience of the Integral Oncology Center of Leben Salud.

Participants will gain a profound understanding of recommended guidelines and practices, backed by the practical experience of implementing the first medical physics residency in Latin America. This will

contribute to the quality and effectiveness of SCTPs in the region, fostering the growth and development of highly skilled professionals in medical physics.

Learning Objectives:

To review of useful bibliography for the implementation of a SCTP.

To analyze recommendations to build a structured supervised clinical training program (SSCTP) harmonized with ALFIM guidelines and IAEA – IOMP recommendations.

To show recommended tools to start with an implementation of a SSCTP with the reality of your institution and/or your country.

To understand the training, evaluation and follow-up by competencies, according to the recommendations of the Guidelines for Academic Education and Clinical Training for Medical Physicists in Latin America.

Topics we are not going to deal with:

Regulatory situations in each country

Academic programs

Ricardo Ruggeri

MSc. Medical Physics – Bioengineering

Specialist in University Teaching

Currently my work is to generate new contexts and work spaces in education, innovation, research and development in the field of oncology in general but with a special focus on medical physics.

Current positions:

Technical Director of Oncology at Centro Oncológico Integral of Leben Salud.

Chief of the Medical Physics Service of Leben Salud (Radiotherapy, Nuclear Medicine and Diagnostic Imaging).

Director of the Residency in Medical Physics (Accredited by the National University of Comahue and the Nuclear Regulatory Authority of Argentina) of Leben Salud with full accreditation of International Organization of Medical Physics (IOMP)

Member of the Argentine Society of Medical Physics (SAFIM).

Member of the research and development committee of Leben Salud's committee.

Member of the Advisory Council of the Nuclear Regulatory Authority (CAAR).

Chairman of the Health and Biotechnology Committee of the Argentina-Texas Chamber of Commerce.

Introducing Radiotherapy in Africa through Network Collaborations

Wednesday, 24th April 2024 at 12 pm GMT; Duration 1 hour

Moderator: Prof. Dr. M Mahesh, IOMP Science Committee Chair

Speakers:

Dr. George Acquah

Dr. Chris Trauernicht

Part 1: Introducing Radiotherapy in Africa through Network Collaborations – Medical Physics Perspective: The Togo and Malawi Case Study

Abstract:

According to the GLOBOCAN 2020 database of the International Agency for Research on Cancer, it is estimated that there will be 24 million new cancer cases per year globally from 2020 to 2030. Out of these cancer incidence, approximately 75% of estimated cancer mortalities will occur in the developing countries. Radiotherapy (RT) is a vital and effective method for treating and managing cancers. However, many countries in Africa still lack access to radiotherapy as part of a comprehensive cancer care. Advanced forms of treatments in low and middle-income countries (LMICs) is limited due to lack of resources (both human and equipment) – expertise, expensive equipment and software. From the International Atomic Energy Agency's (IAEA) Directory for Radiotherapy Centres (DIRAC), as of March, 2024, 34 (63%) of Africa's 54 countries had access to some form of external beam radiotherapy, 20 (37%) had brachytherapy capacity, and no country had a capacity that matched the estimated treatment need. Urgent initiatives/collaborations in the setting-up of RT facilities, human capacity building and management are needed to change Africa's worrying trajectory in providing quality comprehensive cancer care to patients in the next decade comparative to same quality of care by the best hospitals in the U.S., Europe or Asia. This webinar presents a medical physicist's case study review on establishing radiotherapy using online networking technology in Togo and Malawi, two countries with no RT facility. Such efficient collaborative strategies do not only help build human resource capacity for Africa but build competent

and confidence workforce capable of delivering same high quality care as in major international RT centres.

Learning Objectives:

How to build human capacity through collaboration

Develop network-based radiotherapy

Bridge the gap by enhancing local training

Establish African Radiotherapy Satellite centres via Network

To deliver quality radiotherapy care through resource sharing.

Speaker: Dr George Felix Acquah, Head Medical Physicist, Blantyre International Cancer Centre (BICC), Blantyre, Malawi

Part 2: Things to Consider when Specifying a New Linear Accelerator

Abstract:

Radiotherapy is a necessary tool in the fight against cancer. An increasing number of linear accelerators are being installed, but, unfortunately, the purchase specifications are often inadequate or may even be completed by the wrong persons. This leads to sub-optimal functionality or use of very high-end equipment, which could potentially have been avoided.

In this talk I will present what things should be considered when specifying a new linear accelerator, based on personal experience and lessons learnt from several iterations of writing such specifications.

Learning Objectives:

After this talk participants should have better insight into what should be considered when writing specifications for a new linear accelerator.

Speaker: Dr Chris Trauernicht

Chris Trauernicht is the head of the medical physics division at Tygerberg Hospital in Cape Town, South Africa, as well as an associate professor at Stellenbosch University. He is the current president of the Federation of African Medical Physics Organizations (FAMPO) and also serves on the Accreditation Board of the International Organization for Medical Physics (IOMP). He serves as an assessor for the Health Professional Council of South Africa and he acted as an examiner and convenor for the Colleges of Medicine of South Africa. The IAEA has appointed Chris as an expert on numerous occasions.

Medical Physics in the Middle East

Tuesday, 23rd April 2024 at 12 pm GMT; Duration 1 hour

Moderator: Prof. Dr. Eva Bezak, IOMP Vice President

Speakers:

Dr. Mashari Alnuaimi

Dr. Hassan Kharita

Dr. Rabih Hammoud

Part 1: Medical Physics in the Middle East: Current Status and Future Directions in Advancing Patient Care

Abstract:

Medical physics plays a vital role in ensuring the safe and effective use of technology in healthcare, particularly in regions like the Middle East where advancements in patient care are rapidly evolving amidst ongoing challenges and instability. This webinar aims to provide an insightful exploration into the current status of medical physics in the Middle East, shedding light on the technological innovations and practices that are shaping the landscape of patient care. Participants will delve into discussions on the latest advancements in medical physics technology, such as imaging modalities, radiation therapy techniques, and quality assurance protocols, and their impact on enhancing patient outcomes in the region. Moreover, the webinar will offer valuable insights into future directions for medical physics in the Middle East, identifying key areas for improvement and opportunities for collaboration to further elevate standards of care across the region, despite the challenges and instability it faces.

Learning Objectives:

Understand the current status of medical physics practices in the Middle East and their impact on patient care amidst ongoing challenges and instability.

Identify technological advancements in medical physics and their applications in improving patient outcomes in the context of the Middle East.

Explore future directions and opportunities for further advancement of medical physics in the Middle East, considering the unique challenges and opportunities presented by the region's geopolitical landscape.

Speaker: Dr Mashari Alnuaimi, President of the Middle East Federation of Medical Physics (MEFOMP). Head the Radiation Physics Department at the Kuwait Cancer Control Centre (KCCC) – Kuwait

Dr. Mashari Al-Nuaimi has made significant contributions in the field of medical physics and radiation protection in medicine in the region. He has established the first dedicated medical physics unit in Kuwait, and currently serves as the Head of Radiation Physics Department and Head of Nuclear Medicine Physics Unit at the Kuwait Cancer Control Center. Dr. Al-Nuaimi is also actively involved with the International Atomic Energy Agency (IAEA) through national and regional technical cooperation projects to promote radiation safety culture. He holds a PhD in Medical Physics from University College London and has a strong educational background in nuclear medicine technology and medical physics.

Dr. Al-Nuaimi's main responsibilities include Quality Assurance, Radiation Safety, Dosimetry, Research & Development, Teaching & Training. He has established several significant achievements, such as the establishment of the first medical physics unit with full support to nuclear medicine departments in Kuwait, the establishment of a Collaborating Center of the IAEA with KCCC, the establishment of the first EARL accredited center in the region for F18 FDG PET, and the establishment of the first American College of Radiation (ACR) accreditation for SPECT/CT in the region. He has also contributed to establishing Kuwait Cancer Control Center as a regional resource center for diagnostic and therapeutic nuclear medicine to Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA).

Al-Nuaimi has worked in a variety of settings, including academic research, clinical practice, and industry with over 20 years of experience. In terms of teaching experience, Dr. Al-Nuaimi taught numerous courses

in medical physics at both the undergraduate and graduate levels. He has also supervised several students in their research projects and has served as a mentor to junior colleagues. Additionally, He has published several articles in reputable journals and presented his work at international conferences.

Part 2: Advancing Diagnostic Imaging and Nuclear Medicine Education in the Middle East: Strategies for Success

Abstract:

Educational programs in medical physics are crucial for ensuring a skilled workforce capable of meeting the growing demands of diagnostic imaging and nuclear medicine services in the Middle East. This webinar aims to examine the current landscape of education and training initiatives in these critical areas, with a specific focus on strategies for success. Through expert insights, participants will gain an understanding of effective approaches to curriculum development and professional development in diagnostic imaging and nuclear medicine physics education. The webinar will also highlight innovative educational practices and collaborative efforts aimed at addressing challenges and maximizing learning outcomes in the Middle East region.

Learning Objectives:

Evaluate the current status of medical physics education in the Middle East.

Identify successful strategies for curriculum development, student engagement, and professional development in medical physics education.

Discuss collaborative approaches and innovative practices for enhancing education and training in diagnostic imaging and nuclear medicine physics.

Speaker: Dr Mohammad Hassan Kharita – Assistant Executive Director of OHS – Medical Physics Section – Hamad Medical Corporation – Qatar

Dr. Mohammad Hassan Kharita is the Assistant Executive Director OHS Department – Medical Physics Section – HMC (HMC) overseeing all medical physics aspects in diagnostic radiology and nuclear medicine in addition to radiation safety issues at all 15 HMC hospitals. He was Radiation Safety Consultant in the International Atomic Energy Agency (IAEA) 2014-2015 and Director of Research in the Atomic Energy Commission of Syria where he was working until 2013. He obtained a PhD. Degree in Radiation Dosimetry in 1996 and M.Sc. degree in Applied Radiation Physics in 1992 from the University of Birmingham, UK.

He has vast experience with the IAEA as an expert to more than 40 expert missions (including IRRS, ORPAS and EduTA missions). He is the Vice President of the Middle East Federation of Organization of Medical Physics (MEFOMP) 2022-2025 and the Vice President of the Qatar Medical Physics Society (QaMPS) 2022-2025. He has published one book, one chapter and over 50 per reviewed publications with over 1200 Citations and H-index of 17.

Part 3: Building Capacity in Medical Physics for Radiation Therapy and Cancer Control: Collaborative Efforts in the Middle East

Abstract:

Radiation therapy plays a pivotal role in cancer treatment, necessitating strong infrastructure and skilled professionals in medical physics to ensure its safe and effective delivery. This webinar will showcase collaborative efforts aimed at building capacity in medical physics for radiation therapy and cancer control across the Middle East. Participants will explore successful initiatives and partnerships that aim to strengthen infrastructure, foster interdisciplinary collaboration, and enhance the skills of medical physicists in the region. Through case studies and expert discussions, attendees will gain insights into effective strategies for addressing challenges related to workforce development, technology

implementation, and quality assurance in radiation therapy and cancer care. The webinar will also highlight opportunities for further collaboration and capacity-building efforts to advance cancer control initiatives in the Middle East.

Learning Objectives:

Assess collaborative initiatives aimed at building capacity in medical physics for radiation therapy and cancer control in the Middle East.

Explore strategies for strengthening infrastructure, fostering interdisciplinary collaboration, and enhancing skills in medical physics.

Identify opportunities for further collaboration and capacity-building efforts to address challenges in radiation therapy and cancer care in the region.

Speaker: Dr. Rabih Hammoud – Chief Medical Physicist at National Center for Cancer Care & Research, Hamad Medical Corporation – Qatar

Dr. Rabih Hammoud presently holds a position as Chief Medical Physicist at National Center for Cancer Care & Research, Hamad Medical Corporation and an Assistant Professor of Medical Physics Research in Radiation Oncology at Weill Cornell Medicine – Qatar. He is an American Board Certified Medical Physicist since 2004.

He obtained his Master of Sciences Degree in Medical Physics from Wayne State University in US and completed his PhD at Universite De Bretagne Occidentale, in France in the same field.

He is an active member of several Medical Physics Societies locally and internationally like ASTRO, AAPM & ESTRO and an elected treasurer of Middle East Federation of Medical Physicist (MEFOMP). He has been invited as Faculty & Speaker of various activities of the medical and scientific societies as well as within HMC. He has also published numerous papers, book chapters & abstracts. Further, he is actively involved

in IAEA activities as a participant to regional workshops and scientific meetings and an auditor for QUATRO expert mission. He hosted more than one IAEA Radiotherapy Courses. In addition, Dr. Hammoud is an examiner for the International Medical Physics Certification Board (IMPCB).

The new EFOMP Protocol for the Quality Control of Dynamic Imaging Systems

Monday, 22th April 2024 at 12 pm GMT; Duration 1 hour

Moderator: Prof. Dr. John Damilakis, IOMP

Speakers:

Dr. Annalisa Trianni

Prof Nicholas Marshall

Abstract:

This two-part talk introduces the new EFOMP protocol for the Quality Control (QC) of fluoroscopy and angiography imaging systems. Part I looks at the philosophy behind the protocol and the need for a protocol that harmonizes QC testing of dynamic x-ray imaging systems. Part II focuses on technical aspects, and describes the tests and test equipment required.

Evaluation of technical image quality (IQ) poses a real challenge, especially given the time constraints commonly experienced by physicists when testing these systems. Some time is devoted to describing the difficulties of IQ testing. A move to quantitative IQ evaluation is encouraged, in which metrics are calculated from image pixel data. A number of alternative methods are described, allowing physicists to choose the most relevant method, depending on experience, resources and access to image data.

Learning Objectives:

Gain an understanding of how testing of dynamic x-ray systems has varied over the years with manufacturers finding it difficult to meet all the different requirements from country to country.

Provide medical physicists with unified guidance on the assessment of dynamic x-ray imaging systems. The term ‘dynamic x-ray imaging system’ is a blanket term, covering simple mobile fluoroscopy to complex angiography devices.

Learn which tests are required at acceptance, commissioning and constancy performance over the life cycle of a dynamic x-ray imaging system.

The difficulties of image quality testing will be described. Various methods used will be discussed and detailed information on how each test should be performed is included in the EFOMP Quality Control of Dynamic X-ray Imaging Systems.

Part I Webinar: Philosophy Behind the Protocol

Speaker: Dr Annalisa Trianni, Chair of EFOMP Working Group on Angiographic and Fluoroscopic QC Protocol

Dr. Annalisa Trianni is the chief medical physicist at S. Chiara Hospital in Trento, Italy.

Her primary field of application is the medical imaging field, with a focus on dose and image quality optimization for the different X-ray imaging modalities and a special interest for interventional radiology and CT. She is also working as Radiation Protection Expert (RPE).

She is chair of the scientific committee of the Italian Association of Medical Physics (AIFM) and Director of the school of Physics in Medicine “Caldirola”. Dr. Trianni is teaching radiation protection, medical radiation physics and imaging informatics at the Universities of Trieste and Padova. Dr. Trianni has been involved in various research projects and in addition, she is involved in IAEA missions and experts group in several international working groups (chair of DICOM WG28, member of DICOM WG02, co-chair of the Dicom Standard Committee). She has been coordinator of the working group on digital radiology of the Italian Association of Medical Physics and the EFOMP WG on QC protocol for angiography systems.

Part II Webinar: Technical Aspects of the Protocol

Speaker: Prof Nicholas Marshall, Member of EFOMP Working Group on Angiographic and Fluoroscopic QC Protocol

Prof. Nicholas Marshall joined the Regional Medical Physics Department in Newcastle upon Tyne in 1990 and completed his PhD in 1998. He then spent 8 years in the Clinical Physics Group at St Bartholomew's Hospital, London where he was appointed as Medical Physics Expert. He moved to Leuven, Belgium where has worked in Prof. Hilde Bosman's group since 2009. He has contributed to a number of working groups and QC protocols over the years including those of the IPEM, BHPA, EUREF and EFOMP. Current research interests include the development of methods to assess the imaging performance of mammography, general diagnostic and dynamic x-ray imaging systems.

Celebrating International Women's Day with Early Career Medical Physicists

8 March 2024 at 12 pm GMT; Duration 1 hour

Organizer: Loredana Marcu, Eva Bezak & Kathleen Hintenlang

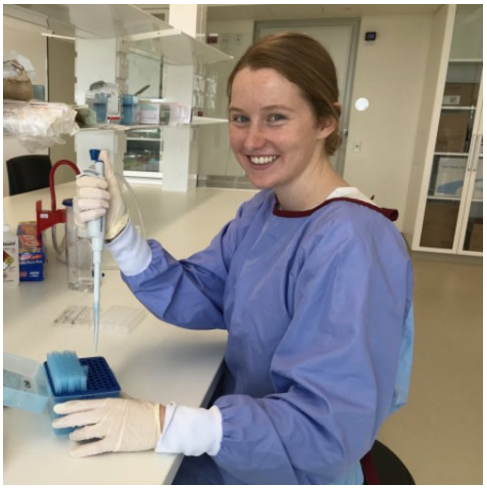
Moderator: Loredana Marcu

Title 1: In vitro development of MUC1-CE targeted alpha therapy for pancreatic ductal adenocarcinoma

Speaker: Ashleigh Hull

Allied Health and Human Performance Academic Unit, University of South Australia, Adelaide, SA, Australia.

Department of Nuclear Medicine, PET and Bone Densitometry, SA Medical Imaging, Royal Adelaide Hospital, Adelaide, SA, Australia.



Ashleigh Hull is a lecturer in Nuclear Medicine and PhD candidate (under submission) at the University of South Australia. Ashleigh's research focuses on the development and characterisation of novel radioimmunoconjugates for the diagnosis and treatment of cancer. Her PhD project has led to the development of two novel therapeutic radioimmunoconjugates capable of treating pancreatic cancer at an in vitro level. In addition to her academic and research roles, Ashleigh also maintains her clinical practice as a registered nuclear medicine technologist at SA Medical Imaging.

Abstract:

Pancreatic ductal adenocarcinoma (PDAC) is a highly aggressive malignancy and a leading cause of cancer-related death worldwide. Development of targeted therapies, such as a targeted alpha therapy (TAT), may improve outcomes of patients diagnosed with PDAC. In this study, a novel alpha-emitting radioimmunoconjugate, ^{225}Ac-DOTA-C595, was developed to target PDAC by binding to cancer-specific mucin 1 epitopes (MUC1-CE). MUC1-CE is known to be overexpressed on over 90% of PDAC tissues yet has minimal expression on normal and benign tissues, offering an ideal expression profile for TAT purposes. A series of in vitro assays were performed to evaluate cell binding, internalisation and cytotoxicity of ^{225}Ac-DOTA-C595 and establish the feasibility of using ^{225}Ac-DOTA-C595 as a radioimmunoconjugate for the treatment of PDAC.

Title 2: Exploring Ultra-high Dose Rate Radiation and Growing as an Educator in Medical Physicist

Speaker: Ashley Cetnar, PhD, Assistant Professor Radiation Oncology

Ashley Cetnar is an Assistant Professor in the Department of Radiation Oncology at The Ohio State University. She is trained as both a clinical medical physicist and expert in teaching and learning. Within the clinic, she strives to provide excellent patient care in her role as a medical physicist by solving problems, applying science and technology, upholding quality and safety, and promoting innovation for new ways of treating patients. As an educator, she is passionate about helping others learn and grow as both individuals and within a team.

Abstract:

In this presentation, Dr. Cetnar will share her journey of involvement of research in ultra-high dose rate radiation therapy and journey professionally growing as an educator. From a research perspective, The Ohio State University currently has two ultra-high dose rate generating devices that can be used to deliver electrons with the next expected expansion to protons soon with the opening the new of proton therapy

facility. This will include background information about FLASH, commissioning of new technology, exploration of dosimetry methods, and biological experiments. Dr. Cetnar has always been passionate about education and will share her pathway to completing a PhD in Education, educational programs, and medical physics education research.

Title 3: Making progress only needs to get started

Speaker: Leticia Irazola Rosales, Medical Physics at Centro de Investigaciones Biomédicas de la Rioja

Leticia Irazola is a Medical Physics from Spain. She made her studies in Physics at the University of Zaragoza (Spain) and then dedcated to the Medical Physics field with her MSc in Medical Physics at the University of Rennes I and the Centre Eugène Marquis (France), PhD thesis at the University of Sevilla (Spain) and PostDoc at the Pontificia Universidad Católica de Chile, Santiago de Chile (Chile).

Then she moved into the clinical field by performing the Medical Physics residency at the Clinica Universidad de Navarra (Spain). Based in La Rioja (Spain), she works now as a medical physicist combining her job as a Medical Physicist with university teaching and research at the Centro de Investigaciones Biomédicas de La Rioja.

She is currently secretary of the Communications and Publications Committee, Secretary of the Spanish Early Career group of the SEFM and Chair of the Early Career SIG of the EFOMP.

Abstract:

I have never in my youthfulness imagined that I would became the Secretary or Chair of any scientific group.

When I was studying my University Degree I just thought which would my future become by studing such a “theoretical” career as Physics. During my 2nd year at University I assisted to a talk related to the Medical Physics profession and I realized then that it was the path I wanted to follow, I felt it was just puting my humble knowledge of physics to the service of public health.

Since then I can almost say that all my life has been by chance and made by choice. What I have clear at this point is that it is not only a matter of being the best at doing something but loving what you do and being passionate about it. This is the way best things come to you and dreams become reality.

Patient Radiation Safety: Meet the IOMP Corporate Members

22 February 2024 at 12 pm GMT; Duration 1 hour

Organizer: John Damilakis

Moderator: John Damilakis & Magdalena Stoeva

Title: Patient Radiation Safety: Meet the IOMP Corporate Members

Speakers:

Delena Hanson, LAP America

Greg Martin, SUN Nuclear

Title 1: LUNA 3D – The New More in Surface Guided Radiation Therapy by LAP

Speaker: Delena Hanson, MSRT, RTT, CSPO, PMP, Director of Clinical Implementation, LAP of America

Delena Hanson is the Director of Clinical Implementation for LAP Laser in the US. She has specialized in SGRT for the past decade, moving from clinical user to applications trainer to senior product manager. Delena is currently leading the education and application of the new LUNA 3D SGRT system from LAP for North America. Delena is inspired by the patients and families she meets and the clinicians caring for them. She is passionate about helping cancer patients live better lives.

Abstract:

LAP is one of the world's leading systems suppliers that increase the quality and efficiency of radiation therapy. LAP provides laser systems offering precise patient alignment and marking at CTs, MRIs, and LINACs. LAP phantoms and RadCalc, the patient-centric 3D QA software, streamline tasks for medical physicists throughout the patient's journey. At ASTRO 2023, LAP launched the new LUNA 3D SGRT system, supporting reproducible patient positioning and monitoring patient surface motion at LINACs and CTs. LUNA 3D streamlines workflows with a browser-based interface across multiple screens and features a virtual laser for swift patient setup. The system supports ergonomic patient setup, utilizing high-resolution stereoscopic CMOS cameras with GPU-powered calculations for accuracy and low latency. LUNA 3D engages patients through a coaching screen, facilitating precise dose delivery. Multiple regions of interest (ROIs) enable focused treatment on different surface regions during setup and therapy.

Title 2: Sun Nuclear: Your Trusted Partner for Patient Safety

Speaker: Greg Martin, MSc.

Registered clinical scientist in the UK, with 5 years clinical experience working in a 10 linac, NHS radiotherapy center, UK. Honorary Lecturer. Number of poster publications at international conferences including AAPM and ESTRO.

Abstract:

Sun Nuclear has been delivering independent quality assurance to the radiation treatment industry for 40 years. Our customers and partners are the guardians of patient safety. They rely on our innovative and efficient solutions at over 5,000 facilities around the world. In this presentation you will learn where Sun Nuclear has been and where we are going along with insights into a few of our key products highlighting how they reduce risk, control costs and improve treatment quality.

From Pixels to Patients: The Influence of Gaming and Smartphone Developments on Radiation Oncology

24 January 2024 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak

Moderator: Eva Bezak

Title: From Pixels to Patients: The Influence of Gaming and Smartphone Developments on Radiation Oncology

Speaker: Dr Michael Douglass, Royal Adelaide Hospital, Adelaide, Australia

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Dr. Michael Douglass is a principal medical physicist at the Royal Adelaide Hospital where he oversees treatment planning systems and planning support services. He also works part-time at the Australian Bragg Centre for Proton Therapy and Research where he contributes to proton therapy comparative planning and research. In addition, Dr. Douglass holds an academic role at the University of Adelaide, supervising Ph.D. and master's student research. His expertise spans across a multitude of research areas, including proton therapy, Monte Carlo simulations, machine learning and 3D printing in radiation oncology, which is reflected in his 40+ peer-reviewed publications. Dr. Douglass's notable contributions

to the field have earned him multiple awards such as the 2021 Simpson Prize for Cancer Research and the 2021 ACPSEM Boyce Worthley Young Achiever Award.

Abstract:

In this presentation, we will explore how advancements in various industries, including the movie, video game, and smartphone industries, have contributed to the progress of radiation oncology. We will discuss how developments such as visual effects in the movie industry have paved the way for the creation of synthetic training data for machine learning models in radiation oncology. Additionally, we will examine how the smartphone industry has enabled new methods of 3D scanning patients for treatments like TBI, TSET, Brachytherapy, and 3D printed bolus, thanks to technologies like Gaussian platting, NERF, LiDAR, and iPhone capabilities. The integration of augmented reality in the video game industry has revolutionized the visualization of medical imaging data, providing volumetric views and assisting in breath hold coaching. We will also explore the impact of GPU technology on deep learning segmentation, auto planning, and accelerated dose calculations, as well as the potential of large language models like Llama 2 and GPT in education and automated patient record transcription. Through these examples, we will highlight the interconnectedness of these industries with radiation oncology and the ongoing advancements they bring to the field.

Learning Objectives:

Gain an understanding of the advancements in optical scanning technologies, including LiDAR, photogrammetry, and NERF, and their applications in radiation oncology.

Understand how consumer technologies, such as smartphones and gaming, have contributed to the progress of radiation oncology and medicine as a whole.

Learn about the benefits and potential applications of large language models, like Llama 2 and GPT, in radiation oncology, including education and automated patient record transcription.

Examine the integration of visual effects in the movie industry and its influence on the creation of synthetic training data for machine learning models in radiation oncology.

Understand the impact of augmented reality in the video game industry on the visualization of medical imaging data and its role in assisting in breath hold coaching.

IOMP's Focus: Early Career in Medical Physics and the most recent trends in diagnostic imaging and radiotherapy

19 December 2023 at 12 pm GMT; Duration 1 hour

Organizer: M Stoeva

Moderator: KH Ng

Speakers: Tan Hong Qi & Choirul Anam, IUPAP Early Career in Medical Physics awardees

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Title: Impact of dispersive proton beam on reference dosimetry in a synchrotron spot scanning system

Dr Tan Hong Qi is currently a senior medical physicist in National Cancer Centre of Singapore (NCCS) and is also a clinical instructor in Duke-NUS medical School. He received his PhD from National University of Singapore and completed his residency in NCCS. He is active in both the radiotherapy research and education in Singapore for which he was recognized with institutional level awards and recent SEAFOMP young leader award. His current research interests are the application of AI in radiotherapy, adaptive radiotherapy, and proton therapy.

Abstract:

We have recently commissioned the largest proton therapy center in Singapore and have treated more than 30 patients over the last 4 months after the first clinical start date. This talk will share some of our commissioning experience with Hitachi ProBeat proton therapy which is a spot scanning synchrotron

delivery system. In particular, we will report the observation of a large fluctuation in reference dosimetry measurement with a square field and an ion chamber measurement at the plateau region of a monoenergetic proton beam. An investigative journey reveal that the fluctuation originated from the dispersion in the proton beam. This accelerator physics term will be introduced, and we will show for the first time, the feasibility of measuring it in the clinic.

Title: Automated dose and image quality measurements from clinical CT images for CT optimization

Dr. Choirul Anam completed his Ph.D at Physics Department, Bandung Institute of Technology (ITB). He received Master degree from University of Indonesia (UI) and the B.Sc degree in physics from Diponegoro University (UNDIP). He is currently working as a Lecturer and Researcher in the UNDIP. His research interests are medical image processing and dosimetry for diagnostic radiology, particularly in CT. He has authored and co-authored over 200 papers. In the last ten years, he was the first author over 50 papers. One of his papers published in the Journal of Applied Clinical Medical Physics had been awarded as the Best Medical Imaging Physics Article in 2016. He received the Best Paper Award during 15th South East Asian Congress of Medical Physics (SEACOMP). He was also recognised as an Outstanding Reviewer for Physics in Medicine and Biology in 2018 and for Biomedical Physics and Engineering Express in 2019. He was also awarded as the SEAFOMP Young Leader Awards 2019 for his contribution in CT dosimetry and image quality from the South East Asian Federation of Organizations for Medical Physics (SEAFOMP). He is developer of two software, i.e. IndoseCT and IndoQCT (www.indosect.com).

Abstract:

Recent studies revealed that computed tomography (CT) scanning poses a potential cancer risk in patients. Although the risk is considered much smaller than the benefits of CT scanning to accurately diagnose patient abnormalities, the CT examination must be optimized. In radiation optimization, an image of sufficient quality to diagnose the patient must be achieved with the smallest possible dose. Up

until now, image quality and radiation dose were usually evaluated using a standard phantom of standardized characteristic. The evaluation of image quality and radiation dose using the standard phantom is very good for assessing dependency on controllable variables, such as tube currents, tube voltage, pitch, reconstruction filter, and beam width. However, they are also influenced by uncontrollable variables, such as body size and body region. For optimization purposes, the controllable and uncontrollable variables must be considered simultaneously. This talk will discuss methods of automated image quality (noise and spatial resolution) and patient dose (i.e. size-specific dose estimate (SSDE)) directly from image of patient.

IOMP Anniversary Webinar: November 07, 2023

Tuesday, 7th November 2023 at 12 pm GMT; Duration 1 hour

Organizers: John Damilakis & Magdalena Stoeva

Moderators: John Damilakis & Eva Bezak

Speakers: Azam Niroomand-Rad, Colin G. Orton, Fridtjof Nüsslin

Title: The 60th Anniversary of IOMP – Personal Memories and Some Thoughts on the Future of Medical Physics

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Speaker: Prof. Azam Niroomand-Rad, PhD, DSc, FAAPM, FACMP, DABR, FIOMP, FIUPESM

Azam Niroomand-Rad was born in Tehran, Iran. Encouraged by her math/physics teacher and inspired by Maria Skłodowska-Curie, she won Fulbright Scholarship for college education and went to USA in 1966. Azam completed BS in Math/Physics with honors (Summa Cum Laude & Phi Beta Kappa) from State University of NY in 1970 and then PhD in Atomic and Molecular Physics from Michigan State University in 1978.

Azam Niroomand-Rad received Postdoc Fellowship in 1981 and worked at the Department of Medical Physics at University of Wisconsin in Madison, Wisconsin under supervision of late Profs John Cameron

and Herb Attix. She has specialized in therapeutic medical physics and has been certified by American College of Radiology (ACR) in 1988 by American Board of Medical Physics (ABMP) in 1990. Prof. Niroomand-Rad worked at Medical College of Wisconsin in Milwaukee (1983-1988) and then at the Department of Radiation Medicine, Georgetown University Medical Center, Washington DC until her retirement in 2008. She is now an Honorary Prof. at University of Wisconsin-Madison where she lives.

Prof Azam Niroomand-Rad is first (and thus far only) woman to serve as IOMP President (2003-2006). She is founder of the AAPM / IOMP International Scientific Exchange Programs (ISEP) for developing countries and has served on many AAPM / IOMP committees / Task Forces including International Labor Organization (ILO) (1991- 2008). She has published numerous articles and book chapters and has been Co-Inventor of a US Patent for designing a novel stereotactic method for treatment of spine lesions. She has received many Honors and Awards from numerous organizations including Honorary Doctor of Science Degree (DSc.) in 2001, AAPM Life-Time Achievement in Medical Physics (Quimby Award) (2006), and IOMP Marie Skłodowska Curie Award (2009) for a distinguished career contributing to the advancement of international medical physics through research, teaching and leadership.

Abstract

First Giant of Medical Physics

• Since Nov. 7, 2013, Marie birthday is celebrated as International Day of Medical Physics (IDMP)

• She was the first scientist to introduce the principles of physics in the field of medicine with a focus on diagnosis and treatment of diseases.

• How did she create Medical Physics not knowing what it was?

• How did she know her discoveries could transform the practice of physics and chemistry?

• How great scientists are formed?

Is it: time/place of birth, upbringing, hardships, hard works, obstacles to overcome?

Or is it: curiosity, courage, persistence, patient, problem solving, open-mindedness, communication skill, willingness to take risks, detail-oriented, critical thinking, and creativity?

• I believe Maria had most of these personal and scientific attributes. She took “path less traveled.”

• I believe Maria’s family tragedies in Poland, her financial difficulties in college, along with poor research condition and sudden death of her husband Pierre Curie may have contributed to her becoming stronger and more determined to reach her goals.

Role Model: Marie Skłodowska-Curie

• Most people have some role models and heroes when they are growing up.

• When I was growing up in Tehran, Iran, I had no idea what Medical Physics was but I knew that Marie

Curie had a remarkable life in Poland under Russian occupation and had difficult life in Paris and had won 2 Nobel Prizes in: Physics and Chemistry.

• Encouraged by my teachers and inspired by Marie Curie, I studied Math/Physics in High School.

• Then I received Fulbright scholarship to go to US (1966) for my college education.

• This was a difficult decision for my family and a big risk for me since I had never had to leave my family / country.

• I knew studying Physics will be a long and winding path for me when I left Iran.

• My journey to US at a young age, brought both challenges and opportunities.

• Had to overcome obstacles to reach my goals/dream with determination / discipline.

• Feeling homesick, facing cultural differences, had to overcome language barriers, I escaped to study long hours in libraries.

• Completed BS in Math/Physics with honors (Suma Cum Laude) from State University of New York in Albany, NY. (1970)

• Completed PhD in Atomic/Molecular Physics from Michigan State University, MI (1978)

New Professional Path: Medical Physics Career

• In 1981 when I saw a Postdoc Advertisement in Physics Today by late Prof. John Cameron, I called him and asked him “What is Medical Physics?”.

• After some conversation, when he learned about my Math/Physics background, he asked me to come to the UW-Madison within a few days before he goes to China.

• Luckily, I started my Postdoc Fellowship (1981) at the UW-Madison under supervision of late Prof. Cameron and Prof. Attix not knowing much about Medical Physics.

• I learned that in 1981 John had established the 1st Medical Physics Department in US.

• With a step-function change in my career (theoretical physics to applied physics), I had to decide between diagnostic and therapeutic Medical Physics.

• This was not an easy decision. Eventually chose therapeutic MP and became certified by American College of Radiology (1988) and American Board of Medical Physics. (1990).

• I became qualified to work at medical schools with patient care, research and teaching duties.

• Inspired by John Cameron and Larry Lanzel for improving MP globally, in 1988, I founded the AAPM/IOMP International Scientific Exchange Programs (ISEP) for developing countries.

• Initially with no funding from AAPM and IOMP and some resistance from developing countries, I did not know how to implement these programs.

• With the help of the American colleagues, including Faiz Khan and Colin Orton, we were able to offer

these programs for free and established several MP Associations / Societies in Pakistan, Iran, Morocco, Egypt, Cameroon, Saudi Arabia, Cuba, Turkey, Russia, Bangladesh, Iraq, etc.

Lessons Learned, Plans Pursued, Future Actions

• Soon we learned that since MP was not listed as occupation by ILO (International Labor Organization), there were inertia to change / establish PM profession in developing countries.

• In 1994, in coordination with IOMP Presidents (Keith Boddy and Colin Orton), I provided data/documents as needed till MP profession was recognized and listed by ILO (2008).

• Encouraged by Larry Lanzl and John Cameron and supported by Colin Orton, I was nominated for IOMP Presidency in 2000 and became IOMP President (2003-2006).

• In collaboration with Colin Orton, we re-wrote IOMP Bylaws, established Rules Com., Joined IUPAP (Int'l Union of Pure and Applied Physics) as Affiliated Commission on Medical Physics (IntComMP), established Honors & Awards, including Marie Skłodowska-Curie Award for Distinguished Career in Research, Teaching, and Leadership.

• I was honored to receive Maria Skłodowska-Curie Award in 2009 and AAPM Life Time Achievement Award (Quimby Award) in 2006.

• What Actions could be taken by the next generation of Medical Physicists?

• Today, MP is exciting, dynamic and unique. There are new challenges to overcome to foster the next generation of MPs: Integration and sharing skills & expertise including creation and application of novel technical approaches with artificial intelligent robots that may increase efficiency/ efficacy of patient care in urban and underserved remote areas which have limited local resources.

Speaker 2: Colin Orton

Ph.D. in Radiation Physics from the University of London. Past Secretary-General of the IOMP and Past President of several organizations including the IOMP, IUPESM, IMPCB, AAPM, ACMP, and ABS. Chief Medical Physicist at New York University School of Medicine, Rhode Island Hospital and Brown University, and Karmanos Cancer Institute and Wayne State University, where I am currently Professor Emeritus. Past Editor of Medical Physics World, Medical Physics, Bulletin of the American College of Medical Physics, and the AAPM Quarterly Bulletin. Author or coauthor of about 300 papers in refereed journals, over 50 book chapters and 600 presentations, and author, coauthor, or editor of over 50 books. Major research interests have been bioeffect dose modeling, development of new fractionation and dose-rate regimes, HDR brachytherapy, cervix and breast radiotherapy, radiobiology, radiation carcinogenesis, radiation induced injuries, and radiotherapy physics.

Abstract:

I will be reviewing experiences when helping incoming Vice-President Prof. Larry Lanzl establish Medical Physics World in 1982 and as MPW Editor from 1985-1988, as IOMP Secretary-General from 1988-1994, and as IOMP President from 2000-2003. Memorable events during my terms of office included the establishment of the IOMP Library Program, the Travel Scholarships program for attendance at the World Congress by developing country delegates, the publishing agreement between the IOMP and the IOP, the IOMP/AAPM International Scientific Exchange Program (ISEP), the Donation of New and Used Equipment program, and the awarding of Full Membership in ICSU. Personal memories include helping countries establish their national medical physics organizations so as to apply for IOMP membership, participating in the 1st IOMP/AAPM ISEP course in Pakistan in 1992, and participation in the 1991 USSR medical physics

conference when the USSR was dissolving, and the member countries voted to form their own national medical physics societies.

Speaker: Fridtjof Nüsslin, Technical University Munich, Germany

Education & Academic Qualification:

1959 Study of Physics and Medical Sciences at universities of Tübingen and Heidelberg;

1968 Dr.rer.nat., Physics and Physiology, University of Heidelberg; Postdoctoral fellowship at Max-Planck-Institute for Nuclear Physics, Heidelberg;

1979 Qualification university lecturer in Medical Physics;

1984 Professor Medical Physics;

Employment:

1970 Physicist at Radiotherapy Department, Medical School Hannover;

1987-2004 Full professor Medical Physics at the University of Tübingen;

Scientific Activities & Topics of interest:

Radiotherapy Treatment Optimisation, Conformal Radiotherapy (IMRT, IGRT); Dosimetry and Treatment Planning Optimization, Conformal Radiotherapy, Image Guidance, Advanced Technologies (particle beam therapy, laser application in imaging & particle beam therapy), Imaging technology (MRI/MRS, PET, CT); Biological & Molecular Imaging, Biological Modeling, Small Animal Image Guided High Precision Irradiation Technology. Treatment planning, Radiotherapy equipment, Dosimetry; Quality Assurance in Radiotherapy and Radiology; Radiation Protection; Non-Ionizing Radiation Effects; Hyperthermia; Radiological and Nuclear Emergencies. National and International professional matters of Medical Physicists, Medical Physics in developing countries. Education & Training Programmes

Professional Activities:

Since 2004 Professor Biomedical Physics at Technische Universität München

Various positions held in scientific organisations, boards, committees in Germany;

1990-1994 president DGMP

1994-1996 EFOMP Chair Scientific Committee;

1996-1998 EFOMP President.

2000-2006 IOMP Chair International Advisory Board

2006-2009 IOMP Vice President (elect)

2009-2012 IOMP President

2012-2015 IUPESM Vice-President

Honours:

2004 Honorary membership of the Czech Association for Medical Physicists (CAMP)

2005 Honorary membership of the European Federation of Organisations for Medical Physics (EFOMP)

2006 Honorary membership DEGRO (German Society of Radiooncology)

2008 Honorary membership OEGRO (Austrian Society of Radiooncology)

2008 Distinguished Affiliated Professor, Technische Universität München (TUM) and Fellow of the Institute of Advanced Studies, Technische Universität München (TUM-IAS)

2011 Richard-Glocker-Award of the DGMP (German Society of Medical Physics)

2011 Honorary membership SMPS (Saudi Medical Physics Society)

2013 Honorary Fellow IOMP

2021 Honorary Member DGMP

2021 Honorary Fellow IUPESM

Publications:

More than 200 publications in peer reviewed journals

Abstract:

Why medical physics? What is so fascinating in medical physics? Isn´t it just something in between of medicine and physics? Looking back on my professional life, I still have the feeling that hardly any other profession than medical physics covers such a broad spectrum of various disciplines. Indeed, during my whole life as a medical physicist I appreciated so much the many opportunities to witness exciting innovations, new trends and breakthroughs in medical and natural sciences, and to enjoy the challenge of translating these into health care practice. Another track of my professional life was my passion for contributing to the expansion and flourishing of medical physics worldwide. In this context it was a great honour and my personal highlight to have the opportunity to serve our community in several capacities

at IOMP from 2000-2015. I am indebted to innumerable colleagues and friends during that time who made it possible to achieve important milestones, such as the expansion of the IOMP-Chapter structure, membership of IUPAP, tighter connection to WHO and IAEA, the approved definition of the “Medical Physicist” as a profession listed at the ILO, and many other advancements. However, there are still some issues we must focus on: the harmonization of education & training worldwide, filling the gap of qualified medical physicists, particularly in the LMI-countries, and opportunities for advancing medical physics science.

Radiopharmaceutical Therapy (RPT)

Wednesday, 25th October 2023 at 12 pm GMT; Duration 1 hour

Organizer: M Mahesh

Moderator: M Mahesh

Speakers: George Sgouros and Ana Kiess

Topic 1: Imaging and Dosimetry in Radiopharmaceutical therapy

George Sgouros, PhD

Dr. Sgouros is Professor and Director of the Radiological Physics Division in the Department of Radiology at Johns Hopkins University, School of Medicine. He received his PhD from Cornell University, Biophysics Dept, completed his post-doc at Memorial Hospital Medical Physics Dept. He is author on more than 200 peer-reviewed articles, several book chapters and review articles. He is recipient of the SNMMI Saul Hertz Award for outstanding achievements and contributions in radionuclide therapy and a fellow of the American Association of Physicists in Medicine (AAPM). He is a member of the Medical Internal Radionuclide Dose (MIRD) Committee of the Society of Nuclear Medicine and Molecular Imaging (SNMMI), which he chaired 2008-2019. He has chaired a Dosimetry & Radiobiology Panel at a DOE alpha-emitters workshop and also an ICRU report committee for ICRU guidance document No. 96. Dr. Sgouros is a former chair (2015-2017) of the NIH study section on Radiation Therapeutics and Biology (RTB). Dr.

Sgouros is also founder and principal of Rapid, a dosimetry and imaging services and software products start-up in support of radiopharmaceutical therapy.

Abstract

Even after they have made it to Phase I clinical trial investigation, 97% of new cancer drugs fail. The majority of these drugs are chosen based on their ability to inhibit cell signaling pathways responsible for maintaining a cancer phenotype. Although this approach has led to dramatic improvements in treatment efficacy for certain cancers, this approach to cancer therapy is more complex than initially appreciated. Radiopharmaceutical therapy (RPT) involves the targeted delivery of radiation to tumor cells or to the tumor microenvironment. Since the radionuclides used in RPT also emit photons, nuclear medicine imaging may be used to measure the pharmacokinetics of the therapeutic agent and estimate tumor and normal organ absorbed doses in individual patients to implement an individualized (precision medicine) treatment planning approach to RPT delivery. This unique feature of RPT, along with its ability to delivery highly potent alpha-particle radiation to targeted cells, is at the heart of what distinguishes RPT compared to other cancer treatments for widespread metastases.

Learning Objectives:

- Understand the mechanism of Radiopharmaceutical therapy.
- Compare and contrast RPT with other cancer therapy modalities.
- Understand the distinction between RPT and Theranostics.

Topic 2: Clinical Radiopharmaceutical Therapy, Dose-Response and Future Directions

Ana Kiess, MD, PhD

Dr. Ana Kiess's clinical focus is on the treatment of prostate cancer and head and neck cancers with radiopharmaceutical therapies and external beam radiotherapy. Her research concentrates on the integration of dosimetry, dose-response analyses, and new radiopharmaceutical therapies into the clinic.

Education:

MD; Duke University School of Medicine (2008)

PhD; Biomedical Engineering; Duke University (2008)

Residency:

Radiation Oncology; Memorial Sloan-Kettering Cancer Center (2013)

Recent Publications:

Wang J, Kiess AP. PSMA-targeted therapy for non-prostate cancers. Front Oncol. 2023 Aug. 13:1220586. doi: 10.3389/fonc.2023.1220586.

Kiess AP, Hobbs RF, Bednarz B, Knox SJ, Meredith R, Escorcia FE. ASTRO's framework for radiopharmaceutical therapy curriculum development for trainees. Int J Radiat Oncol Biol Phys. 2022; 113(4):719-726.

Jia AY, Kashani R, Zaorsky NG, Baumann BC, Michalski J, Zoberi JE, Kiess AP, Spratt DE. Lutetium-177 Prostate-Specific Membrane Antigen Therapy: A Practical Review. Pract Radiat Oncol. 2022; 12(4): 294-299.

Jia AY, Kiess AP, Li Q, Antonarakis ES. Radiotheranostics in advanced prostate cancer: Current and future directions. Prostate Cancer and Prostatic Diseases. 2023, April: 1-11.

Abstract

Radiopharmaceuticals are rapidly expanding in clinical use and development for prostate cancer and many other tumor types. As in other radiation therapies, there is a dose-response relationship for both tumor and normal tissues, with increasing responses or toxicities at higher absorbed doses. In this webinar, we will discuss these concepts in relation to currently approved radiopharmaceutical therapies (RPTs) and future directions of RPTs. We will also review clinical indications and practical use of currently approved RPTs including [177Lu] Lu-PSMA-617, [177Lu] Lu-DOTATATE, and [223Ra] RaCl2.

Learning Objectives:

Understand clinical indications and practical use of currently approved radiopharmaceutical therapies

Discuss concepts of radiation dose and response of tumors and normal organ toxicities

Explore future directions of clinical radiopharmaceutical therapies.

Physics and Technology for Cancer Care – Meet the IOMP Corporate Members

Tuesday, 12th September 2023 at 12 pm GMT; Duration 1 hour

Organizer: Magdalena Stoeva

Moderator: Ibrahim Duhaini

Speakers: Axel Hoffmann (PTW) & Alexander Pegram (RadFormation)

Topic 1: PTW and VERIQA RT EPID 3D as the Approach to EPID Dosimetry

Axel Hoffmann

Sales Director, PTW, Freiburg, Germany

Education:

09/1969 – 07/1977 Polytecnic Secondary School, Basic Education in Lauta, Germany 09/1977 – 07/1981 Extended Secondary school, Hoyerswerda, Germany 10/1984– 02/1989 Ilmenau Technical University, Ilmenau, Germany. Technical and Biomedical Cybernetics; Biomedical Engineering; Master of Science.

Professional:

02/1989 – 02/1991 National Board for Atomic Safety and Radiation Protection (SAAS), Berlin, Germany. Radiation Measurement in Health Physics; Film Dosimetry.

03/1991 – 08/2013 PTW, Freiburg, Germany, Area Sales Manager (Eastern Europe, Asia, Australia)
09/2013 – Present PTW, Freiburg, Germany, Sales Director, Sales Operation

Abstract

PTW is a world-wide leader in dosimetry. We develop, manufacture, and distribute measurement equipment and software for quality assurance as performed in radiotherapy, diagnostic radiology, and metrology.

PTW is over 100 years old and represents a high level of expertise in our business fields. VERIQA RT EPID 3D is a new PTW software product for EPID patient treatment plan and delivery verification (pre-treatment and in-vivo). The result is a dose distribution in patient anatomy (based on the back-projection algorithm developed by the Netherlands Cancer Institute). The combination of a Monte Carlo algorithm and the EPID images provide a workflow-efficient and highly accurate dose reconstruction.

The pre-treatment verification does not require a phantom (measurement “in air”). Neither a phantom setup nor a re-planning is necessary.

Topic 2: Optimizing Cancer Care with Efficient QA

Alexander Pegram

Alexander “Alex” Pegram, DMP, DABR, received his Professional Doctorate in Medical Physics and Master of Science in Medical Physics from Vanderbilt University. His research focused on risk analysis using System Theoretic Procedures (STPA). He also attained certification in Therapeutic Medical Physics from the American Board of Radiology.

At Vanderbilt, Alex was the Chief Medical Physics Resident, before moving to Sanford Health. As the Chief Physicist there, Alex managed a team across two sites and oversaw the purchase, installation, and commissioning of new equipment, including a TrueBeam. In 2020 Alex started at Radformation, where he

is now the Product Manager of RadMachine, the company's cloud-based Radiation Therapy Machine QA Platform. As an affiliate of AAPM, he is part of a working group on "Ask the Expert."

Abstract

Ensuring the accuracy and reliability of radiation therapy machines is paramount for patient safety and effective cancer treatment in medical physics. In "Optimizing Cancer Care with Efficient QA," Alex Pegram, DMP, DABR, delves into RadMachine, an innovative solution for Machine Quality Assurance offered by Radformation. RadMachine streamlines the QA process and enhances treatment precision, enabling physicists to perform more efficient, high-quality QA in less time.

The presentation discusses the clinical and scientific aspects of RadMachine, illustrating its seamless integration with data from therapy machines, imaging devices, and ancillary equipment, and more into a consolidated platform. A sophisticated combination of robust automation and a streamlined, cloud-based platform enables RadMachine to efficiently verify and validate machine parameters, minimizing human errors to maximize patient-centric care.

By optimizing resource allocation and time management, the highest standards of safety and quality for cancer care are met. Coupled with additional solutions for workflow automation from start to finish, this presentation will provide insights into the transformative potential of physics-driven technology in delivering exceptional patient care.

IOMP-IUPESM-ISC Joint Webinar: Practical Deep-Dive on ChatGPT

Tuesday, 29th August 2023 at 12 pm GMT; Duration 1 hour

Organizers: Magdalena Stoeva (IOMP,IUPESM) & Zhenya Tsoy (ISC)

Moderator: Magdalena Stoeva

Speaker: Nick Scott

As a senior digital leader for more than 15 years, Nick worked with third sector organizations as diverse as Médicins Sans Frontières, UNISON and the Overseas Development Institute (ODI) to understand their goals; explore the possibilities digital offers for achieving these goals; and map and deliver the changes they needed to succeed. For his work building a digital team at UNISON Nick was listed in the Digital Leaders 100 list in the UK while at ODI his digital strategy was awarded Digital Strategy of the Year at the European Digital Communications Awards.

Since 2021 Nick has been working as a consultant while undertaking an Executive MBA programme at ESADE Business School in Barcelona. Nick helps non profits realize a transformative vision of what they could be in the digital age.

Abstract

The joint IOMP-IUPESM-ISC (International Science Council) webinar will create a safe space for experimentation and explore how the most popular tool – ChatGPT – can be used in our everyday work.

The webinar in the form of practical workshop follows the initial workshop organized by the ISC in June 2023.

The webinar is focused on but not limited to the following items:

An overview of technical capabilities and limitations of ChatGPT.

A guided live preview of ChatGPT with examples on writing, testing and validating effective prompts.

What is happening next with new versions of software, such as MS Office, where similar tools will be in-built.

Moderated Q&A session.

A special focus is given on insights on how to work around technical capabilities and limitations of the tool, what makes for an effective prompt, and other practical questions around the use of ChatGPT.

The webinar is aimed at those working in the scientific organizations, communications colleagues and those with a general interest in using the tool. It would be useful to all levels of users – from those just starting out to discover ChatGPT, to those who are already actively using it.

IOMP-AAPM Webinar

Wednesday, 19th July 2023 at 12 pm GMT; Duration 1 hour

Organizers: Robert Jeraj, Allen Movahed, Claire Park, Robert Jeraj & AAPM Global Research & Scientific Innovation Committee (GRSIC)

Moderator: M. Mahesh (Scientific Committee Chair of the IOMP)

Speakers: Kevin W Eliceiri, Heather Whitney, Robert Finnegan

Title 1: Open Source Computational Imaging of Cellular Microenvironments

Speaker: Kevin W Eliceiri

Kevin Eliceiri is the RRF Walter H. Helmerich Professor of Medical Physics and Biomedical Engineering and Director of the Center for Quantitative Cell Imaging at the University of Wisconsin-Madison. He is also an investigator in the Morgridge Institute for Research. In 2022 he was named a Open hardware Trailblazer by the Open Source Hardware Association and the Sloan Foundation. His research focus involves developing novel optical imaging methods for investigating cellular microenvironment changes in wound healing, and the development of software for multidimensional image analysis. His lab has been contributing lead developers to several open-source imaging software packages including FIJI, ImageJ and µManager. ImageJ was named by Nature as one of the top ten computer codes that changed science. His open hardware instrumentation efforts involve novel forms of polarization, light sheet, laser scanning and multiscale imaging.

Abstract:

A primary interest of the Eliceiri lab is in developing novel imaging techniques that examine the interaction between cells and their microenvironment in space and time. Much of this work has involved the development of multiphoton based and computational approaches to interrogate cells noninvasively deep into intact tissue over time to study metabolism, cell signaling and stromal interactions. This has been particularly useful in studies of cell differentiation and cancer invasion and progression. A major element of this work is the construction of novel open source imaging hardware platforms including custom fluorescent lifetime, spectral imaging systems and multiphoton laser scanning systems. This work entailed new open hardware developments in laser, detection and acquisition technology. Much of our focus in hardware development is at the intersection of hardware and computation. Our past efforts have mainly focused on open source image analysis and visualization (ImageJ), on the computational side, and image acquisition (Micro-Manager) and device management on the hardware side. We are lead developers of the open-source project ImageJ/FIJI and in 2020 we launched the NIH P41 funded "Center for Open Bioimage Analysis" (COBA) to develop and maintain the open-source software CellProfiler and ImageJ while making new deep learning tools and workflow solutions for bioimaging. In 2021 we became the lead development home for Micro-Manager and OpenScan for light microscopy acquisition. We have been leading efforts to build an open source imaging informatics toolkit for light microscopy that spans the complete life cycle of imaging from acquisition, image analysis, data storage, and data dissemination. These tools have included support for novel imaging modalities such as light sheet microscopy, new metadata standards for sharing data and improved image analysis packages such as our work on ImageJ. This work on open source imaging software has enabled novel biological imaging studies and is in use by thousands of labs around the world. We now realize that there is an outstanding, untapped opportunity to advance computational optics, including opportunities for image analysis at runtime, where image processing routines can be run during acquisition to yield new insights and outcomes on data that would not be possible post-acquisition. We are combining our hardware accelerated approaches with our new algorithms to develop "smart" microscopes that can make decisions at runtime and use these decisions to determine where to focus in large tissue arrays.

Title 2: Open source tools from the Medical Imaging and Data Resource Center

Speaker: Heather Whitney

Heather M. Whitney, PhD is a research assistant professor in the Department of Radiology at the University of Chicago. She conducts research in computer-aided diagnosis of breast and ovarian cancer, focusing on the modalities of dynamic contrast-enhanced magnetic resonance imaging and ultrasound. Her primary areas of interest are in artificial intelligence and radiomics across the imaging and classification pipeline, from medical image acquisition to performance evaluation and data harmonization. She also conducts research and collaborates in MIDRC, the Medical Imaging and Data Resource Center. Within MIDRC she works on methods of task-based distributions, interoperability between data enclaves, and monitoring and studying the diversity and representativeness of the MIDRC data commons to foster research in AI and health disparities.

Abstract:

The Medical Imaging and Data Resource Center (MIDRC, midrc.org) is a multi-institutional collaborative initiative driven by the medical imaging community that was initiated in late summer 2020 to help combat the global COVID-19 health emergency and to accelerate the transfer of knowledge and innovation in the COVID-19 pandemic and beyond. MIDRC, funded by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) and hosted at the University of Chicago, is co-led by the American College of Radiology®, the Radiological Society of North America, and the AAPM. The aim of MIDRC is to foster machine learning innovation through data sharing for rapid and flexible collection, analysis, and dissemination of imaging and associated clinical data by providing researchers with unparalleled resources. In this talk, I will discuss the MIDRC open data commons and freely available resources developed by MIDRC investigators, including tools for building patient cohorts, building bias awareness in AI/ML development, and selecting performance metrics, as well as opportunities for contributing data.

Title 3: Unlocking medical imaging with platipy

Speaker: Robert Finnegan

Rob, an Australian physicist, brings extensive experience from geophysics, astrophysics, and medical physics. After completing his PhD from the University of Sydney he continued his work though research fellowships across multiple institutes, where he co-established the platipy library to facilitate accessible, high-quality tools for medical imaging and radiotherapy. Currently, Rob is advancing his skills through clinical medical physics training at the Northern Sydney Cancer Centre.

Abstract:

In the evolving landscape of medical physics, open-source software is becoming increasingly pivotal. This talk will introduce PlatiPy, a Python library designed to revolutionise medical imaging. PlatiPy offers a comprehensive, extensible, and continually expanding suite of tools, spanning all aspects of processing and analysis such as DICOM conversion, image registration, automatic segmentation, and a powerful visualisation toolkit. This talk will delve into the capabilities of PlatiPy, demonstrating simplify and expand users' capabilities to use and understand imaging and radiotherapy data.

A standout feature of PlatiPy is the streamlining of common tasks in big data pipelines, a critical component in today's data-driven medical research. To illustrate this, we will walk through an end-to-end example focusing on cardiac toxicities. This demonstration will highlight how PlatiPy is innovating medical imaging and radiation dose assessment pipelines. Embracing the principles of accessible and open software, PlatiPy encourages collaboration among researchers, medical physicists, and computer scientists worldwide. Are you ready to explore how PlatiPy is helping to unlock medical imaging? Join us!

Radiation Doses and Risk in Imaging – to Know or Neglect?

Tuesday, 20th June 2023 at 12 pm GMT; Duration 1 hour

Organizer: Prof Magdalena Stoeva

Moderator: Prof Arun Chougule

Speakers: Prof Dr Anchali Krisanachinda and Prof Dr Tomas Kron

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Title 1: Imaging doses in radiotherapy: to know or neglect?

Speaker: Prof Dr Tomas Kron

Tomas Kron was born and educated in Germany. After his PhD he migrated to Australia in 1989 where he commenced his career in radiotherapy physics. From 2001 to 2005 he moved to Canada where he worked at the London Regional Cancer Centre on the commissioning of one of the first tomotherapy units. In 2005, Tomas became principal research physicist at Peter MacCallum Cancer Centre in Melbourne, Australia where he now is Director of Physical Sciences. He holds academic appointments at Wollongong, RMIT and Melbourne Universities. Tomas has an interest in education of medical physicists, dosimetry of ionising radiation, image guidance and clinical trials demonstrated by 100 invited conference presentations and 330 papers in refereed journals. He has received many awards over the years including an Order of Australia Medal (2014), Fellowship of IOMP and IUPESM and Life Membership of the TransTasman Radiation Oncology Group (TROG) in 2020.

Abstract:

Radiotherapy is one of the main treatment modalities for cancer patient. It uses target doses in excess of 50 Gy to eradicate tumour cells. In the context of this high dose many people consider dose from imaging procedures that allow for treatment planning and delivery verification to be negligible, a position reflected in the lack of education about imaging dose optimisation for radiotherapy physicists and scant dose reduction methods available on commercial radiotherapy equipment. This presentation argues that this is a mistake not only because the framework of radiation protection urges us to justify and optimise all radiation doses. The number and complexity of imaging procedures is increasing and the volume of the patient irradiated and dose distribution in imaging is fundamentally different form the high dose region in therapy. As such a recently formed task group of ICRP is dealing with imaging dose in radiotherapy. This and experience of managing imaging dose in a large radiotherapy centre will be subject of the presentation.

Title 2: Radiation-induced Cancer Risk in Medical Imaging: To know or Neglect?

Speaker: Prof Dr Anchali Krisanachinda

Anchali Krisanachinda graduated her B.Sc.(Hons) in Physics, M.Sc. (Radiation Physics) from University of London, UK, and Ph.D. (Medical Radiation Physics) from University of Health Science, North Chicago, Ill, USA. She was a Director of Medical Physics Graduate Program, Mahidol University, Bangkok, Thailand. She established Medical Imaging/Medical Physics, graduate programs, M.Sc. and Ph.D. at Chulalongkorn University and became Chairperson of both programs. She established Thai Medical Physicist Society (TMPS) in 2002, started the clinical training of medical physicists in 2007 and obtained Clinically Qualified Medical Physicist, CQMP, in radiation oncology, ROMP in 2009, DRMP in 2012 and NMMP in 2015. Then all 3 branches in medical physics clinical training were started at the same time using AMPLE (Advanced Medical Physics Learning Environment). Medical Physicists in South-East Asia join AMPLE sharing Thai Clinical Supervisors in ROMP and NMMP. The Ministry of Public Health of Thailand approved the medical

physics national license in 2022, more than ten years after she requested. Hopefully, in 2023, there will be 300 Thai medical physicist with national license in medical physics. Continue Professional Development in medical physics will be later established. She has received many awards from her Faculty of Medicine and Chulalongkorn University, South-East Asian Federation of Organizations for Medical Physics (SEAFOMP), Asia-Oceania Federation of Organizations of Medical Physics (AFOMP), IOMP and IUPESM.

Abstract:

The risk model, the cancer sites, dose and dose rate effectiveness factor (DDREF) and mathematical models will be described presenting differences among the models. These models take into account parameters such as sex, age-at-exposure, attained age and time since exposure.

Medical Imaging:

Patient dose from a chest X-rays is about 0.1 mSv, whole-body CT scan is about 10 mSv. The effective doses from diagnostic CT procedures may be associated with an increase in the possibility of fatal cancer of approximately 1 chance in 2000. This increase in the possibility of a fatal cancer from radiation can be compared to the natural incidence of fatal cancer in the U.S. population, about 1 chance in 5 (400 chances in 2000). In other words, for any one person the risk of radiation-induced cancer is much smaller than the natural risk of cancer. If the natural risk of a fatal cancer is combined to the estimated risk from a 10 mSv CT scan, the total risk may increase from 400 chances in 2000 to 401 chances in 2000. Nevertheless, this small increase in radiation-associated cancer risk for an individual can become a public health concern if large numbers of people undergo increased numbers of CT screening procedures of uncertain benefit.

Radiogenomics/Radiomics-Guided Personalized Radiation Therapy: Current Status, Challenges, and Opportunities

Friday, 12th May 2023 at 12 pm GMT; Duration 1 hour

Moderator: Prof Arun Chougule

Speaker: Dr. V. Subramani

Dr. V. Subramani, PhD is currently working as Assistant Professor of Radiation Oncology (Medical Physics) and Heading Medical Physics in the Department of Radiation Oncology at All India Institute of Medical Scien

ces, New Delhi. He is having more than 26 years of experience in in radiation oncology medical physics. He has publication of around 50 scientific research articles as author and co-authors in the field of radiation oncology. Also He has delivered around 70 invited guest lectures, chaired several scientific sessions and participated in the debates and panel discussions in the national and international professional organization's annual and periodic scientific meetings for the last ten years in the field of advanced radiotherapy and medical physics. He is currently national secretary of Association of Medical Physicists of India (AMPI), IOMP Education and Training Committee member and also serves as Chief Editor of Asia-Oceania Federations of Organization for Medical Physics Newsletter.

Abstract:

The success of a cancer treatment depends on the ability to deliver the right treatment to right patient to a right dose at right time, which is an ultimate goal of precision medicine or precision oncology. However,

currently patients undergoing radiotherapy are treated using uniform dose constraints specific to the tumor and surrounding normal tissues. This population based one-size-fit-all approach results in significant adverse effects and suboptimal tumor control. Another concern with current approach is that two patients with nearly identical dose distributions can have substantially different acute and chronic morbidities leading to poor quality of life. Therefore, there is a need to develop an approach to overcome this limitation of current standard of care in oncology. Due to recent advances in biological and quantitive imaging, image processing analysis, computational power, cancer biology, biotechnology and genomics, there are tremendous growths and large amount of data is available for each individual patient.

The radiogenomics is an emerging field in precision radiation oncology. “Radiogenomics” has two meanings: “the study of genetic variation associated with response to radiation (Radiation Genomics) and “the correlation between cancer imaging features and gene expression (Imaging Genomics). Radiogenomics is a combination of both radiomics and genomics biomarkers, which is useful in guiding and personalizing treatment prescription and adaptation when changes occurring during the course of therapy. This is termed as Radiogenomics-Guided personalized radiation therapy. Both radiomics and radiogenomics biomarkers can be used to evaluate disease characteristics or correlate with relevant clinical outcome such as patient prognosis and treatment response. The common goal of discovering useful diagnostics, prognostics or predictive biomarkers to improve clinical decision making and ultimately enable the practice of precision and personalized medicine.

The presentation will address about the medical physics aspects of quantitative imaging biomarker, radiomics/radiogenomics model development, radiomics-guided radiotherapy using radiomics-target volume, radiomics-knowledge based treatment and also gnomically-guided radiotherapy including genomic-adjusted radiation dose and radiation sensitivity signature and models for personalized radiotherapy.

Upright Radiotherapy: Challenges and Opportunities

Friday, 28th April 2023 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak, IOMP

Moderator: M Mahesh, IOMP

Speaker: Tracy Underwood, PhD

Dr Tracy Underwood is a Senior Physicist at Leo Cancer Care, an innovative young company who are developing medical devices for upright radiotherapy. She is also a UKRI Future Leaders Fellow and an Honorary Senior Research Fellow at University College London. As a radiotherapy researcher she has worked at some of the most innovative clinics and academic departments worldwide, including Massachusetts General Hospital / Harvard Medical School in Boston, IUCT Oncopole in Toulouse, the Christie NHS Foundation Trust, the University of Manchester, and the University of Oxford. She is passionate about medical physics education and is part of the editorial board of "The Encyclopaedia of Medical Physics", which is published as an open resource at http://www.emitel2.eu/, as well as in hardcopy by CRC Press. Tracy was awarded the 2015 IMechE JRI: Best Medical Engineering PhD Prize and the 2017 Early Career Academic Prize from the UK Institute of Physics and Engineering in Medicine. She likes to spend her free time on the beach or in the forest with her husband and two young kids.

Abstract:

Treatments which combine fixed radiation beams with upright, rotating patient positioning systems have been investigated since the advent of radiotherapy. However, recently there has been an upsurge of interest in this topic, as evidenced by new academic publications and commercial systems. In Heidelberg, one of the only carbon ion gantries in the world weighs ~600 tonnes. For proton therapy, gantries typically weigh ~100-200 tonnes. Even conventional photon gantries weigh ~5 tonnes: around the weight of an adult elephant. Eliminating the gantry could vastly reduce the radiation shielding required and the 3D footprint of treatment bunkers. It could also reduce the complexity of beam delivery equipment, leading to reduced maintenance, easier upgrades, and lower expertise barriers. These factors can bring down treatment room costs, not just for heavy ion / proton radiotherapy, but also for conventional photon radiotherapy where global access is unacceptably low. There may be tumour sites where upright radiotherapy is better medicine (e.g., lung, liver). For certain patients (e.g., those with head and neck cancers), upright positioning is also likely to prove more comfortable. Against the advantages of upright radiotherapy, we need to weigh the practical challenges of re-implementing the clinical workflow. Questions also remain over immobilisation and how treatment plan quality and radiotherapy effectiveness will vary with body position. Given the decades of enhancements across supine radiotherapy, how committed are we to the traditional paradigm? Here we will explore the published evidence, challenges and opportunities associated with upright radiotherapy.

IMPW 2023 Webinar: Leadership in Medical Physics

Thursday, 27th April 2023 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak, IOMP, Simone Kodlulovich Renha, IOMP

Moderator: Simone Kodlulovich Renha, IOMP

Speaker: Colin Orton, PhD

Dr. Orton graduated with a Ph.D. in Radiation Physics from the University of London, England in 1966. He has worked as Director of Medical Physics at New York University School of Medicine (Assistant Professor 1966-1975), at Rhode Island Hospital and Brown University (Associate Professor 1975-1981), and at the Detroit Medical Center/Karmanos Cancer Institute and Wayne State University (Professor 1981-2003), where he is currently Professor Emeritus in the School of Medicine. While at Wayne State he directed of one of the first accredited medical physics graduate programs, with over 150 M.S. and Ph.D. graduates. His major research interests have been bioeffect dose modeling, development of new fractionation and dose-rate regimes, HDR brachytherapy, cervix and breast radiotherapy, radiobiology, radiation carcinogenesis, radiation induced injuries, and radiotherapy physics, and he has taught courses in radiation biology annually to residents, therapists, and physicists. He has served as President of the American Association of Physicists in Medicine (AAPM), Chairman of the American College of Medical Physics (ACMP), President of the International Organization for Medical Physics, the American Brachytherapy Society (ABS), the International Union for Physical and Engineering Sciences in Medicine

(IUPESM), and the International Medical Physics Certification Board. Dr. Orton has published over 20 books, over 290 papers, made over 600 presentations, and has received the major awards of the AAPM, ACMP, ABS, IOMP and IUPESM.

Abstract:

Many medical physicists would like to become leaders, but many will be just as happy working all their lives making valuable contributions to the health and safety of their patients without taking on the added responsibilities of leadership. This talk will review the different types of leadership available to medical physicists, what makes you a “leader”, and what opportunities are there for you to reach your leadership potential.

Leadership can take several forms for medical physicists, such as:

Chief Medical Physicist

Chief Clinical Physicist

Radiation Safety Officer

Director of an educational program

Director of a residency training program

Officer in a regional, national, or international medical physics organization

In this talk we will discuss a variety of topics, including:

Can anyone be a leader or do leaders need to have special traits (interests, skills, motivation, personality, commitment…)?

Can leadership be taught and, if so, should a teaching program include “leadership” in the curriculum?

Should there be leadership mentorship programs?

How can you work to become a leader?

IMPW 2023 Webinar: Cumulative Dose: What, Why, When, How, and How Much?

Wednesday, 26th April 2023 at 12 pm GMT; Duration 1 hour

Organizer: John Damilakis, IOMP

Moderator: John Damilakis, IOMP

Speaker: Madan Rehani, PhD

Dr. Madan Rehani is Director, Global Outreach for Radiation Protection at the Massachusetts General Hospital, Boston. He was President, IOMP (2018- 2022) and is currently President IUPESM. He is a retired Professor of Medical Physics and also retired from the IAEA where he worked for 11 years. He was Head of the WHO Collaborating Center on Imaging Technology and Radiation Protection in India. Dr. Rehani is an Emeritus Member, International Commission on Radiological Protection (ICRP), having been active member for 24 years. He is author of 9 Annals of ICRP, 4 of which as Chair of the TG. He is Senior editor Br J Radiology and Assoc Editor, Eur J Medical Physics. He has more than 180 publications, has written 40 chapters in Books and edited 5 books. Besides medical physics & radiology journals, he has published papers in clinical journals e.g. JAMA Intern Med, Br Med J, Eur Heart J, Cardiovascular Imaging, Am J Gastroenterol, Circulation J, The Lancet.

Abstract:

Despite criticism, there is no way out from cumulative effective dose (CED) when several organs are involved, and we have to focus on the patient's radiation safety in addition to the technique dose. One

cannot close eyes to stochastic risks when patients are receiving cumulative doses in three digits of mGy of organ doses or three digits of mSv of CED in a short period of a few years. Scientists involved in studying radiation effects inform us that we have to sum doses from imaging exams performed at different times and they do not have gap correction factors for stochastic effects. Studies published in the last 3 years have brought new results, never before known. They have opened a new era where every one of us has the potential to contribute to enhancing patient radiation safety and the manufacturers have to do much more. The talk will deal with what lies ahead, which is more powerful than controversies.

IMPW 2023 Webinar: Micro-X CNT Emitters, X-ray Tubes, and Unique Imaging Applications

Tuesday, 25th April 2023 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak, IOMP

Moderator: Eva Bezak, IOMP

Speaker: Brian Gonzales, PhD

Brian is the Chief Scientist of Micro-X and the CEO of Micro-X Inc, the US subsidiary. Brian has a Ph.D. in biomedical engineering from UNC and NC State University and has published in multiple peer-reviewed scientific journals, focused on X-ray Computed Tomography using carbon nanotube (CNT) X-ray technology. Brian has worked with carbon nanotube X-ray technology from the early research at UNC, then lead early development of the technology at XinRay Systems, and then assisting in the transition to full commercialization of the technology at Micro-X in partnership with Flinders University and the University of Melbourne in Australia.

Abstract:

Micro-X has successfully developed the world's first carbon nanotube (CNT) based x-ray tube for medical applications. This unique technology achieves both the high x-ray current, and the stable x-ray output required for safe and effective medical imaging. The performance of Micro-X CNT tubes is achieved through two patented design features of the CNT emitter that differentiate the emitter for other field-emission emitters. In this presentation, Micro-X will present an overview of the emitter design and share

emitter data demonstrating the high current and stable performance. CNT x-rays are smaller and simpler compared to conventional x-ray tubes. CNT x-ray tubes are controlled by direct electronic voltage instead of the indirect thermionic control of conventional x-ray. These differences enable new imaging systems to be developed. In this presentation, Micro-X will overview the four different products Micro-X has designed taking advantage of the advantages of the CNT x-ray. This includes a lightweight mobile digital x-ray imaging system to bring x-ray directly to a patient bedside, an x-ray camera that creates two-dimensional x-ray backscatter images with the x-ray source and detector on a single side, a compact lightweight CT for early diagnosis of stroke, and a reimaged airport checkpoint based around a miniaturized CT baggage scanner.

IMPW 203 Webinar: Radiation Protection When Imaging Pregnant Patients: An ICRP Perspective

Monday, 24th April 2023 at 12 pm GMT; Duration 1 hour

Organizer: John Damilakis, IOMP

Moderator: John Damilakis, IOMP

Speaker: Kimberly Applegate, MD. MS

Dr. Kimberly Applegate is a retired professor of radiology and pediatrics from the University of Kentucky in Lexington.Kimberly is a member of the ICRP Main Commission of the International Commission for Radiological Protection (ICRP) as chair of Committee 3, focusing on radiation protection in medicine and also the National Council on Radiation Protection and Measurements (NCRP). She is active on multiple ICRP task groups including TG 108, 109, 113, 121, 124, and 126 and NCRP subcommittees—one on patient shielding in medical imaging and another on the stratification of equipment use and training for fluoroscopy. To improve safe and effective imaging care of children worldwide, Kimberly has been active in the Image Gently Campaign (now the Alliance) Steering Committee from its beginning in 2007.

Abstract:

The radiological protection community in medicine has long recognized the relative radiosensitivity of pregnant women and the fetus compared to the average adult patient. There are a number of serious

clinical conditions, including new cancer diagnoses, that occur during pregnancy and that require imaging procedures and radiation therapy that will be described. Further, there is continued evolution of our scientific understanding of radiation health effects, of societal values, and imaging protocols allow for improved radiological protection as long as local education/training and communication are provided for all stakeholders. However, there are varying levels of guidance, imaging protocols, and shared decision-making with women and their families. This webinar will provide an update on the ICRP work regarding this topic.

Women in Medical Physics (on the occasion of the International Women's Day)

Wednesday, 8th March 2023 at 12 pm GMT; Duration 1 hour

Organizer: Magdalena Stoeva and Eva Bezak

Moderator: Loredana Marcu

Title 1: Improving Women Health: the needs of medical imaging and the IAEA perspective

Speaker: Virginia Tsapaki, PhD

Medical Physicist (Diagnostic Radiology), Dosimetry and Medical Radiation Physics Section, Division of Human Health, Department of Nuclear Applications, International Atomic Energy Agency (IAEA)

Medical Physicist specialised in radiology at the DMRP Section, Division of Human Health, IAEA since August 2019. Since then, involved in multiple regional, national training courses, as well as various missions and activities related to human health. Scientific Secretary of 3 IAAEA publicaitons and contributor to 3 other related guidance documents. From 2004 until 2019, an IAEA expert sent in several missions, analysing data and publishing scientific papers from various IAEA surveys. Clinical experience for approximately 30 years with more than 150 publications in national/international journals/conference proceedings and more than 200 presentations/posters in national/international conferences. Participated in multiple European projects such as the Clinical Diagnostic Reference Levels, ENEN+ project, Basic Safety

Standards Transposition project, ENETRAP III, Paediatric Diagnostic Reference Levels, EUTEMPE-RX, EMAN, SENTINEL, DIMOND II/III research projects. Served as a chair or member of committees in international organizations (AAPM, IOMP, EFOMP, ESR, EURAMED). Chair of Organizing committee of 2 European conferences (2016, 2018).

Abstract:

The International Atomic Energy Agency (IAEA) assists Member States in nuclear sciences and applications to benefit human health and to ensure safe, high quality and effective medical uses of radiation. The overall goal of the IAEA Human Health programme is to build capacity and transfer technology for the prevention, diagnosis and treatment of diseases in radiation medicine according to best practices. Various activities to support the above efforts, relevant to improving women health are: a) Guidance documents, training and professional matters; b) Coordinated Research Activities; c) Development of training resources; and d) Clinical audit programmes. All these will be presented in more detail during the session.

Title 2: Pioneer women in medical physics from the Middle East

Speaker: Huda Al Naemi, PhD

Executive Director, Hamad Medical Corporation, A/Professor, Weil Cornel Medicine, Qatar

Dr. Huda has been working in Hamad Medical Corporation for almost 3 decades and she is the Executive Director of Occupational Health and Safety Department since 2006. Dr. Al Naemi represents Qatar in a number of international and global organizations such as; International Atomic Energy Agency (IAEA), IPEM and World Health Organization (WHO) and implement some of their projects at the national level. Dr. Al Naemi is an active member in many international organizations such as, European Society of Radiology(ESR), American Organization of Physicists in Medicine (AAPM), IOMP, Institute of Physics and Engineering in Medicine (IPEM) and, Gulf Nuclear medicine association.

In 2019 Dr. AlNaemi was appointed as Assistant professor of Medical Biophysics Research in Radiology at Weil Cornel Medicine (WCM). Dr. AlNaemi's role in WCM is to collaborate in education and training for medical students and to conduct research at the cutting edge of knowledge to provide the highest quality of care to the community. Dr. AlNaemi has collaborated on several research and educational projects including some funded by the Qatar National Research Fund (QNRF) and International Atomic Energy Agency (IAEA). These have led to several peer-reviewed publications, this research focused on radiation dose optimization in imaging modalities for patients including pregnant women and pediatrics. The two projects funded by QNRF were in collaboration with Massachusetts General Hospital and Harvard Medical School USA and Geneva University Hospital Switzerland.

Dr. AlNaemi was elected president of the Middle East Federation of Organization of Medical Physics (MEFOMP) for the term 2018 – 2022 and she is also the president of the Qatar Medical Physics Society (QaMPS) since 2018. As MEFOMP president Dr. AlNaemi led the MEFOMP efforts for the publication of a chapter in a published book on "Medical Physics during the COVID-19 Pandemic. In 2019 Dr. Al Naemi was awarded the Institute of Physics and Engineering in Medicine (IPEM) The Healthcare Gold Medal. In 2017 she was awarded the State Encouragement Award for Medical Sciences Category, Doha Qatar. In 2022 Dr. Huda received an appreciation from IOMP for her strenuous efforts in her work as president of MEFOMP from 2018-2022. In 2022 Dr. Al Naemi has been elected as a regular member of the IDMP, one of the IOMP committees.

Abstract:

Main Objectives

To Believe in ourselves as women and face the challenges

To do the maximum energy in work and giving

To be always optimistic and believe of better future.

Middle Eastern women have a very limited opportunity when it comes to professional career and they are thought to be better off staying at home taking care of the household. Yes indeed, such fact existed in the old days. It has rooted from the very own families of the Arabs and continued in primary school where girls and boys studies separately. There is an opportunity then for women, but it was limited only to teaching and nursing profession. But gone are those days; opportunities have opened for women. Slowly, the colleges started admitting women in the so-called "men field" especially in the healthcare industry.

Eventually, I started work in healthcare as senior radiation physicist then became the Executive Director of Occupational Health and Safety Department where I direct various health and safety sections including the Radiation Safety Section which was later named as Medical Physics Section. Being the only Medical

Physicist in Qatar then, I represented the country internationally and had the opportunity to work with various international organizations such as WHO, IAEA, UNEP to name a few, and has implemented some of their projects at the national level. It has always been my aspiration to further the advancement of the medical physics profession locally and regionally. I established the Qatar Society of Medical Physics (QSMP) and co-founded the Middle East Federation of Medical Physics (MEFOMP) which I also became the President in 2018-2021.

Title 3: Wearing more than one hat – is this the new fashion trend for women in medical physics?

Speaker: Iuliana Toma-Dasu, PhD

Medical Radiation Physics Division, Stockholm University and Karolinska Institutet, Cancer Center Karolinska, 171 76 Stockholm

Iuliana Toma-Dasu is Professor in Medical Radiation Physics and the Head of the Medical Radiation Physics division at the Department of Physics, Stockholm University, affiliated to the Department of Oncology and Pathology at Karolinska Institutet in Stockholm, Sweden, and the Editor in Chief of Physica Medica – European Journal of Medical Physics.

Iuliana Toma-Dasu studied Medical Physics at Umeå University, Sweden, where she also became a certified medical physicist and received a Ph.D. degree. In parallel with her involvement in the educational program for the medical physicists run at Stockholm University, her main research interests focus on biologically optimised adaptive radiation therapy, including particle therapy, modelling the tumour microenvironment and the risks from radiotherapy.

Abstract:

Achieving gender equality has been one of the objectives of the medical physicists' community in many European countries, as well as in many other places around the world. This objective has been partially reached, nowadays women in the medical physics being much less underrepresented than in other

physics fields. Becoming a medical physicist and performing clinical duties is, therefore, possible for many women due to the various strategies developed and implemented at institutional, national or international levels within the professional associations under the IOMP umbrella. Reaching, however, higher positions in the hierarchy on either clinical or academic side in medical physics is still a considerable challenge for women compared to men. The question therefore is: how many hats should a woman wear, how many accolades should she receive, how many merits should she prove, to be regarded as successful in medical physics and accede to a leading position? This talk would attempt to answer some of these questions while highlighting the importance of successful women in medical physics to share their experience to inspire others and help the policy makers develop the most successful strategies to continue the work towards offering the same opportunities to all genders in the medical physics field.

Carbon-ion Radiotherapy: Current Status and Future Perspective

Tuesday, 7th February 2023 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak, IOMP

Speaker: Taku Inaniwa, National Institute for Quantum Science and Technology, Japan

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Taku Inaniwa, Ph.D, is a group leader of treatment beam research group at the Institute for Quantum Medical Science, National Institutes for Quantum Science and Technology (QST) in Japan. His research focuses on developing dose calculation algorithms and biological models used for charged-particle therapy treatment planning. He has contributed more than 100 peer reviewed publications. He is a member of international scientific advisory board of Physics in Medicine and Biology. For his works, he has received several national and international awards. From April 2022, he has concurrently served as a guest professor at Division of Health Science, Graduate School of Medicine, Osaka University.

Abstract:

Charged-particle therapy with carbon ions (C-ion RT) has attracted growing interest due to their advantageous physical and biological characteristics. So far more than 40,000 patients have been treated worldwide. During the past three decades, C-ion RT has made remarkable progress in clinical and technological aspects. In my presentation, I would like to introduce physics, dosimetry, radiation biology, carbon RBE, and some clinical results of C-ion RT.

Safety Blinded or Safety Minded – Don't Learn Safety by Accident

Monday, 23rd January 2023 at 12 pm GMT; Duration 1 hour

Speaker: Chris Trauernicht, President of FAMPO

Chris Trauernicht is the head of the medical physics division at Tygerberg Hospital in Cape Town, South Africa, as well as an associate professor at Stellenbosch University. He is the current president of the Federation of African Medical Physics Organizations (FAMPO) and currently serves on the IOMP Accreditation Board.

Chris has north of 150 congress contributions and 30 papers, and he is a member of the editorial boards of "Advances in Radiation Oncology" and the "South African Journal of Oncology".

He serves as an assessor for the Health Professions Council of South Africa and has acted as examiner and convenor for the Colleges of Medicine of South Africa. The IAEA has appointed Chris as an expert on numerous occasions, including on the implementation of the Basic Safety Series for medical professionals, on the prevention of accidents and incidents in radiotherapy, and most recently on a regional training course to train the trainers in radiation safety culture (hence the idea for this talk).

Chris was the recipient of the 2020 "International Day of Medical Physics" award for his services to medical physics in the FAMPO region.

Abstract:

Should have, would have, could have… many healthcare professionals may be familiar with that sinking feeling when a preventable incident has slipped through the safety net and reached the patient. The incorporation of safety culture in healthcare can help prevent many adverse incidents and events.

Safety culture can be defined as “the assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance”. In fact, the Bonn Call for Action specifically proposed the strengthening of radiation safety culture as one of its ten main actions.

In 2021, the International Atomic Energy Agency published a booklet on safety culture traits and proposed ten traits – patterns of behaviour or thinking – that encourage the prioritization of safety.

The implementation of these traits is free, yet many systems fail to apply these characteristics effectively. In this talk a brief overview of the ten traits is given. The application of these will improve your institution’s safety culture.

Radiation Biology Updates: From Low Doses to Ultra-high Dose Rates

Thursday, 15th December 2022 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak, IOMP

Moderator: M Mahesh, IOMP

Topic 1: Low dose simulation: perspectives in radiation protection

Speaker: Andrea Abril, Profesora Asistente, Departamento de Física, Universidad Nacional de Colombia

Dr Abril is an Assistant Professor and Academic Coordinator for the Master of Medical Physics at Pontificia Universidad Javeriana (Bogotá-Colombia), and since 2022 she is an Assistant Professor (part-time) at Universidad Nacional de Colombia. She taught subjects such as Advanced radiation physics, Radiobiology, and Numerical Methods for MP which enabled her to integrate her experience in MC simulations with the radiobiological concepts, relevant to imaging optimization. Before that, She held a postdoc position where the main objective was to set up the proof of concept of the development made her my Doctoral thesis (Dr.Sc Universidad Nacional de Colombia 2018); a Hybrid device gamma-MRI that integrates dosimetric gel as a gamma radiation detector, the methodologies wrere based on MC simulations.

Abstract:

Doses over 100 cGy have been reported to have evident and consistent biological effects that the patient safety and radiation protection limits are based on it. However, low dose effects are still misunderstood.

The NCRP27 compiled relevant studies in which biological responses were reported, even though the effects are unrelated to each other.

The low reproducibility does not permit the determination of the effects observed in the risk models. The main recommendation to boost the knowledge barrier is to design specific experiments at low doses to reproduce the SF curves. DNA mechanistic simulations are a tool to perform in silico experiments under different doses and radiation conditions and to evaluate if they have considerable effects on the SF. These simulations can even distinguish the probability and specific damage reparation mechanism through the damage location to compare with biochemical in vitro assays.

Topic 2: The state of ultra-high dose rate (FLASH) radiotherapy: the rapid developments of a rapid therapy

Speaker: Nolan Esplen, University of Victoria, Canada

Nolan Esplen is a PhD candidate at the University of Victoria (Victoria, BC, Canada). As a member of the UVic XCITE lab, Nolan's active research interests pertain to the development of enabling technologies supporting delivery of novel preclinical modalities including spatially-fractionated and ultra-high dose rate (FLASH) radiotherapy. His recent work has found focus on physics and dosimetry within the context of ultra-high dose rate x-ray source development, including that of a megavoltage x-ray platform for FLASH radiobiological research at TRIUMF (Vancouver, BC). Nolan has been awarded a number of honors for his scientific contributions.

Abstract:

Renewed interest in the use of ultra-high dose rates (UHDR) in radiation therapy (RT) has been prompted by a growing body of literature supporting UHDR irradiation, or "FLASH", as a means to reduce normal-tissue toxicity when compared to irradiation at conventional dose-rates. The potential for improved normal-tissue outcomes (i.e. FLASH effect), paired with isoeffective tumor control and the ability to freeze

target motion, has thus made FLASH an attractive candidate for widening the therapeutic window in curative RT. However, while tissue-sparing effects have since been demonstrated across various animal models and radiation modalities (photons, electrons, protons), the radiobiological mechanisms which underlie the FLASH effect, and the beam parameters required to reproducibly elicit it, remain to be elucidated. Continuously updated knowledge has given rise to a number of competing or complementary mechanistic explanations and technologies for more accessible delivery and investigation into this exciting frontier. In this session, a general overview of FLASH radiobiological concepts and delivery techniques will be presented.

Growing Professional Recognition for Medical Physicists: Raymond Wu and IMPCB

Tuesday, 6th December 2022 at 12 pm GMT; Duration 1 hour

Organizer: Tomas Kron, IMPCB Nomination and Election Committee Chair

Moderator: Tomas Kron, IMPCB Nomination and Election Committee Chair

Speakers: Colin Orton, John Damilakis , Adel Mustafa, Ibrahim Duhaini, Art Boyer (Office bearers and Board members of IMPCB)

Abstract:

Raymond Wu has been instrumental in setting up the International Medical Physics Certification Board more than 10 years ago. As CEO he has guided the organisation through its rapid growing phase and the many ups and downs typical for an international organisation run by volunteers. IMPCB now has mature processes for accreditation of Medical Physics Certification Boards and certification of medical physicists in countries where no certification board exists. At the end of 2022 Raymond Wu will retire from his position as CEO and the present mini-symposium celebrates his contributions to IMPCB and medical physics.

IOMP Webinar on International Day of Medical Physics (IDMP) 2022

Monday, 7th November 2022 at 12 pm GMT; Duration 1 hour

Co-Chairman: John Damilakis & Ibrahim Duhaini

Invited Speakers		Organization
1.	Paddy Gilligan	EFOMP
2.	Arun Chougule	AFOMP
3.	Patricia Mora	ALFIM
4.	Chai Hong Yeong	SEAFOMP
5.	Christoph Trauernicht	FAMPO
6.	Meshari AlNuaimi	MEFOMP
7.	J. Daniel Bourland	AAPM- USA
8.	Boyd McCurdy	COMP- Canada

Joint IOMP-IFMBE Webinar on Clinical Engineering Day 2022: management and maintenance of medical technologies

Wednesday, 19th October 2022 at 12 pm GMT; Duration 1 hour

Organizer: Magdalena Stoeva, IOMP

Moderator: Francis Hasford, IOMP

Speakers: Ernesto Iadanza, IFMBE & Magdalena Stoeva, IOMP

Ernesto Iadanza, BME, CE, M. Sc., Ph.D., Senior Assistant Professor in Bioengineering (tenure-track) at the Department of Medical Biotechnologies, University of Siena, nationally qualified as Associate Professor in Bioengineering. He is currently a member of the International Federation for Medical and Biological Engineering (IFMBE) Administrative Council, and Chair of its Council of Societies. He received the IBM Faculty Award in 2013 and the IFMBE/CED Teamwork Award in 2019. Editor in Chief of the Clinical Engineering Handbook 2nd Edition, Academic Press, 2020. Associate Editor of many BME journals. Supervisor in 200+ graduation theses. Author of 190+ publications on international books, scientific journals, volumes, and conference proceedings.

Magdalena Stoeva, PhD, FIOMP, FIUPESM is the present Secretary General of the International Organization for Medical Physics (IOMP) and the International Union for Physical and Engineering Sciences in Medicine (IUPESM) and an Editor-in-Chief of the journal Health and Technology, jointly published by Springer and the IUPESM in cooperation with the WHO.

Dr. Stoeva has expertise in medical physics, engineering and computer systems at academic and clinical level, as well as organizational and international experience.

Prof. Stoeva's work is directed towards the technological advancements as a driving factor of contemporary healthcare.

IOMP – WHO Joint Webinar on World Patient Safety Day 2022

Wednesday, 14th September 2022 at 12 pm GMT; Duration 1 hour

Organizer: John Damilakis, IOMP

Moderator: Eva Bezak, IOMP

Speakers: John Damilakis, IOMP; Emilie van Deventer, WHO; Erik Briers, EPCC

Topic 1: Medical Physicists' Impact on Patient Safety

Speaker: John Damilakis, MSc, PhD, FIOMP, FIUPESM

John Damilakis is professor and chairman at the Department of Medical Physics, School of Medicine, University of Crete and director of the Department of Medical Physics of the University Hospital of Heraklion, Crete, Greece. He is President of the 'International Organization for Medical Physics' (IOMP), Past President of the 'European Alliance for Medical Radiation Protection Research' (EURAMED), Past President of the 'European Federation of Organizations for Medical Physics' (EFOMP) and Past President of the 'Hellenic Association of Medical Physics'. Prof. Damilakis is a member of the ICRP Committee 3 and member of the steering committee of the 'EuroSafe Imaging Campaign' of the European Society of Radiology. He is coordinator or an active research member of several European and national projects. As a Visiting Professor he has given lectures on dosimetry and radiation protection in Boston University, USA. His publications have been focused on medical radiation protection and dosimetry and, recently, also on

Artificial Intelligence in medical imaging. He is editor, author or co-author of several books. Number of publications in PubMed: 243, number of citations: 8286, h-index 48 (Google Scholar). He has received several awards for his work.

Abstract:

Medical Physicists are essential healthcare professionals working in varied settings such as hospitals, industry, academia, research institutions, and national radiation protection competent authorities. Regardless of where they work, all medical physicists contribute to safe and quality health care. In radiation safety, a combination of practices and measures are applied to ensure that patients are not exposed unnecessarily, and radiation use is justified. This presentation will summarise the key categories of patient safety issues and provide information about what medical physicists can do to promote patient radiation safety.

Topic 2: Patient Safety: A WHO perspective

Speaker: Dr Emilie van Deventer

Dr Emilie van Deventer is the Head of the Radiation and Health Unit at the World Health Organization in Geneva, Switzerland. This programme covers the public health aspects of both ionizing and non-ionizing radiation safety and provides information and guidance to national authorities on radiation protection and health. She is responsible, inter alia, for the WHO International EMF Project, the Global UV project and radon activities. Before joining WHO in 2000, she was a chaired professor of Electrical and Computer Engineering at the University of Toronto, Canada. She holds a PhD from the University of Michigan, USA and an honorary doctorate (doctor honoris causa) from the University of San Marcos, Lima, Peru.

Abstract:

Patient safety is a fundamental principle of health care and is now being recognized as a large and growing global public health challenge. Patient safety is a framework of organized activities that creates cultures,

processes, procedures, behaviours, technologies and environments in health care that consistently and sustainably lower risks, reduce the occurrence of avoidable harm, make error less likely and reduce its impact when it does occur. Recognizing the huge burden of patient harm in health care, the 2019 World Health Assembly adopted a resolution on "Global action on patient safety", which endorsed the establishment of World Patient Safety Day, to be observed every year on 17 September; and recognized "patient safety as a global health priority". The theme of World Patient Safety Day 2022 is "Medication Safety", emphasizing the need to adopt a systems approach and promote safe medication practices to prevent medication errors and reduce medication-related harm. In the context of radiation safety, it is important to address quality and safety in the use of radiopharmaceuticals, both in terms of manufacturing and administration/use.

Topic 3: Radiation without harm: Patient's perspective

Speaker: Dr Erik A.M. Briers, MS, PhD

Dr Erik Briers holds a doctorate in Chemistry from the University of Leuven, Belgium. Since his promotion in 1979 he has been involved in laboratory medicine. He founded in 1982 the diagnostic company Eco-Bio diagnostics and served as its CEO until 1990. In this function he developed a diagnostic test for the detection of Aspergillus antigens with a fast assay allowing the potential curative treatment of patients with disseminated aspergillosis, a deadly disease. This test has been approved by the FDA. He has been a guest lecturer for the subject "Applied immunology" within the Master study programme Biochemical Engineering at the University of Leuven 2009-2016. Erik Briers was the Executive Director of the European Cancer Patient Coalition (ECPC) (2012-2013) and ad interim executive director of EPPOSI (The European Platform for Patient Organizations Science and Industry) (2014). He was active at the European Medicine Agency (EMA) at the Patient and Consumer working party (PCWP) and later was appointed by the EU commission as an alternate patient member of the Committee on Advanced Therapies (CAT) (2016-

2019). He is board member and vice chairman of Europa Uomo. He is a member of the Guidelines Panel on the treatment of prostate cancer of the European Association of Urology (EAU) since 2013. He is since 2013 member of the patient advisory board of the European Society of Radiology (ESR-PAG) and has given many presentations at the occasion of the yearly European Congress of Radiology (ECR). He is vice-president of Us Too Belgium and the chief editor of PROSTAATinfo the magazine of the organization. He serves as a member of advisory boards of several scientific organizations.

Abstract:

Radiation is used in medical applications in imaging, treatment, or as a guiding tool for interventions. The objective is to contribute to the health outcome and the guiding principle is as always “do not harm”. But radiation by itself can cause harm, depending on the energy and the dose but also on the kind of carrier, photons, electrons etc.

It is a guiding principle that the benefit of a “use” should always outweigh the possible harms or side effects. Thus, when the objective is a screening of apparently healthy individuals for a potentially serious disease such as cancer with a prevalence of some percent the dose should be as low as technically possible. The dose used to treat the discovered cancer on the other hand can be much higher because now we want to harm the cancerous tissue.

The discussion on what is a harmful dose will always depend on the purpose of the application and is to be discussed with the patient, or in case of screening with the healthy individual.

Fractionated radiotherapy and its synergistic relationship with immunotherapy

Tuesday, 21st June 2022 at 12 pm GMT; Duration 1 hour

Organizer: Eva Bezak, IOMP

Moderator: Eva Bezak, IOMP

Speaker: Rebecca D'Alonzo, PhD Candidate

Rebecca D'Alonzo is a PhD candidate at the School of Physics, Mathematics and Computing, University of Western Australia, Australia. Rebecca is a 3rd year PhD student at the University of Western Australia. She completed her Bachelor of Science at UWA, majoring in Physics and Pathology. She the graduated from Masters of Medical Physics where she won the Master of Physics Medical Physics Prize in 2018. Rebecca is passionate about pre-clinical research, using novel radiotherapy and imaging devices to better understand cancer and how to improve treatment outcomes. Rebecca has also won numerous awards for her research presentations. .

Abstract:

Malignant tumours have decreased oxygenation due to malformed blood vessels. Hypoxia decreases the effectiveness of radiotherapy (RT), and the abnormal vessels prevent both systemic therapies and immune cells from reaching areas of the tumour. This study quantified the alterations of the tumour microenvironment (TME) that can be achieved with varying RT fractionation. The objective was assess the

changes in vasculature normalisation and reoxygenation that can be achieved with localised RT. The optimal RT was then combined with various immunotherapy schedules, to find the immunotherapy + RT combination that improves treatment outcomes.

AB1-HA mesothelioma tumour cells were subcutaneously injected into BALB/cJAusbP mice. Mice underwent RT fractionation with a small animal RT device. Starting 10 days post-inoculation, mice received various RT fractionations. Fractions were delivered on consecutive days. On day 15 mice underwent hybrid optical and Doppler ultrasound imaging with a LAZR-X photoacoustic imaging instrument to assess the vasculature and oxygen saturation concentration within the tumour. Imaging continued every second day, until day 29 post-inoculation. The RT fractionation schedule that resulted in the most TME alterations was then combined with various immune checkpoint inhibitor (anti-PD1 and anti-CTLA-4) schedules to find the optimal treatment combination. Mice with cured primary tumour then underwent tumour rechallenge.

Alterations to the TME were observed following different RT fractionation schedules. Imaging showed the most significant increase in vascularisation and oxygen saturation for 2 Gy x 5 fraction. This fractionation schedule was then combined with immunotherapy given at varying timepoints. Immune checkpoint inhibitors given concurrently with RT resulted in the most tumours cured, and lead to tumour rechallenge resistance.

RT fractionation can be used to modulate the TME. This has the potential to be exploited to prime the tumour for susceptibility to other treatments, especially immune checkpoint inhibitors.

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