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for Medical Physics Bulletin

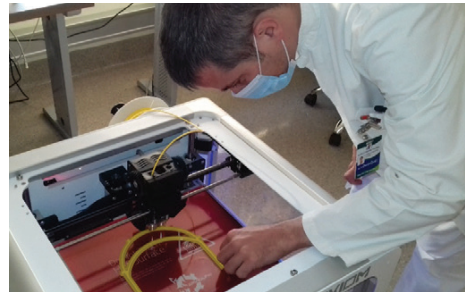
European Medical Physics News

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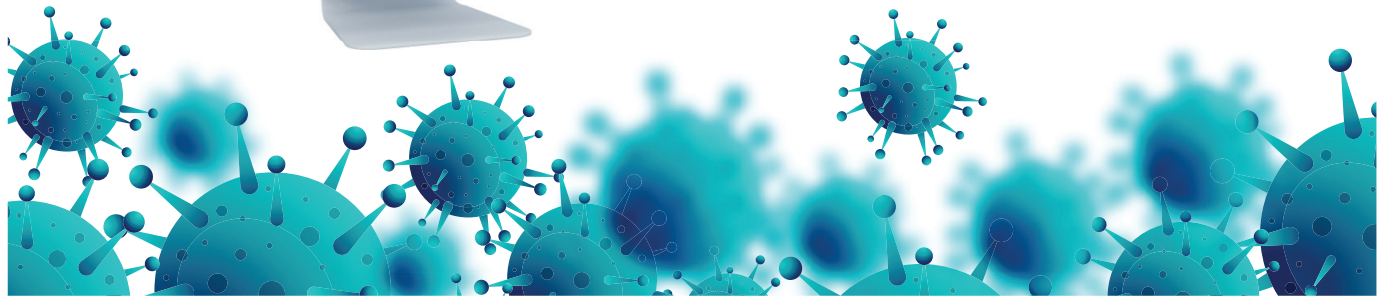
Medical Physics during the COVID-19 pandemic



Online
Lockdown
lectures
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3d-printing
face shields
in Serbia
(p24)



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Editorial

I am writing this editorial message in late May 2020. It would be an understatement to say that a lot has happened in the three months since the Spring 2020 issue of this newsletter was published! Although, back then in early March, we certainly knew that something was on the horizon, I don't think any of us were aware of what a profound effect the COVID-19 pandemic would have on almost every aspect of our working and domestic lives. Now, at the time of writing, the pandemic would appear to be on the wane (at least in Europe), though significant social restrictions remain in place in many countries and are likely to affect our lives for quite some time to come.

One casualty of the pandemic has been our ability to get together to present and discuss our science at national and international conferences. Our own congress, the 3rd European Congress of Medical Physics (ECMP 2020), originally planned for September 2020 in Turin, will now take place at the same fantastic Lingotto location in June 2021. In his President's Message, Marco Brambilla discusses the detailed reasoning behind the postponement, while in another article, ECMP 2020 President, Mika Kortensniemi, writes about the congress.

The ingenuity and resourcefulness of our medical physics community during the pandemic is very much in evidence in this issue, especially in the four articles labelled as "COVID-19". As featured on the front page and in one of the pieces, a group of medical physicists in a Serbian hospital put their talents to excellent use by 3d-printing face shields. Another article describes how a northern-Italian medical physics department adapted to the pandemic. EFOMP itself has been at the forefront of activities as well: a COVID-19 forum on our web site was established early on and has been an extremely useful and popular resource. In the absence of in-person meetings, the Irish Association of Physicists in Medicine, together with EFOMP, established a series of "Lockdown Lectures" which were streamed to the community (and are now available as recordings), as described in an informative article by co-organisers Paddy Gilligan and David Lavin.

Thanks to our many talented and eager contributors, this issue contains a fantastic selection of interesting non-COVID articles too. This includes the first of a regular series by Physica Medica's Editor-in-Chief, Paolo Russo, in which he highlights papers recently published in the journal. You can find articles from two of our Baltic state NMOs, describing medical physics education and career progression in Lithuania and in Estonia. Our popular series on medical physicists' hobby activities is represented by two extremely diverse activities, namely organic olive oil production in Greece and choral singing in Serbia! I am delighted that the AURORA Young Minds team from the Czech Republic have contributed another comic strip; this time, their friendly cartoon lion discusses his nuclear medicine scan over a pint of beer with a friend. Last, but certainly not least, the results of the latest EFOMP photo contest are announced in this issue.

Finally, it is definitely worth mentioning that 2020 marks the 40th anniversary of the founding of EFOMP! We are planning to feature the anniversary in the Autumn 2020 issue of EMP News, but there is no harm in starting our celebrations early! To that end, as the first "EFOMP@40" event, EFOMP held a bake-an-EFOMP-birthday-cake competition, the results of which can be found in this newsletter.

I hope you will enjoy reading this issue of European Medical Physics News!

David Lurie and the Editorial Team
(pubcommittee@efomp.org)
May 2020



David Lurie holds a Chair in Biomedical Physics at the University of Aberdeen, UK, where he has researched and taught MRI Physics since 1983. In 2017 he was awarded the Academic Gold Medal of IPEM. David Lurie is Chair of the Communications and Publications Committee of EFOMP and Vice Chair of the Course Accreditation Committee of IPEM.

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EFOMP President's Message

ECMP 2020 postponement: why and how the decision was taken.

I am writing this message in the midst of the COVID-19 pandemic, which is affecting us all and everything we do, at work and at home. Much has been written about the pandemic so I will not go into details here, suffice to say that I am very proud of the ways in which medical physicists have been contributing to the efforts against the virus, as described elsewhere in this issue of EMP News.

I would like to focus, instead, on a practical outcome of the pandemic, namely the postponement of the 3rd European Congress of Medical Physics (ECMP 2020), our flagship conference, which will now take place in June 2021.

The decision to postpone ECMP 2020, which was planned from 23rd-26th September 2020 at the Lingotto Conference Centre in Torino, Italy was taken unanimously by members of the ECMP Congress Planning Committee (CPC) at their meeting on 14th April 2020. During the previous week, the information coming from the Local Organizing Committee made it clear that holding the in-person Congress in September 2020 was no longer an option. Italy, the organizing country, and Spain, the welcome country, have been among the worst affected by the COVID-19 pandemic and had therefore expressed a need to postpone ECMP 2020 to the next year, to enable them to overcome this challenge.

At that point, we only had two options:

1. Cancel the European congress, pay the significant penalties associated with a cancellation and leave our Italian colleagues alone.
2. Postpone the Congress until 16th-19th June, 2021. The Local Organizing Committee informed us that this was the only available slot at the Lingotto Conference centre in 2021. It came as no surprise that the Torino venue was already almost fully booked, because it had been necessary to move all its 2020 events to 2021, due to the extraordinary coronavirus spread in North Italy.

The decision of the CPC was in favour of postponement for several reasons:

- The first and the most important is that we, as EFOMP, could never have left one of our NMOs (AIFM) alone to face the consequences of these unprecedented events.
- The second is that for a very new initiative such as the ECMP (ECMP2020 would be the 3rd European Congress), cancellation could have been catastrophic.
- The third is at the time of postponement around 450 abstracts were already submitted and we did not want to disappoint all the colleagues who see ECMP among the most interesting events in the field of Medical Physics and had chosen ECMP to submit and present their work.
- The fourth is that many industrial partners had already signed up to support the congress through sponsorship and participation in the associated exhibition; it was very important to preserve our excellent relationship with them and to provide an equivalent opportunity for them at the rescheduled congress.

This postponement is a fully-equivalent replacement for the planned event originally scheduled for September 2020 and for this reason we decided to leave the original name of the event "ECMP 2020".

Unfortunately, the available dates were in superimposition with those of the Spanish Congress of Medical Physics, organized as a joint event in conjunction with the Spanish Society of Radioprotection. The Spanish Society of Medical Physics, with a generous gesture, brought forward their 23rd Congress to make it possible for the Spanish colleagues involved in the ECMP to participate in both congresses. We really appreciate and acknowledge the sense of accommodation demonstrated by the SEFM!

→

EFOMP President's Message

ECMP 2020 postponement: why and how the decision was taken.

Moreover, we acknowledge that there will be a proximity with the World Congress (WC) on Medical Physics & Biomedical Engineering organized by IUPESM in Singapore from 30th May – 4th June 2021. We are willing to find solutions to build bridges in a new way also regarding the WC and ECMP events. This will not combine the events in one location (which in any case would not be realistic for many reasons) and will not take the unique role from either event (which would not be desired or allowed), but it could strengthen both events and build bridges between them during this challenging time.

We would like to heartily thank the President of the ECMP Congress, Prof. Mika Kortensniemi and the members of the Scientific Committee who gave us their availability to face a prolongation of their term of service in ECMP with the associated work.

We would also like to express our sincere thanks to our invited speakers, participants and industry partners for their understanding, continuous support and flexibility. Most of our industry partners have already expressed their ongoing commitment and are fully on-board for ECMP 2020 in June 2021.

One lesson can be learnt from these events and it has already been expressed by Mr. Winston Churchill in a speech delivered in 1946 at the University of Zurich: "If Europe were once united in the sharing of its common inheritance there would be no limit to the happiness, prosperity and glory".

This was our intent. This is our mission. This is what we tried to do also in these difficult times.



Dr. Marco Brambilla
President of EFOMP
Head of Medical Physics Department, University Hospital of Novara, Italy

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Lingotto Conference Centre



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 UPCOMING MEETING ANNOUNCEMENT

Third European Congress of Medical Physics – ECMP 2020



A view to Mole Antonelliana in Torino. (Photo: City of Torino - Enrico Aretini)

Dear Colleagues,
We hope that you and your families are well during this challenging time. We have all faced the worldwide pandemic and have been forced to adjust our everyday life to various precautions and isolation. Social distancing and emerging financial effects are affecting us as individuals and as entire nations. It is clear that we will need time to recover. As with many professional societies and congress organisers, we had to make a hard decision based on our best judgement, resulting in the **postponement of the third ECMP by nine months. While doing so, we remain firmly committed and forward-looking to ECMP 2020 which will be held in Torino, Italy, June 16th -19th, 2021.** The ESMPE pre-congress meetings will also be postponed and will take place on 16th June 2021, immediately before the ECMP.

This postponement is a fully-equivalent replacement for the planned event originally scheduled for September 23rd-26th,

2020 and for this reason we decided to leave the original name of the event, “ECMP 2020”. The congress slogan – embracing change, sharing knowledge – will carry even more profound meaning in our changed world.

We warmly acknowledge our participants, invited speakers and industry partners for their understanding, continuous support and flexibility in this uncharted situation. Most of our speakers and industry partners have already expressed their ongoing commitment to ECMP 2020 in June 2021.

As we move forward with our adjusted congress planning, we would like to provide the following information for participants who already made arrangements for September 2020.

Registration fees for the ECMP and the ESMPE pre-congress meetings will be unchanged for the new congress date. Registration for ECMP 2020 (taking place in June 2021) remains open.

Abstracts:

If you have already submitted abstract(s) for ECMP you will be contacted by the ECMP secretariat, who will offer the following three opportunities:

- You may keep the abstract as originally submitted;
- You may modify the abstract;
- You may withdraw the abstract.

Registration:

If you have already registered for the Congress you will be contacted soon by the ECMP secretariat, who will offer the following two opportunities:

- You may keep your registration in place (and in that case no action is required from your side);
- You may withdraw your registration, with a full refund of the registration fee.

Accommodation:

- If you arranged accommodation through the ECMP secretariat, your booking will be automatically transferred to the new dates (if you are keeping your registration) or cancelled (if you choose to withdraw your registration), with no fee.
- If you arranged accommodation yourself for September 2020, you should contact the hotel or agency with which you booked, to discuss their policy on date changes or cancellation.

Travel:

- Most airlines have policies in place regarding date changes or cancellations arising from changed circumstances due to COVID-19. You are advised to contact your travel provider directly.

We would like to remind you that Physica Medica – European Journal of Medical Physics (EJMP), will publish a focus issue containing up to 50 selected papers from contributions (oral or poster) from ECMP 2020. The papers will be selected by the guest editors and the editor-in-chief on the basis of the high scientific quality of the presentations.

You may find further information on the congress web page (www.ecmp2020.org) and the EFOMP web page (www.efomp.org) as well as social media (LinkedIn, Facebook, Twitter, Instagram) for constant updates.

Our core aim is to maintain and strengthen the European community of Medical Physics. Our Congress is an excellent occasion to do so. Therefore, we are already looking forward to welcoming you to Torino in June next year!

Stay safe,

Mika Kortesiemi, President of ECMP 2020



Dr Mika Kortesiemi works as the Chief Physicist and Adjunct Professor in the HUS Medical Imaging Center, University of Helsinki, Finland. His professional focus is on the quality assurance, dosimetry, optimisation and radiation protection in x-ray modalities, especially the evolving CT technology. The research work is primarily related on radiological optimisation, utilizing anthropomorphic phantoms and Monte Carlo simulations. Dr Kortesiemi is the past-chair of EFOMP Science Committee. In addition to his primary position in HUS Medical Imaging Center, Dr Kortesiemi is also involved in IAEA, ICRP and ESR collaboration, and quality audits in radiology.

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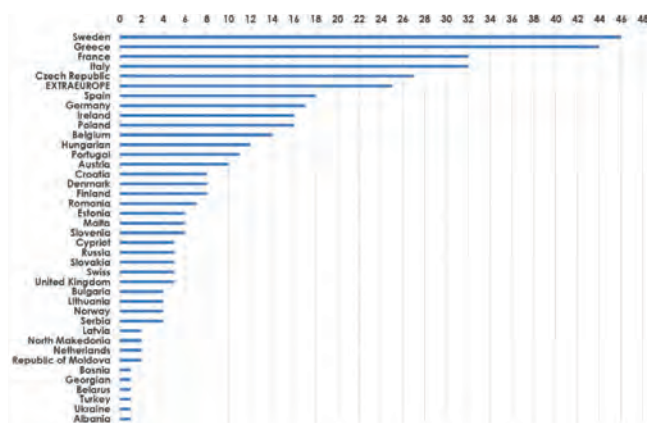
School for Medical Physics Experts

Update on activities

Since 2013, the EFOMP School for Medical Physics Experts (ESMPE) has been organising educational and training events for those Medical Physicists who desire to move towards the achievement of MPE status.

ESMPE events are open to Medical Physicists and are accredited by the European Board for Accreditation in Medical Physics, ensuring that they are performed at the required educational level (Level 8 of the European Qualifications Framework). ESMPE is committed to document, implement and maintain the quality of its management and delivery, constantly improving effectiveness so that the service to each MP student is ensured.

Up to now, ESMPE has organised a total of 16 Schools, with seven courses delivered on Nuclear Medicine, five in the area of Diagnostic Radiology, three courses in Radiotherapy and one course on general medical physics. Year-on-year, interest and participation have steadily increased: to date, the courses have been attended by more than 400 participants, coming from all over Europe, along with 25 participants from non-European countries; the geographical distribution is shown below.

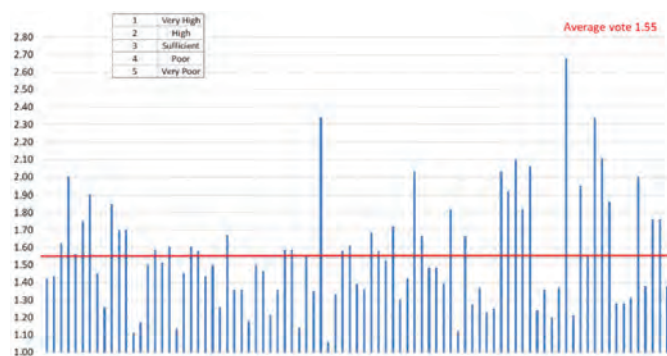


Geographical distribution of participants at ESMPE Schools

Student feedback is a very important tool to monitor and improve the quality and effectiveness of our courses. At the end of each course, each student is asked to complete a comprehensive questionnaire.

All the while, the ESMPE Board have been evaluating the quality of the courses through analysis of students' responses. The questionnaires were carefully designed to evaluate the quality of the topics covered, the individual lessons, the speakers and the organisational aspects of the course. A rating scale of 1 to 5 has been used (1 being best); typical results illustrating students' evaluation of speakers are shown in the chart below, indicating that the majority of speakers are evaluated very highly.

Taking the results of questionnaires returned by participants of the 16 Schools conducted to date, 96% of attendees rated the overall quality to be either Very High (64%) or High (32%). There has been a great level of professional appreciation and satisfaction in what we believe to be the central aspects of courses, namely the speakers and the content. On the organisational side, the questionnaires have told us that the use of Dropbox



Students' evaluations of speakers

for the exchange of teaching material was appreciated by students, as acknowledged by 75% of the participants.

Nevertheless, there is always room for improvement. Participants have asked for more frequent practical sessions and earlier availability of the teaching material; the ESMPE Board is working to address these issues.

An important development is that all the recent ESMPE courses were recorded (audio and video) and are now available on the EFOMP e-learning platform, which is accessible to all Individual Associate Members of EFOMP. Information on the e-learning platform [can be found by following this link](#). Individual Associate Membership (annual subscription only €15) [is described here](#).

As with many activities, ESMPE has been affected by the COVID-19 pandemic. Courses that were scheduled to take place immediately prior to the European Congress of Medical Physics, originally planned for September 2020, will now occur prior to the rescheduled Congress, in Turin, Italy in June 2021. The next ESMPE course will be "Statistics in Medical Physics", which has been re-organised for 19-21 November, in Athens, Greece. Details of all ESMPE events can be found on the EFOMP web site's [ESMPE events page](#).

Online education and training open up exciting new training opportunities that will be strengthened in the near future. In addition to online courses, the ESMPE Board is considering

whether and how monothematic webinars can be programmed and be part of EFOMP's e-learning platform. More information will be provided, via the EFOMP web site, in due course.

Finally, as Chair of ESMPE I would like to thank my colleagues for the preparation and analysis work presented in this article, especially M. Brambilla, President of EFOMP - Department of Medical Physics, Novara, Italy; J. Ptáček, Secretary General of EFOMP - Department of Medical Physics and Radiation Protection, University Hospital Olomouc, Prague, Czech Republic; E. Artuso, Department of Medical Physics of ASST Fatebenefratelli Sacco, Milano, Italy

Alberto Torresin, PhD

Chair of ESMPE

“ESMPE has organised a total of 16 Schools, with seven courses delivered on Nuclear Medicine, five in the area of Diagnostic Radiology, three courses in Radiotherapy and one course on general medical physics. Year-on-year, interest and participation have steadily increased: to date, the courses have been attended by more than 400 participants”



Dr Alberto Torresin is the Head of Medical Physics Department in the Physics Faculty, ASST Grande Ospedale Metropolitano Niguarda and Visiting Professor at the University of Milano, Italy. His professional focus is on the patient dosimetry, optimisation and radiation protection in x-ray modalities, quality assurance, imaging for radiotherapy, MRI, advanced MRI (fMRI, DTI) for planning in Neurosurgery. His research work is primarily related on radiological optimisation, currently emphasising the use of dose tracking and multicentre CT and angio exposure tracking. Dr. Torresin is one of the coordinators of the EFOMP Working Group for QA protocol in Digital Mammography and CBCT and the AIFM Working Group on Dose exposure. He is a member of the European Commission Initiative on Breast Cancer, Guidelines Development Group and is Principal Investigator of the projects “DataLake images (CT-RX) and clinical data of COVID19 patients” and “PREP Procedure Radiodiagnostiche in Età Pediatrica”.

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MoU signed between EFOMP and EURADOS



We are happy to announce the signing of a Memorandum of Understanding (MoU) between the European Radiation Dosimetry Group (EURADOS) and the European Federation of Organisations for Medical Physics (EFOMP), in order to establish the terms of our long-term collaboration.

The MoU was signed on 1st May 2020 by the EURADOS Executive Board Chair, Filip Vanhavere and EFOMP's President, Marco Brambilla. This MoU officially reflects the willingness to advance collaborative ideas between the two organisations.

EURADOS is a non-profit organisation for promoting scientific understanding, technical development and innovation of all dosimetric aspects regarding ionising radiation. The major fields of interest cover radiation protection, radiobiology, medical diagnostic imaging and radiation therapy. The aim of EURADOS is to stimulate the collaboration between European organisations in the area of dosimetry of ionising radiation, which was warmly embraced by EFOMP.

This MoU sets out the terms and understanding between EFOMP and EURADOS to facilitate collaborative activities that are mutually beneficial for both organisations, especially but not limited to:

- Individualised dosimetry in all fields of medical dosimetry: Diagnostic Radiology, Nuclear Medicine, Molecular therapy, Radiation therapy, Radiation biology, Hadron therapy;
- Improving radiation protection of workers and the public;
- Education and training.

We also want to share with you the enthusiasm of our team for the idea of working side-by-side with EURADOS in common projects. We are looking forward to strengthen and advance the interests and activities of each organisation, and continue to promote excellence in our shared research, education, and marketing strategies in the aforementioned topics.



Oscar Casares Magaz

Chair of the EFOMP European Matters Committee

Oscar Casares-Magaz is a Medical Physics Expert educated and trained in Spain. After that he came to Aarhus University Hospital (Denmark), where he completed his Ph.D. (2013-2017) on image-based radiotherapy response modelling. In 2018 he became a postdoc at the Danish Center for Particle Therapy, with a project focused on using MRI to describe cognitive changes after proton therapy for paediatric brain tumors. Since mid-2019 he has worked in industry.



Loredana Marcu

Vice chair of the EFOMP European Matters Committee

Loredana Marcu is Professor of Medical Physics at the University of Oradea, Romania and Adjunct Professor at School of Health Sciences, University of South Australia. She is a radiotherapy medical physicist, being educated and trained in Adelaide, South Australia. Since 2018 she is the president of the Romanian College of Medical Physicists (CFMR).

X-rays and eye lens dose in interventional radiology

Advice from the EURADOS annual meeting, held in January 2020 in Italy



Group photograph of the participants in the EURADOS meeting. The organisers were Francesco Rossi, AOU Careggi, Firenze (Italy), Marco Carezana, Politecnico di Milano (Italy) and Isabelle Clairand, IRSN (France).

The European Radiation Dosimetry Group (**EURADOS**) is a non-profit association promoting research and development and European cooperation in the field of the dosimetry of ionizing radiation; EURADOS voting members are laboratories concerned with carrying out or promoting scientific research in dosimetry.

The annual EURADOS meeting is perhaps the main occasion for discussion within the association. It takes place over one week during which several sessions dedicated to the various topics of dosimetry are held. This year the EURADOS Annual Meeting took place in Firenze, Italy from January 27th- 30th. Over 300 people from all over the world participated in the 2020 edition, with sponsorship from the main companies in the sector. Furthermore, the meeting included the 13th EURADOS Winter School, devoted this year to the hot topic of eye lens dosimetry.

Eye lens dosimetry was chosen as a hot topic for 2020 because of the large reduction in the effective dose annual limit to the crystalline lens provided for by the Euratom Directive 59/2013. The factor is reduced by about 7.5 times. This reduction leads to the need to answer many operational questions, especially for the monitoring of the most exposed workers, namely: what workers need to be monitored directly, i.e. with an additional device? Which devices to use, taking into consideration that some may interfere with the doctor's activity in the medical environment?

How to calibrate them? What protective devices must workers use? Is it possible to obtain sufficiently accurate dose estimates by numerical simulation? In fact, in addition to the reduction of the dose limit, the Euratom Directive 39/2013 leaves a margin of only 5 mSv between the dose limit to the lens of the population and that of the exposed personnel, making it necessary to have a strong reduction in the measurement uncertainty that was tolerable when this difference was over 130 mSv.

Many talks were presented by scientists from all over the world. Radiobiology and dose limits were described, as well as the state-of-the-art of European projects and of national regulations. Talks focused on which quantities to measure to estimate the dose to the lens and on the presentation of new shielding systems. The doctor's point of view was described by a cardiologist who works in a catheterization lab, who explained the clinical rationale of many procedures involving the use of x-rays. This talk was much appreciated, as it showed the importance of sharing experience and practices among different professionals like cardiologists, dosimetrists and medical physicists. The results of a large inter-comparison study designed to identify the best measuring devices for estimating the dose to the lens was also presented. It emerged that, if it undergoes proper type testing, a dosimeter originally designed to measure surface dose is supposed to give very good results in measuring eye lens dose.



Francesco Rossi

Francesco Rossi is a medical physicist at the Careggi University Hospital in Firenze, Italy, where he also acts as RPE. He has been a member of the Italian Association of Medical Physics since its foundation. Francesco currently runs the Individual Dosimetry Service at the Careggi Hospital. The Service has been ISO 17025 ("test laboratory") accredited since 2016; it was the first Italian public dosimetry service to achieve such recognition.

IBA Dosimetry: Clinical Experience with SMARTSCAN™ Automated and Guided Beam Scanning Error Detection Capabilities

Interview with S. Fletcher & J. Haynes, University Hospitals Bristol NHS Foundation Trust, UK



Linear accelerator (linac) commissioning ensures that treatment machines are fully functional and safe for clinical use. Water Phantom tests are also conducted after servicing, system updates and as part of annual checks. *“For any major equipment change, we need to verify that everything is behaving as expected because this data is shared with the TPS,”* explains Sally Fletcher, a medical physicist at University Hospitals Bristol NHS Foundation Trust, UK.

Commissioning data is then fed into the TPS model. *“You need to be sure that this model is correct for all energies available on the linac across different field shapes,”* says Jackie Haynes - a principal clinical scientist working alongside Fletcher. *“Therefore, it’s necessary to carry out hundreds of test scans and dose measurements.”*

Data collection is conducted with a water phantom and a detector that scans across the beam. With many combinations of linac parameters to scan and to evaluate, the commissioning work can take weeks to complete.

However, SMARTSCAN developed by IBA Dosimetry in Germany can automate and guide the user through the beam commissioning and helps to optimize the workflow. Fletcher and Haynes – who have commissioned multiple linacs – have tested SMARTSCAN at their centre.

As part of the testing process, they deliberately included errors in the linac setup to see how well SMARTSCAN was able to spot the mistakes. *“Happily, it noticed them all,”* reports Haynes.

→

SMARTSCAN highlights any suspicious data and indicates the severity of the problem based on user set tolerances. The software also suggests possible causes of the error – an advantage also when used as a commissioning training tool.

“It’s a useful feature that has the potential to become even smarter in the future,” adds Fletcher.

Before launching the main queue, SMARTSCAN conducts a series of baseline measurements to check the water tank level, the gantry angle position and many other parameters.

Next SMARTSCAN runs a series of preliminary scans, which double-checks that all water phantom and linac settings are perfect before proceeding with the full scanning. *“Here the system is looking for beam symmetry,”* Haynes comments. *“It means that you can be confident that your setup is configured to gather good data when you begin the scanning.”*

During the actual commissioning scans, SMARTSCAN prompts users when the linac needs adjusting - for example, if machine settings weren’t updated correctly for

the next test scan. In addition, electrometer signal normalization is automated following each change of field size, energy or detector position. *“The software is continuously measuring the quality of the inputs and will alert you in real time if a detector is becoming too noisy, or whether another sensor would be more appropriate, so that you can remedy the issue promptly,”* Haynes comments. *“It saves you from carrying out a long series of measurements only to discover issues later on when you analyse that day’s data back in the office. Commissioning doesn’t happen that often, so it’s helpful to have a guided workflow, especially for team members that may not have experienced the installation of a new machine,”* says Haynes.

SMARTSCAN also optimizes the scanning order and speeds up the scanning process.

“As you go along, the commissioning software will tell you whether you are matched to your gold standard,” says Fletcher.

For more information and user presentations on SMARTSCAN visit <https://www.iba-dosimetry.com/radiation-therapy/smartscan/>



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First International Medical Physics Week (#IMPW), 11th-15th May 2020

EFOMP's Efi Koutsouveli and Petter Wilke write about EFOMP-related activities during IOMP's International Medical Physics Week

Earlier this year, the President of the International Organization for Medical Physics (IOMP) Madan M. Rehani, announced that IOMP decided to launch their first International Medical Physics Week (IMPW) as an extended version of the already established and appreciated International Day of Medical Physics (IDMP).

The goal and purpose of IMPW is to motivate and engage the organisation of activities in a specific week every year, when promotion of different fields of global medical physics are covered and meetings with decision making bodies, leaders and professionals are arranged. During the week in mid-May 2020, a wide variety of digital educational sessions, campaigns, and also chats on social media platforms took place to spread knowledge and awareness to a broader audience worldwide about the important role and impact of Medical Physics in health care.

EFOMP is one of the six regional organisations of IOMP. Since 2020 marks also the 40th anniversary of the foundation of the organisation (1980-2020), EFOMP's Commu-

nications and Publications committee decided to join in the IMPW by launching its first "EFOMP@40" celebration event, the "Birthday Cake competition", in which our colleagues baked, decorated, took photos and created videos of their creations. You can find further details about the competition, including photos of the winning cakes, in a separate article within this issue.

In association with the IMPW webinars organised by IOMP, on 12th May EFOMP and IAMP hosted a Lockdown Webinar lecture: "Implementing a system for automated, remote quality assurance in CT, Radiography and Mammography", given by Erik Tesselaar, Linköping University Hospital, Sweden and Liz Keavey, Irish Breast Screening Service, Ireland. Panelists were David Lavin, President of the Irish Association of Medical Physics and Paddy Gilligan, EFOMP Vice-President. This was the fifth in the series of webinars – make sure that you also read the article on the Lockdown Webinars, elsewhere in this issue of the Newsletter! The series of webinars is firmly in line with the goal of the IMPW, to ensure continuity in education and training and promote the role of Medical Physicists worldwide.



Erik Tesselaar and Liz Keavey, speakers at EFOMP's IMPW Lockdown Webinar

EFOMP's National Member Organisations have also contributed to the IMPW. The Italian Association of Medical Physics (AIFM), prepared a virtual edition of the excellent "Superheroes & Radiation" exhibition. The exhibition was born from the collaboration between the AIFM and the WOW Spazio Fumetto, the Museum of Comics in Milan, towards the end of 2017 and was presented for the first time at the 10th AIFM National Congress in Bari in April 2018. One of the future International planned events will take place in Torino (June 2021) during the [European Congress of Medical Physics](#).

For the IMPW, AIFM uploaded on [Facebook](#) five short videos, one for each day of the week. Five different superheroes from the Marvel universe were presented, focusing on the history of the superheroes, the type of radiation involved and the application of the radiation in the everyday life of medical physics activities. See also the article about the Superheroes and Radiation exhibition in the [Spring 2020 issue of EMP News](#) (page 33).

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AIFM celebrations for IMPW

EFOMP Company Members also embraced the IMPW2020 and shared on social media the stories of Medical Physicists working in their companies. The stories can inspire and motivate young people to follow Medical Physics careers and showcase the various environments where a Medical Physicist can work outside of a hospital and contribute to global health by taking part in research projects, supporting product implementation and product management.

IMPW undoubtedly will continue to grow in the coming years and will follow the success of the International Day of Medical Physics (IDMP), which will be celebrated on November 7th, 2020 with the theme "Medical Physicist as a Health Professional".

According to the IDMP coordinator, Ibrahim Duhani, this year's theme is expected to bring awareness and shed light on the importance of our profession in the healthcare field and that the Medical Physicist is an essential key element not only to help in diagnosis and treatment of many diseases, but also to ensure radiation safety for patients, professionals and staff. This year, as every year, an IDMP2020 page has been created inside EFOMP's website where all European activities either virtual or physical will be gathered and shown to members of the staff and public and will reach a broader audience via EFOMP's digital channels.



Efi Koutsouveli

Efi Koutsouveli works as a Medical Physics Expert in the Medical Physics department of Hygeia Hospital, Athens, Greece. Her professional focus is on radiotherapy units (external radiotherapy & brachytherapy). Her special interest is on Hospital Quality Management Systems and Oncology Information Systems and she has been actively involved in various hospital quality committees since 1996. She is currently the Vice President of the Hellenic Association of Medical Physicists (HAMP), EFOMP's Internet Manager and Assistant Secretary General.



Petter Wilke

Petter Wilke works as a Medical Physicist at the X-ray department at the central hospital in Kristianstad, Sweden. His professional orientation is in the field of X-ray diagnostics. He has a special interest in personal dosimetry, and has been participating in projects covering personal dosimetry using NaCl, he has also contributed to the work of environmental gamma spectroscopy in southern Sweden. Petter is a member of the EFOMP Communications & Publications Committee.

EFOMP 40th Anniversary cake competition!

2020 marks the 40th anniversary of the foundation of EFOMP! Our Communications and Publications committee decided to kick off the celebrations by holding a “Birthday Cake competition”, in which our Medical Physicists (and their families) were invited to bake and decorate a cake, then submit photos of their creations; all the entries were shared on EFOMP’s social media.

The entries were judged by Orla Hayman, consultant clinical scientist at James Cook University Hospital, Middlesborough, UK, who is also a keen cook and baker, and by Paddy Gilligan, Vice President of EFOMP, who came up with the idea for the competition. Unfortunately, none of the entries could be tasted by the judges; nevertheless, a fully-scientific assessment process was implemented, in which the cakes were given numerical scores in four categories: Technical, Celebration, Visual Impact and (Imagined) Taste.

EFOMP is extremely grateful to all those who took the time to bake celebratory cakes and to submit their photos! We are very happy to announce the three best adult entries, as well as the best entry from a junior baker. We hope that you enjoy feasting your eyes on the delicious cakes!

PS – please look out for further “EFOMP@40” events throughout the year. The Autumn 2020 edition of EMP News will include featured articles about the 40th Anniversary.

First Place

The winning cake was baked by Natalia Saltybaeva from Zurich, Switzerland, who was helped by her 3-year-old son, Dani. Natalia said, “It is an apricot-almond Milestone cake, which goes up like a mountain, I wish the mountain of EFOMP achievements will grow further!” The judges remarked: “This cake was amazing with the two tiers and all the printed sugar paste and decorations. Loved the celebratory theme to this cake”.



Second Place



This cake was baked by Susan Maguire from Dublin, Ireland, seen here with her children Tom (aged 9) and Aoife (aged 6) who helped. Susan said, “We went with the theme of the original Social Distancing - Nuclear Medicine!” The judges commented: “This cake has great sugar work and excellent references to radiation. We also loved that the cake is a rainbow cake inside and looks really well made and delicious.”



Third Place

This cake was baked by Sinéad Cleary, from Galway, Ireland. The judges said: "This cake looks like it would taste amazing, very festive and celebratory with the flags of all the countries involved in the federation."



Best Junior entry

This delicious-looking cake was baked by 12-year-old Despoina from Cyprus and was submitted by her Medical Physicist mother, Erato Stylianou Markidou, who passed on "lots of love for the 40th anniversary of EFOMP" from her daughter. The judges said: "Brilliant work by a junior entrant and really impressed with the technical decoration. Keep up the baking!"

The Judges



David Lurie wrote the article

David Lurie holds a Chair in Biomedical Physics at the University of Aberdeen, UK; he is Chair of the Communications and Publications Committee of EFOMP.



Co-judge: Paddy Gilligan

Paddy Gilligan is chief physicist in the Mater Private Hospital, Dublin, Ireland and Vice President of EFOMP.

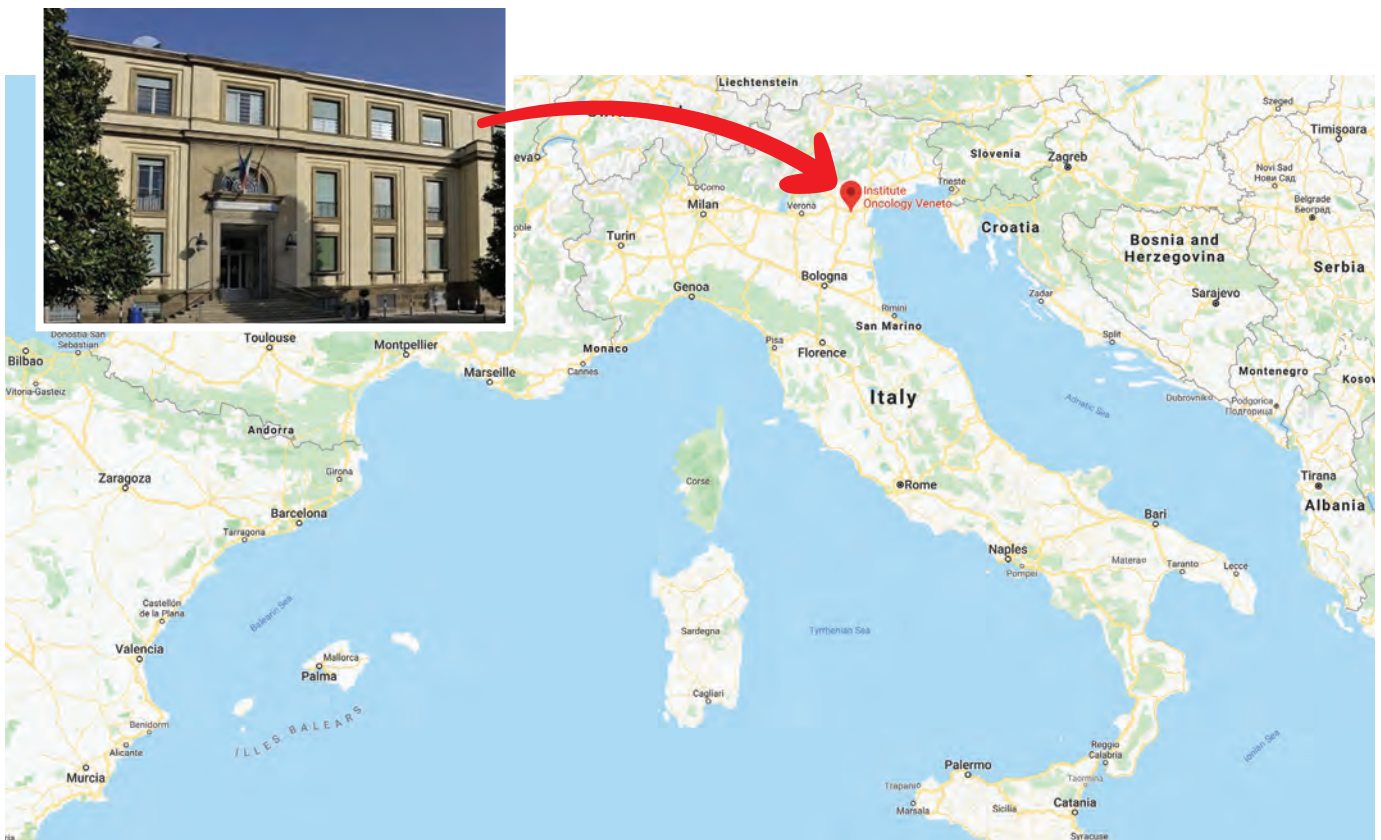


Chief judge: Orla Hayman

Orla Hayman is a consultant clinical scientist, head of QC and Dosimetry at James Cook University Hospital, Middlesbrough, UK. She is also a keen cook and baker and was a contestant on the Masterchef TV programme in the UK in 2006-7; she has had her own organic cake business and loves baking competitions, winning first prize in the local show with her butterfly buns in 2019.

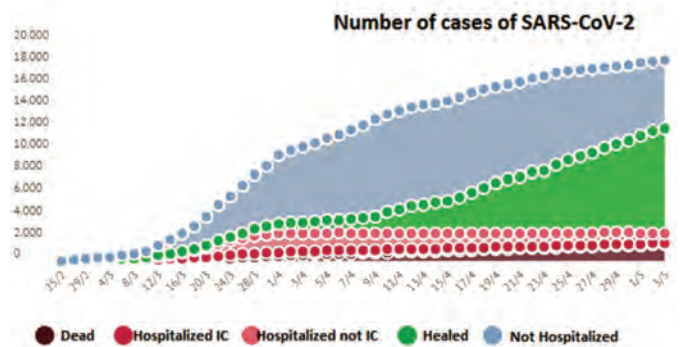
Field experience of a clinical medical physicist in a Northern Italy hospital during the COVID-19 pandemic

Marta Paiusco writes about delivering a Medical Physics service during the pandemic



The Veneto Institute of Oncology (VIO) is located in Padua, Italy. The Veneto region is one of the areas in Italy where several cases of coronavirus infection have been confirmed (SARS-CoV-2): the first case was identified in the province of Padua (see the map).

As indicated in the chart, after two months of lock-down, the spread of the virus seems to be curbing and we hope to start “phase two” safely. Nevertheless, at the beginning of the infection, we experienced an extremely fatiguing season. Ignorance about an invisible enemy and being unprepared to face a pandemic made the situation confusing, complicated and stressful. The primary objective was to reduce the possibility of contagion to protect ourselves and at the same time continue to guarantee the care of patients, especially cancer patients. All of us have been called to put in place actions so



that COVID-19 does not jeopardize the clinical activity of the hospital: in doing so our life was rapidly changing. Strategies to work safely were adopted and our work arrangement has been changed. →

While inside the hospital COVID and non-COVID areas were being identified in parallel, a special entrance for physicists was identified, avoiding to meet oncologists and patients: the communication door between the Medical Physics Dept. and the Radiotherapy Dept. was closed and doctors were invited to call a contact before access. Students, Fellows and colleagues not directly involved in the clinical activity but supporting research were invited to stay at home. To avoid gatherings, internal meetings were converted to web meetings.

Time spent in care areas has been reduced by trying to prioritize activities with balance of cost and benefit. Meetings with doctors were limited, less important QA procedures postponed and patient-specific radiotherapy treatments QA are made only one day per week, with the only exception of hypofractionated stereotactic treatments. Currently, pre-treatment measurements are performed early in the morning prior to patient treatments to be sure that machines and bunkers are cleaned and disinfected. Mandatory is wearing surgical mask, gloves and the use of alcohol-based disinfectant.

To limit the risk to infect the staff, the turnover of physicists in planning approval has been reduced and planning by remote mode has been activated and encouraged. An effort has been done to implement, where possible, automated solutions like a daily monitoring of the MLC by software, in place of measurements at the LINAC.

However, with the increase of patients in intensive and sub-intensive care, requests for portable radiographic imaging has grown and a mobile CT was installed to perform imaging for COVID patients. Therefore, medical physicists were deeply involved in acceptance tests and radiation protection. Related to the radioprotection field we evaluated and decided to stop temporarily radiometabolic treatment. Our concern was to avoid compromising the extremely fragile condition of intensive care. Managing a radioactive patient and the waste produced would stress further weary doctors and nurses. Radiometabolic treatments have restarted at the end of April 2020.

I think that we did and we are doing a great work facing Coronavirus. So far we are healthy (most of my staff did 2 swab tests and antibody tests) and patients receive safely their oncological treatments. However, our work has changed. Isolation has been our main strategy, starting in the first phase. Isolation protected us in the most critical period but the main drawback is the debasement of our work along with our role. We were used to working in close contact with doctors, to share and exchange with them ideas and proposals and all of this was suddenly prevented or heavily reduced by isolation. We need to think about this because nothing will be and nothing should be as before. The COVID-19 pandemic provides unique challenges for Medical Physicists in Italy. We have to treasure this working experience to improve our practices and services in future by rethinking and redefining our working profile. We need to invest in process automation and acquire skills in this area, to learn more about organisation methodology, improve our ability in planning by working for goals and projects. Projects should be shared and we must learn more about communication strategies and related technology. We quickly need to become part of a process of re-formation and to be born again. A new challenge awaits us but...." *Andrà tutto bene*".



The Medical Physics team at the Veneto Institute of Oncology



Marta Paiusco

Marta Paiusco is Head of the Imaging and Medical Physics Department at Veneto Institute of Oncology – IRCCS Padua, Italy. She is involved in clinical and research activities. Her main interests are Radiotherapy and Radiology with a focus on dose optimization.

3D printing of face shields for the COVID-19 emergency in Serbia

Practical support from medical physicists

Just as in almost every country, the COVID-19 pandemic initiated an emergency situation in the Republic of Serbia, mostly due to reasons of preserving the healthcare system, rather than due to unexpected numbers of new cases or deaths.

The government announced a state of emergency on March 17th 2020, after a total of 48 registered new cases had been reported. All kindergartens, schools, universities, shopping centres, restaurants and sports arenas were closed down. The public transport was stopped and people could move around only between 5 am and 5 pm. The movement of people was limited, and those older than 65 were forbidden to leave their houses. These hard decisions were made due to the fact that the Serbian healthcare system would not be able to cope with a possibly heavy load of new patients, especially the older population, who might end up on respirators.

The working conditions have also been changed at our department, Clinic of Radiotherapy, Oncology Institute Vojvodina. The temperature of all patients was measured and they were given masks to wear; they could enter into the radiotherapy premises only at the time of treatment, without accompanying persons. Employees were divided into two weekly shifts which were not mixed up. Maximum attention was paid to the safety of staff and patients, and measures of disinfecting working places, halls, bunkers and waiting areas.

Since the situation was rapidly getting worse, as medical physicists we felt that we could contribute to the efforts against the virus; we decided to do this by printing face shields.

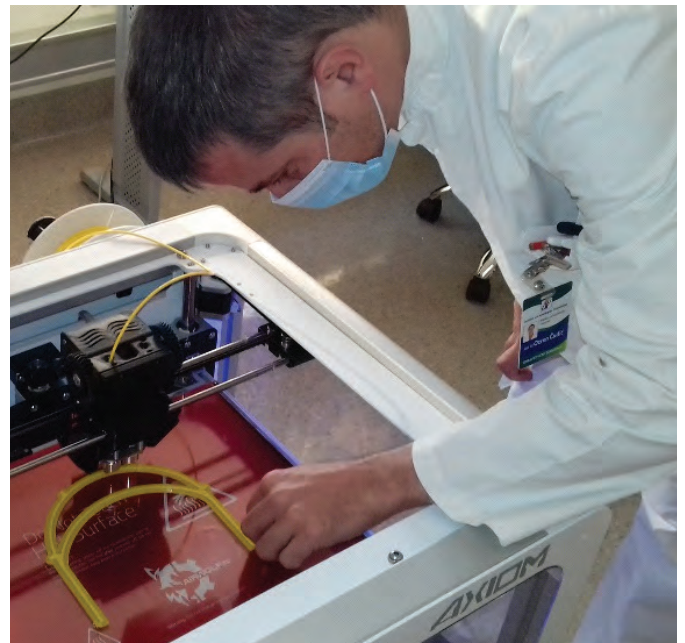
We had recently purchased a 3D printer for the purpose of producing boluses and brachytherapy moulds. The printer was brand new, and we had printed only a few boluses for testing purposes. Our colleague Ozren Cudic, who had most experience with the printer, and Ivan Gencil who had the face shields idea, joined forces, obtained the required printing file and started the printer. First attempts were not successful due to the problems with temperature and printer upper plate, so we contacted the manufacturer Adaptiiv, to help with file adaptation for our printer characteristics. The response came quickly from Borko Basaric, a colleague who now works for Adaptiiv, having previously worked with us for years, so success was inevitable! In the photographs, you can see how we did the printing.

The printer produced a fantastic first prototype, without a single error in manufacturing. We purchased foil and the face

shields were ready. Now they are in use every day, protecting our healthcare workers and colleagues from the direct influence of aerosols and COVID-19.

The idea of volunteering came from the Serbian 3D printing Facebook page, "Visionaries" (in Serbian Vizionari, vizir = visor in English). They were making face shields and were the connection between the volunteers who have 3D printers and donors of material for 3D printing. They gained media attention fast and instantly the list of people printing face shields increased, so healthcare institutions were provided within a few days with functional, but cheap equipment.

The message from the terrible pandemic that we all faced, is that we all have a moral obligation to support and help those in need. We are all in potential danger and we could all be patients; this is how we supported those colleagues who were in first lines during the battle.



How it looks on the machine

“as medical physicists we felt that we could contribute to the efforts against the virus”

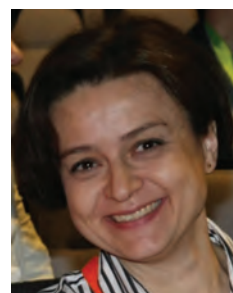


The completed head band



The final result

Authors



Borislava Petrovic

President and co-founder of the Serbian association of medical physicists. She holds PhD in the field of medical physics and works as chief of the medical physics group at the Radiotherapy Clinic, Institute of oncology Vojvodina, Sremska Kamenica. She is also associate professor of medical physics at the University of Novi Sad, Faculty of Sciences, Department of Physics.



Medical physicists of radiotherapy department, Oncology Institute Vojvodina, Sremska Kamenica, Serbia (left to right): Nemanja Golubovac, Sonja Cuturilo and Ozren Cudic



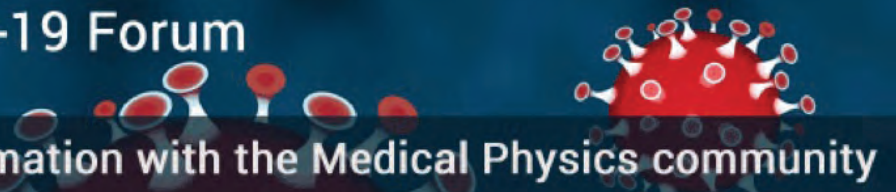
Ivan Gencel

Ivan studied medical physics and is currently a Medical Physicist at the Oncology Institute of Vojvodina. He is also Secretary of the Communications and Publications Committee of EFOMP. Ivan has also worked in the Military Medical Academy in the Radiological Protection department, and at a dosimetry laboratory.

EFOMP Medical Physics COVID-19 online forum initiative

EFOMP MP CoVID-19 Forum

Share your information with the Medical Physics community



Since the end of February, European countries have been in the midst of an unprecedented challenge to their healthcare systems and this was a challenging time for all of us. As Medical Physicists we have a role to play in helping patients and staff, and the majority of our colleagues continued to work at the forefront of the European healthcare systems and collaborate with other medical professionals during the time of crisis. This effort involved maintaining existing patient service needs and dealing with the new service demands arising from the COVID-19 situation, especially the need for reliable Coronavirus testing and increased Intensive Care capacity.

EFOMP decided to share some approaches to providing physics services through this crisis (see the [EFOMP President's message](#) from March 13th), while recognising that governmental and institutional policies and advice may differ in detail and that we should follow the recommendations of experts in infection control and public health.

On Wednesday 18th March, EFOMP developed a [website-based forum](#) for the exchange of information on the COVID-19 problems on an international level. The initiative was led by the EFOMP Communications and Publications committee which is responsible for the dissemination of information relevant to Medical Physicists. The aim was to provide an easy-to-use platform where Medical Physicists across Europe could post their experiences, changes in their everyday clinical activities and novel contributions to hospital departments, with the aim of helping their colleagues elsewhere.

National Member Organisations were asked to spread information about the forum to their members and invite them to contribute on an individual basis. It was made clear that neither EFOMP nor the NMOs were responsible for the content of the posted messages.

Our Medical Physics community embraced the forum initiative and posts related to our work in Imaging, Nuclear Medicine, Radiation Oncology departments as well as Intensive Care Units appeared since the first days of the forum's operation.

Recommendations by National societies and International organisations, webinars organized for the exchange of best practices and lessons learned, latest publications and resources were added in the platform. Some of the topics presented in the material that was uploaded were: triage at the entrance of the departments; design of different contamination level areas; cleaning of treatment equipment and devices; working in shifts and work keeping distance; identification of a management team within each department; working remotely; use of digital solutions; education on the use of protective equipment by staff and patients as well as level of staff protection; scheduling and management of patients on treatment and follow up clinics; and finally, use of mobile equipment in new areas within the hospital or in temporary hospitals.

Discussions have also started inside the forum such as: strategies for handling radiotherapy treatment gaps during COVID-19; lung CT acquisition protocols in Imaging departments; use of MRI compatible protective masks. Articles were shared containing interesting information on the use of CBCTs for detecting COVID-19 in patients under treatment in radiotherapy, fast track solutions for the isolation of COVID-19 patients or disinfection of surgical facemasks and respirators with UVC.



Medical Physicists working on the frontline. Acceptance tests for new radiological equipment at a temporary COVID hospital in Turin, Italy. Photo courtesy of Michele Stasi, President of the Italian Association of Medical Physics (AIFM).

In some countries Medical Physicists are engaged in the availability and quality assurance of Intensive Care equipment (ventilators, syringe pumps, CCVH devices, consumables) as well as looking for alternatives.

Information on the words of appreciation for the contribution of Medical Physicists by the Scottish First Minister Nicola Sturgeon and in a published formal document by the Dutch Ministry of Health on 30th March 2020 were posted in the forum. In both countries, the number of beds in the Intensive Care Units for COVID-19 patients was increased in a short period of time with the help of medical physicists, who have worked non-stop

to make this happen. It was good to see acknowledgement for all our colleagues who continued in spite of the immense challenges they faced on a daily basis to keep our working places safe, serve our patients, work closely with all specialties and who demonstrated the ability either to work in or lead teams and quickly adapt to the new circumstances.

It is hoped that EFOMP's COVID-19 forum was of assistance to the Medical Physics community and that it kept us connected during this period of increased physical, mental and psychological stress.



Efi Koutsouveli

Efi Koutsouveli works as a Medical Physics Expert in the Medical Physics department of Hygeia Hospital, Athens, Greece. Her professional focus is on radiotherapy units (external radiotherapy & brachytherapy). Her special interest is on Hospital Quality Management Systems and Oncology Information Systems and she has been actively involved in various hospital quality committees since 1996. She is currently the Vice President of the Hellenic Association of Medical Physicists (HAMP), EFOMP's Internet Manager and Assistant Secretary General.

IAPM/EFOMP COVID-19 lockdown lectures

Paddy Gilligan and David Lavin write about their webinar series

Following on from EFOMP president Marco Brambilla's [communication on the corona virus](#), it became clear that many physicists were having similar experiences in adapting their medical physics service in the COVID-19 era. It was also evident that sharing of good scientific knowledge and experience would help in the fight against the virus.

Before the lockdown, I had been asked by fellow physicist Tom Heary to give a lecture on eye doses in cardiology to our neighboring Beaumont hospital. Our site has restricted travel to other sites so the question of whether the lecture would be cancelled arose. We decided to use Zoom on that occasion and invited some external people along. It worked well and the prospect of doing this nationally and internationally was exciting. Zoom is limited to 100 hundred participants and the free version will cut off after forty minutes. Having viewed an excellent webinar on CT given by Shane Foley (a colleague from University college Dublin) using GoToWebinar, I contacted him and he was able to set me up on a shared temporary university account. Thus, the lock-down lectures were born! They are broadcast from my front room or my multimedia elevating platform (laptop on an ironing board).

With Marco's communication in mind and with the support of the IAPM (David Lavin, IAPM President has been a panelist for all the lectures) and EFOMP, a list of topics was generated. We believe the sharing of good information will help us mitigate the effects of this virus in our healthcare systems. We also had to be mindful that many webinars are available on the topic and not to overlap or crowd the space. The first webinar was delivered by Lynn Gaynor from Beaumont hospital who gave a really good lecture about risk assessment in mobile radiography. These types of risk assessment have kept the physics community busy since the virus was imminent. Efi Koutsouveli, David Lurie and Christos Alexakos from EFOMP's Communications and Publications Committee were able to put the recording of the lecture on the EFOMP educational platform, viewable by [Individual Associate Members of EFOMP](#). We also posted a link to the recording on the [EFOMP COVID-19 Forum](#).

For the second lecture, we chose the topic of ventilators as this is very current for many physics departments and also for those of us who do not work in that area it is useful to find out more about the science behind such a high-profile topic. Fran Hegarty who is a biomedical engineer, colleague from the Robert Boyle foundation and chief technical officer in the new children's hospital in Dublin gave us a brilliant primer on ventilators. Ad Maas put me in touch with fellow NVKF member Carola van Pul from the Netherlands who also shared her experience with some excellent slides. This international collaboration worked very well and points a clear way for the future.

*“we have had over
1000 registered,
nearly 600 attendees
and 300 views
of the recordings”*

For the third lecture, we again used the international collaborative model, and were joined in the panel by Cormac McGrath from Belfast and heard Nigel Davies from Birmingham in the UK share his experiences on testing of PPE for MRI. Nigel has been highly active in this area since the crisis began. Niall Colgan from Galway gave a lecture on using gradient echo thermometry to assess heating from metal components of surgical masks. The quality of the presentations, the level of interest and discussions with such short notice was remarkable and was reflected in

the positive feedback received after the event.

There have been a number of webinars in the early days of the COVID-19 crisis on its effects on radiotherapy. Our fourth lecture sought to identify what practices could change and what we could use going forward. Brendan McClean who is vice chair of the Scientific Committee of EFOMP recounted how his department had quickly adapted, particularly in the area of online collaboration and this is something that would be taken forward. Longer days, remote planning and smaller teams all had benefits that allowed continuation of treatments for similar workloads as pre-COVID-19. The use of Internet tools such as Vscene and Citrix added levels of attendance and engagement not seen before the monitored infection control rates among staff. Hypofractionation and FLASH breast techniques which had been in progress were utilised to reduce visits and the current crisis accelerated their introduction into clinical practice. The recent [statement by DGMP president Mark Ladd](#) inspired us to connect with our German counterparts. Holger Wirtz from Lake Konstanz radiotherapy centre showed



Screenshot of a poll in progress, following one of the lockdown webinar presentations.

the results of a survey which is now published on how corona virus had affected their practice. He showed how the use of risk management tools, combined with his experience working in civil protection and ISO 9000 had led to early risk assessment-based strategies that allocated clear action plans. He kindly has made these tools free of charge in both English and German. They represent a remarkable proactive approach which even includes Internet tools searching for trends on different risks. Again, this session was packed full of useful information.

One of the very useful tools available during webinars is the ability to initiate instant polls of the online audience. In one of the polls we asked whether physicists had been infected during their work. The number was small but 3% of the audience reported knowing physicists who had been infected at work.

At the time of writing, the next lockdown webinar will move our collaboration northwards to Sweden with Erik Tesselaar; although their movements are not as restricted as the rest of us, they have QA tools in place for remote assessment in order to provide protection. This will be combined with a lecture on remote quality assurance in digital mammography screening from Irish physicist Liz Keavey.

We plan to continue these lectures as long as the lockdown is in place; ultraviolet disinfection and nuclear medicine therapies are in our sights as possible topics. To date, we have had over 1000 registered, nearly 600 attendees and 300 views of the recordings from many countries. We are glad to see knowledge spreading rather than the virus and hope that these lectures will assist all participants to get through these difficult times.



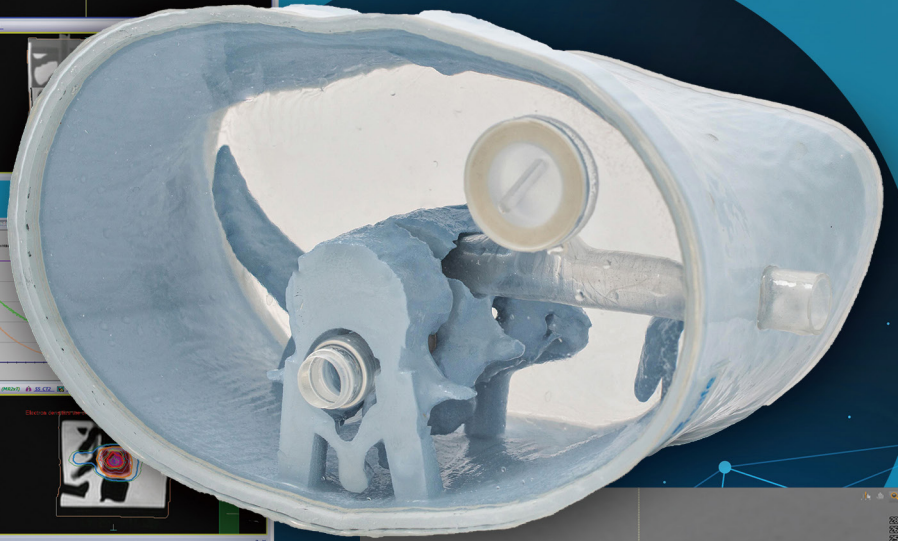
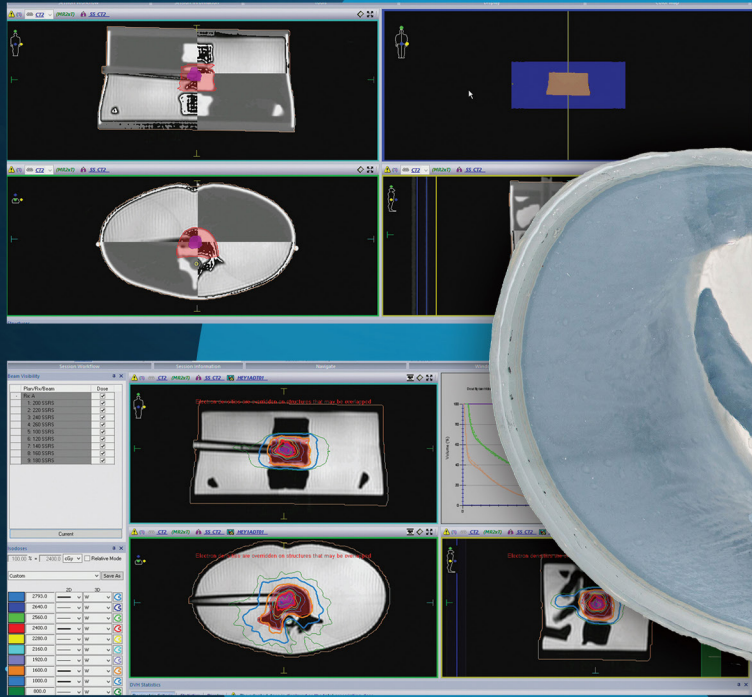
Paddy Gilligan

is chief physicist in the Mater Private Hospital, Dublin Ireland and current Vice President of EFOMP. In 2019 he chaired the European congress of radiology physics subcommittee. He was past president of the Irish NMO, (now IAPM). He organises the annual medical physics workshop at the Robert Boyle summer school and is a trustee of the Robert Boyle foundation. He teaches on various post graduate courses including a recent participation in the advanced QA in digital radiography as part of the IAEA/ICTP workshop in Trieste. He is associate Clinical Professor in University College Dublin.

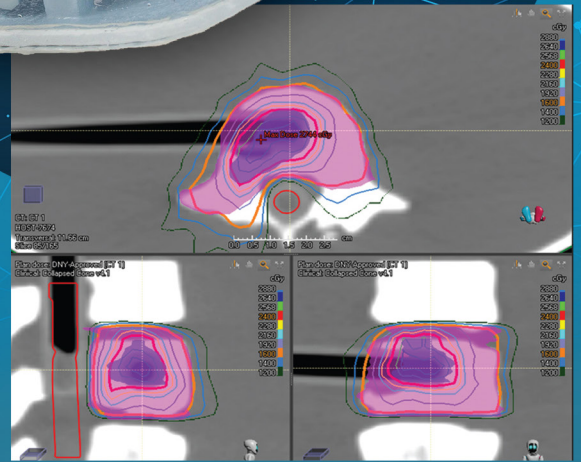


David Lavin

is a diagnostic imaging physicist reporting into the Department of Medical Physics and Clinical Engineering (MPCE), University Hospital Galway (UHG), Saolta University Health Care Group. Based in the North West of Ireland, he has a somewhat nomadic existence providing radiation protection/medical physics expert advice and support to the Radiology Departments of Sligo and Letterkenny University Hospitals. He also supports the community hospitals and public dental X-ray facilities across this region. He teaches on the MSc in Medical Physics programme jointly run by the Dept. of MPCE, UHG and NUI Galway. He is the current President of the IAPM.



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RTsafe: More accurate spine radiosurgery

Stereotactic radiosurgery (SRS) has revealed an increased growth against conventional methodologies in many types of intra- and extra-cranial treatments. Given the proven clinical, social, and financial benefits of treating a variety of brain lesions and thus resulting in a better quality of life for patients, there has been an increased interest in the use of high dose of conformal radiation to treat spinal lesions too. Technological advancements in treatment planning algorithms, collimators' design, patient positioning, and monitoring enable the adaptation of spine radiosurgery treatments from more radiotherapy centres worldwide. Spine SRS is involving a high dose of radiation to tumours of the spine and spinal cord aiming to spare normal surrounding tissues and avoid unwanted side effects. Whilst more complex treatments usually translate to more targeted treatments, at the same time they require more complex Quality Assurance (QA). Therefore, as in cranial SRS, there is a need for a high level of accuracy and precision. But especially in spine radiosurgery, it is required precise localization and accurate dose delivery to avoid critical dose deposition in the spinal cord.

RTsafe, which envisages safer and more efficient radiotherapy worldwide, has developed a novel approach in End-to-End QA testing, focused on SRS applications and starting broadening in SBRT modalities too. **Spine** phantom is an anthropomorphic 3D-printed phantom that simulates the anatomy of a real lumbar spine case, with bone and soft tissue-equivalent materi-

als. With dosimetry options within the vertebrae and the spinal cord it is an ideal tool for End-to-End testing in spine radiosurgery treatments during commissioning and periodic QA.

The unique advantage of having realistic bone and soft-tissue contrast in both CT and MR imaging, makes **Spine** an excellent tool for online adaptation of advanced spine SRS techniques with MR-linacs. The end-user with direct measurements in the spinal cord and vertebrae and being able to perform localization as a real patient, gains confidence for any spine SRS dedicated hardware and software.

Evaluation of the overall accuracy and precision in spine radiosurgery, as well as the clinical benefit that patients gain, will ensure safety in these challenging techniques and consequently the wider adaptation of them from the community.

For more information visit

www.rt-safe.com or email info@rt-safe.com



Georgios Kalaitzakis
Product Manager

Georgios is responsible for the 3D digital design of the 3D printed phantom, the data analysis, the communication and the whole scientific support and guidance of the end user. He has a diploma in Electronic & Computer Engineering, where he focused on the estimation of pharmacokinetic parameters via dynamic contrast enhancement imaging in order to annotate the perfusion of the brain tumour. During his PhD in medical school in the University of Crete, he introduced advanced MRI biomarkers in CNS diseases.



Emmanouil Zoros
Medical Physicist - Product Manager

Emmanouil is responsible for product management, data analysis, and film dosimetry at RTsafe. He has a Diploma in Applied Mathematics & Physics from the National Technical University of Athens and a Master of Science in Medical Physics from the National and Kapodistrian University of Athens. His research interests focus on radiation therapy with emphasis on quality assurance in stereotactic radiosurgery, experimental and computational dosimetry using Monte Carlo simulation techniques.

The EFOMP Examination Board

Medical Physics training standards made comparable

The EFOMP Examination Board (EEB) was established in 2017, to facilitate the harmonization of Medical Physics education and training standards throughout Europe. EEB has introduced the European Diploma of Medical Physics (EDMP) and the European Attestation Certificate to those Medical Physicists that have reached the Medical Physics Expert level (EACMPE). EEB examinations are tests of excellence in Medical Physics. They are designed to assess the knowledge, skills and competences requisite for the delivery of high standard Medical Physics services.

Currently medical physicists in European countries face difficulties in providing the necessary qualification evidence when they seek employment in other EU Member States or other countries. The EDMP will facilitate mobility of medical physicists in Europe and beyond. Furthermore, EEB provides an attestation certificate to those medical physicists that have reached the Medical Physics Expert level to be recognized by the relevant competent authorities of the EU according to the EU Directive 2013/59/EURATOM, laying down the basic safety standards for protection against the dangers arising from exposure to ionising radiation (EU BSS). EEB examinations are voluntary. EEB diplomas will not replace any national certificates. However, they will be a common European qualification for medical physicists and will help to standardise training and expertise in Medical Physics across Europe.

All Medical Physicists certified in one or more sub-disciplines of Medical Physics (diagnostic and interventional radiology, nuclear medicine and/or radiation oncology) by a national competent authority are eligible to sit for the EDMP exams. In order to apply for the EACMPE exams, the EDMP criteria are extended at least full time 2 years equivalent of advanced, structured experience and continuous professional development (CPD). Eligibility criteria for non-certified medical physicists as well as detailed information about EDMP and EACMPE required documents, examination structure, fees etc can be found on the [EEB pages of the EFOMP web site](#).



Kay-Uwe Kasch

Prof. Dr. Kay-Uwe Kasch is Chair of EEB. He is Dean of the Department of Mathematics, Physics and Chemistry at the Beuth University of Applied Sciences, Berlin. He served and serves as a member of various professional organizations. He is the German representative to EFOMP Council and (co-)chairs various organizations at national level. He teaches various courses within the Bachelor and Master Curricula of the Applied Physics – Medical Engineering field, mainly with a focus on radiation physics, radiation therapy and nuclear medicine. His research interests are radiation therapy, particularly novel approaches in particle therapy and tomotherapy.



Snapshot with a couple of examinees in Warsaw 2019: Renato Padovani (second left), Kay-Uwe Kasch (third left), John Damilakis (fourth left), and Pawel Kukulowicz (fifth left) as members of the first EEB board in office till 2019.

EFOMP and the three main clinical societies concerned with the application of radiation to medicine, namely the European Society of Therapeutic Radiation Oncology (ESTRO), the European Society of Radiology (ESR) and the European Association of Nuclear Medicine (EANM) have agreed on the syllabi for the training and education of medical physicists. Moreover, the European Commission has published the European Guidelines on Medical Physics Expert (MPE), Radiation Protection 174, which specifies the requirements for an individual to be recognised as an MPE by the relevant national competent authorities. EEB exams are based on these documents that can be found [on the EEB website](#).

So far there have been three rounds of EEB exams with altogether more than 41 applicants. The first one was held in the field of “Diagnostic and Interventional Radiology” in Prague in July, 2017. The 2nd EEB exams, this time in all three sub-fields of Medical Physics (Diagnostic and Interventional Radiology, Nuclear Medicine, Radiation Oncology) took place in Copenhagen before the European Congress of Medical Physics in August 2018. Last year the venue was Warsaw, prior to the EFOMP Council Meeting in October 2019. Unfortunately, due to the Corona crisis the next exams are postponed to June, 2021 and will take place just before the 3rd European Congress of Medical Physics in Torino. This fourth round of EEB exams will be the first round for the newly-elected EEB board – we are looking forward to it and will hopefully fill the shoes of our colleagues who started this important EFOMP activity!

EFOMP Science Committee seeks nominations for members of Working Group

Applications are being sought for members of a new Working Group on the Role of Medical Physics Experts in Clinical Trials. The WG aims at developing a consensus guidance document for the work MPEs do in clinical trials (external beam radiotherapy, brachytherapy, nuclear medicine / molecular radiotherapy and imaging) across Europe. The document will supplement any MPE guidance from NMOs as well as the AAPM report TG 113.

The target audience is EFOMP members, medical physics community in general, clinical trials units, other professionals working in trials involving radiation. The Chair of the WG is Natalie Abbott (UK).

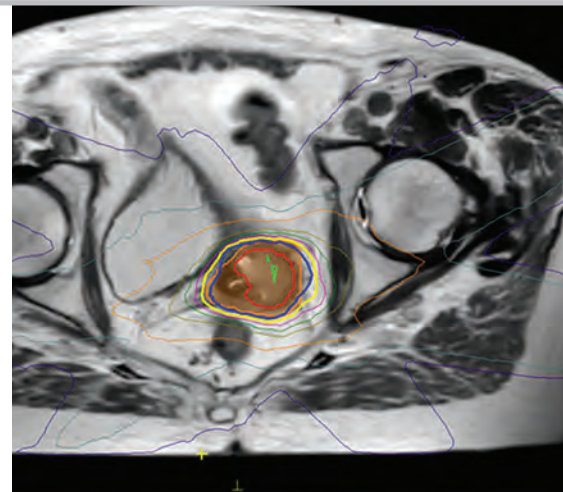
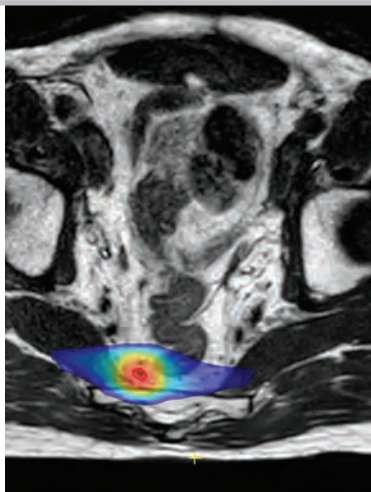
The deadline for the receipt of applications for membership of the WG is 25th June 2020. Details on how to apply can be found at: <https://www.efomp.org/index.php?r=news/view&id=150>



Yolanda Prezado

Dr. Yolanda Prezado is the Chair of EFOMP's Science Committee. She is the founder and head of the interdisciplinary team "New Approaches in Radiotherapy (NARA)", based at the Institut Curie-National Scientific Research Centre - CNRS, Orsay, France.

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ONLINE

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ELSE Solutions s.r.l. & RefleXion Medical: Combining PET/CT and Radiotherapy in one Machine brings a Paradigm Change




ELSE
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ELSE Solutions srl, in the person of Giacomo Bartesaghi, Ph.D., Senior Physicist and Board Member, is pleased to submit an article by Sam Mazin, Ph.D., Founder and CTO of RefleXion Medical. As an EFOMP Company Member, ELSE Solutions srl is excited to present in the EFOMP Newsletter the revolutionary vision of Biology-Guided Radiotherapy, bringing together medical physics, nuclear medicine and radiotherapy in new ways to shift the paradigm of cancer care.

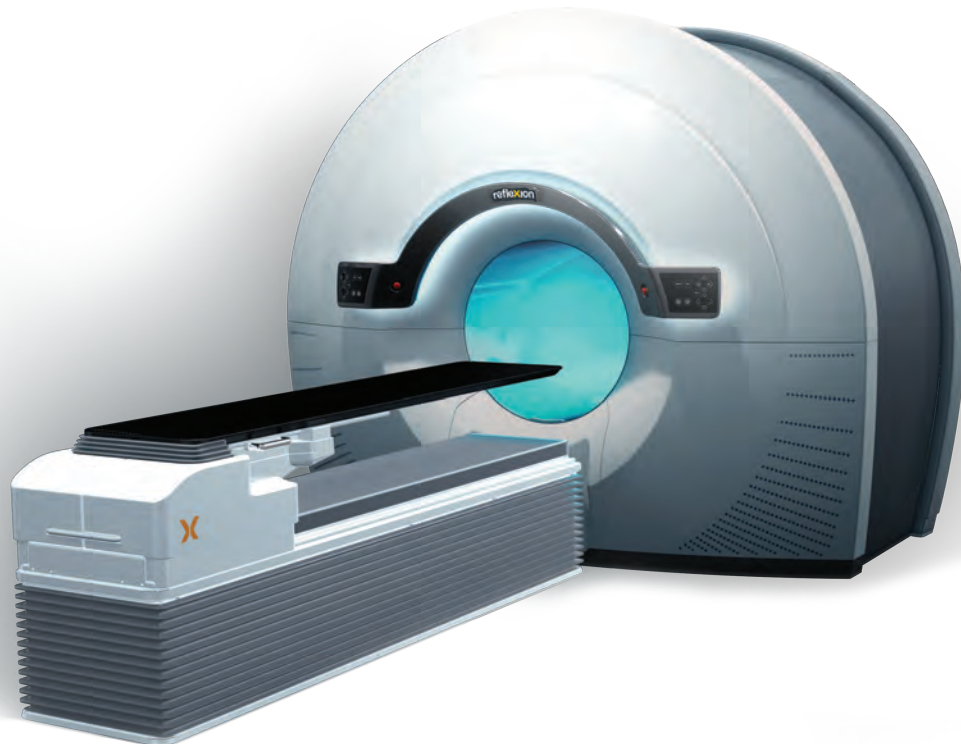
RefleXion Medical is a therapeutic oncology company pioneering the use of biology-guided radiotherapy (BgRT)* to treat all stages of cancer. BgRT, a new treatment modality under development, uses the biological signature of a tumour to characterize its movement and to deliver a precisely tracked therapeutic radiation dose to the tumour.

The technology behind the RefleXion X1 machine combines anatomic data from high-quality fan-beam computed tomography (CT) imaging and functional imaging data from dual 90-degree PET arcs and a 6MV linear accelerator. The X1 rotates up to 60 times faster than other linear accelerators and modulates dose delivery from 100 points per beam station. Each beam station represents a 2.1mm movement of the couch along the bore axis with a variable dwell time. These combined improvements may reduce the side effects of radiotherapy by allowing radiation oncologists to better localize the tumour, reduce patient setup errors and precisely deliver dose to complex targets while avoiding nearby normal structures.

Currently, the RefleXion X1 machine is cleared by the U.S. Food and Drug Administration (FDA) for the delivery of stereotactic body radiotherapy (SBRT), stereotactic radiosurgery (SRS) and intensity modulated radiotherapy (IMRT).

The RefleXion X1 machine with BgRT capability, which requires 510(k) clearance and is not yet available for sale, is designed to overcome the technical limitations that currently restrict radiotherapy to one or two tumours. Once developed, RefleXion will scale BgRT to treat all visible tumours, even those that move rapidly due to involuntary processes such as breathing or digestion, in the same treatment session.

→



The RefleXion X1 machine is designed from the ground up to maximize efficiency in radiotherapy by giving physicians the option of a unified solution for characterizing and treating multiple tumours in a single session of therapy. With the technology, a single intravenous injection of a PET tracer provides a homing signal at every tumour with sufficient uptake in the patient's body.

PET makes use of FDG to highlight the differences between healthy cells and cancer cells. Cancer cells rapidly consume the FDG, which decays and instantly produces emissions, thereby signaling their location. The linear accelerator responds with sub-second latency to deliver beamlets of radiation directly to the tumour(s). Responding in real-time to these detected emissions is the fundamental principle of BgRT and the RefleXion platform.

This is a departure from current technology, which has required complex and different motion management solutions depending on the anatomic location of each individual tumour for managing motion and uncertainty. Because of this complexity, going beyond a couple of tumour sites has not been feasible in most cases.

While aspects of real-time BgRT treatment planning parallel conventional radiotherapy, the combination of PET/CT and radiotherapy in one machine brings a paradigm change to conventional image-guided radiotherapies. In addition to the potential margin reduction and toxicity savings that a tracked dose delivery can achieve for a single tumour, the potential to treat multiple tumours throughout the body in the same session opens the door to combination therapy paradigms that have yet to be accessed by those in the metastatic patient population.

With RefleXion, the hope is that the technology will unlock new possibilities for patients with multiple tumours and a future where physicians will be empowered to investigate the use of radiotherapy in patients with metastatic or stage 4 cancer in order to improve outcomes and survival.

*The RefleXion X1™ machine requires a CE Mark and is not available for sale.



Dr Sam Mazin

Sam Mazin, Ph.D., co-founded RefleXion in 2009 after inventing the company's core technology. During his Stanford postdoctoral tenure, the Kauffman Foundation recognized him as one of 13 U.S. postdocs to commercialize promising innovations. Other Stanford research earned him the American Heart Association Joel Drillings Award and the Cum Laude award from the SPIE international medical imaging society. Dr. Mazin speaks about biology-guided radiotherapy at cancer centers worldwide.

EFOMP has established a category A liaison with IEC

Dear medical physics colleagues,

the EFOMP board would like to inform you **that a category A liaison with the International Electrotechnical Commission (IEC)** was established on 10th March 2020.

IEC (www.iec.ch) is the leading global organization that publishes consensus-based International Standards and manages conformity assessment systems for electric and electronic products, systems, and services, collectively known as electrotechnology. IEC publications serve as a basis for national standardization and as references when drafting international tenders and contracts.

Our cooperation with other organizations allows us to “build” a network of contacts. In this case, it was the cooperation with COCIR on the organization of the ESMPE edition dedicated to State of the Art and New Trends of Angiographic Equipment that brought us the opportunity to nominate an EFOMP representative to IEC WG 37 (Diagnostic X-ray equipment - general requirements for radiation protection and particular requirements for radiography and radioscopy, including acceptance and constancy tests). This nomination was done with the help of the Italian Comitato Elettrotecnico Italiano (CEI) since our representative is Italian and EFOMP couldn't nominate her directly at that time.

We believe that EFOMP's involvement in IEC's technical committees and subcommittees could be very helpful for both organizations and the medical physics community as well.

That is why it was decided to start the process of becoming a liaison organization of category A. The technical committee that has the widest impact on the medical physics community is TC 62 (Electrical Equipment in Medical Practice) and its subcommittees SC 62B (Diagnostic Imaging Equipment) and SC 62C (Equipment for Radiotherapy, Nuclear Medicine, and Radiation Dosimetry). Being a category A liaison allows EFOMP to make an effective contribution to the work of the Technical Committee or Subcommittee for topics dealt with by this technical committee or subcommittee. We will be given access to all relevant documentation and be invited to meetings. Finally, what is very important is that EFOMP may nominate experts to participate in working groups / project teams.

Our application was approved by IEC and now it is time to start working together!

After gaining some experience, the EFOMP board would like to involve our organization also in SC 62A (Common Aspects of Electrical Equipment used in Medical Practice) and SC 62D (Electromedical Equipment) which are of particular interest in some of our NMO countries.



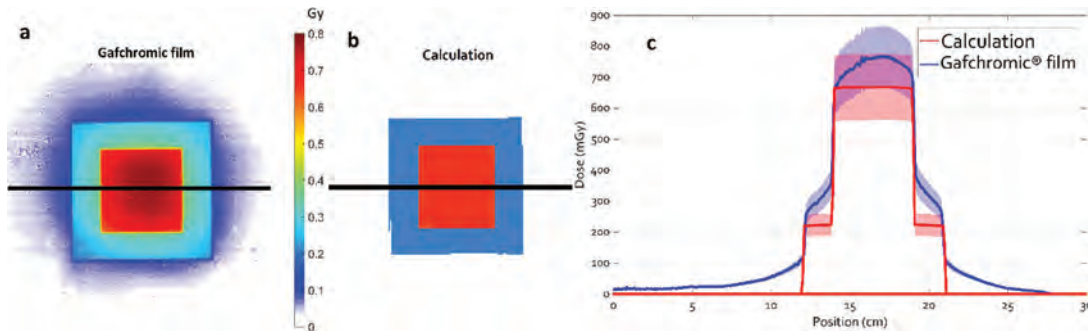
Jaroslav Ptáček

Secretary General of EFOMP

Jaroslav Ptáček works as the head of the Department of Medical Physics and Radiation Protection in the University Hospital in Olomouc, Czech Republic. He is a medical physicist in nuclear medicine and focuses himself mainly on image processing, quality control and radiation protection. He is involved in teaching of medical physics and instrumentation in nuclear medicine and x-ray diagnostics in technologists education programme. He is also involved in education and training of medical physicists in nuclear medicine in Czech Republic who are working on becoming qualified medical physicist. As a board member of Czech Association of Medical Physicists, he is involved in professional matters of medical physicists in Czech Republic. Since 2013 he has been a part of local organizing committee of ESMPE in Prague and since 2018 he has been secretary general of EFOMP.

Bracco: NEXO[DOSE][®] – Dose Management Solutions’ Validation of Skin Dose Mapping

Newly-published scientific paper shows accuracy of calculations



Comparison between the dose distributions obtained with GafChromic[®] film (a) and calculation (b) for test #6

A scientific paper titled “Validation of a dose tracking software for skin dose map calculation in interventional radiology” was released in *Physica Medica*’s April 2020 publication. The paper, authored by members of PACSHealth’s team and the physics team at ASST GOM Niguarda based in Milan, Italy, describes how the skin dose calculations generated by NEXO[DOSE][®] (Bracco Injengineering S.A., Lausanne, Switzerland) were validated against two angiographic systems. Phantom tests using several simple and complex setups were performed and it was found that NEXO[DOSE][®] was proven to provide an accurate skin dose distribution and Peak Skin Dose (PSD) estimate.

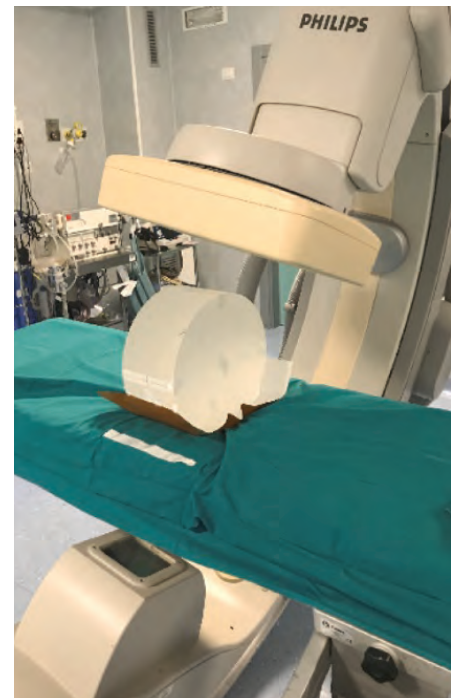
In this work, the accuracy of dose map distribution have been evaluated; a comparison between measurements with radiochromic films and software calculations were performed in terms of geometry (shape, position and size of radiation fields) and absolute dose values in phantom exposures. The outcomes indicate a proper geometry interpretation by the software and an accurate dose calculation

leading a mean difference in PSD of $7\% \pm 5\%$.

As Interventional Radiology (IR) has increased in both elective and emergency procedures, the risk associated with X-Rays should be taken into consideration as the patient skin dose can exceed the threshold of tissue reactions. Radiation-induced deterministic reactions include erythema and hair loss. In the last few years, the necessity of skin dose assessment and follow-up for patients undergoing IR procedures have been considered by different hospitals, as well as national and international bodies. Guidelines and evidences indicate PSD as adequate risk index for patients. Niguarda’s team experience shows NEXO[DOSE][®] can allow faster and more accurate monitoring of patient risk and follow-up.

The full skin dose scientific paper can be found in *Physica Medica Volume 72, April 2020 (Pages 122-132)* or at the following link:

<https://authors.elsevier.com/a/1aq~m3~imgK2XG>



The phantom centre is positioned at the isocenter and the GafChromic[®] film is wrapped under its surface.



Alberto Torresin
Head of Medical Physics
Department, ASST GOM
Niguarda, Milano/Italy
Visiting Professor at University
of Physics, (UNIMI/Italy),
Chair of ESMPE, research PI, 60
peer review articles, 240 invited
lectures.



Paola Enrica Colombo
Imaging MPE of Medical Physics
Department, ASST GOM
Niguarda, Milano/Italy
Visiting Professor at University of
Physics (UNIMI/Italy), 30 peer
review articles, AIFM regional
coordinator.



Steve Massey
VP of Business and Product Development at PACSHealth LLC
Over 25 years of radiology engineering experience with the past decade focused on the tracking and analysis of diagnostic radiation exposure. An active member in both DICOM and AAPM to promote standardization and consistently in the industry.

Joint Meeting of Professional Matters and Education & Training committees on the island of Malta



Meeting participants enjoying a coffee break together. From left: Adriann Lammertsma, Brenda Byrne, Carmel Caruana, Sam Agius, Eric Pace, Ad Maas.

Introduction

For the first time, EFOMP's Professional Matters Committee (PMC) and Education & Training Committee (E&TC) joined forces during a meeting on the island of Malta. The meeting took place from Friday 28th of February until Sunday 1st of March. The meeting was attended by Sam Agius, secretary of PMC, Brenda Byrne, vice chair of PMC,

The aim of the meeting was to hold an open discussion about three themes which concern both committees. These themes are: education and training of medical physics experts, the future of medical physics and some organizational issues. A valuable benefit of the meeting was the preparation of vice chairs on their role as an EFOMP committee chair and continuity of committee policy.

locations were excellent and still within budget.

The meeting started on Friday night 28th February with a welcome dinner in Birgu, one of the so called three cities near Valletta. There the participants were welcomed by Sam Agius in his role as president of MAMP (Malta Association of Medical Physicists).

“Specialization should take place mostly in the third phase of the education and training scheme.”

Carmel Caruana former chair of E&TC, Adriaan Lammertsma, chair of E&TC, Ad Maas, chair of PMC and Eric Pace, secretary of E&TC. Unfortunately, Christoph Bert, vice chair of E&TC was not able to attend the meeting due to restrictions placed on him due to the COVID-19 pandemic.

The meeting programme was prepared by the committee secretaries Sam Agius and Eric Pace. They took care of transport on the island, adequate accommodation, nice lunches and delightful dinners. The conference location was quiet and well-equipped and lunch and dinner

The conference comprised three sessions, Saturday morning and afternoon and Sunday morning, and ended with a pleasant lunch where the participants had a perfect view of the island.

Education and training of MPEs

This theme has several subsections which were discussed extensively and which are summarized below.

Results of the survey on national registration schemes (NRS) in European countries.

In January 2020, PMC and E&TC launched a survey concerning the national registration schemes (NRS) for MPEs among all National Member Organisations (NMOs) of EFOMP. By the end of February, 26 out of 34 NMOs had responded to the survey. These results were discussed. 16 NMOs reported their country has an NRS implemented.

The education and training scheme has been divided in three phases: bachelor, master and clinical practice (the latter including additional education). The average durations for these phases, reported by the responding NMOs were 3.3 years (bachelor), 1.9 years (master) and 4.1 years (which may be divided into 2 years for certification as a Medical Physicist with an additional 2 years to achieve MPE level). This makes an average total of 9.3 years for a complete MPE training programme. Most NRS start with pure physics topics and introduce related topics like biophysics, medical physics and radiation protection later in the curriculum. All NRS have radiation protection included in their curriculum. There was a discussion about the amount of (pure) physics and mathematics during the bachelor phase. It was concluded that there should be sufficient physics and mathematics for a candidate to continue in pure physics, in case he or she wishes to do so. This would ensure that the physics component is sufficient to serve as a strong foundation.

Bachelor and Master phases in the National Registration Scheme

Special focus was given to the first two phases of the NRS.

The start of the MPE curriculum with pure mathematics and physics has the major disadvantage of low numbers of students

being attracted to such a programme owing to the low prospects of employment. In order to cope with this problem, alternative routes have been designed, which offer more practical topics (applied physics) besides pure physics and mathematics. An example is including a course on radiation protection in the bachelor phase. In this light it is regarded as important that the potential pool of students to enter the Masters phase is not dependent on other departments/faculties.

Specialization should take place mostly in the third phase of the education and training scheme (e.g. in the Netherlands during the clinical training an MPE may choose between radiotherapy, medical imaging, hospital physics and clinical audiology).

EFOMP's role in education and training of MPE's: EUTEMPE, ESM-PE, EBAMP and EEB

This session started with an explanation by Carmel. He explained that the EUTEMPE (EUropean network for Training & Education of MPEs) initiative started with some financial support from the EU. It was aimed at young MPs to help them evolve to the expert MPE level. For this purpose, special courses (called modules) were developed. EU financial resources have now been spent, making continuation of EUTEMPE problematic (no further EU funds available), making modules too expensive for candidates without alternative sources of funding. The EFOMP Board has been asked to provide some financial support in order to maintain EUTEMPE. EFOMP has granted this request. The ESM-PE (EFOMP School for Medical Physics Experts) aims at MPE level professionals and needs no financial support. The courses are quite successful and create some extra money for EFOMP. The role and function of EBAMP (European Board for Accreditation in Medical Physics) is to accredit medical physics education and training events. EBAMP accredits mostly E&T events at EQF level 8 (European Qualifications Framework), among them the ones organized by EUTEMPE and ESM-PE. The number of events accredited by EBAMP is stable.

The future of medical physics

New developments in health care which may influence medical physics

The list of new developments in health care could be divided into four sections which are briefly discussed here.

A. Classical medical physics systems

Most MPEs in Europe are engaged in the use of ionizing radiation, be it for imaging or therapeutic purposes. This is why the first section of new developments has been named classical medical physics systems. These include systems for radiotherapy, nuclear medicine and most of the imaging equipment for radiology.

- total body PET
- proton beam therapy

B. Non-ionizing radiation imaging and therapeutics

The use of ionizing radiation for medical imaging and therapy is nowadays complemented by equipment which uses non-ionising radiation like radiofrequencies (MRI), infrared (thermography) visible region and (ultra)sound. The advantages of this approach are clear as there is no carcinogenic or mutagenic risk caused by non-ionizing radiation, however, other safety and image quality issues pop up and this is where the MPE comes in.

- medical imaging based on medical optics such as Optical Coherence Tomography (OCT), tumour cell visualization using fluorescence techniques and Near Infra-Red Spectroscopy (NIRS).
- medical laser technology
- 3D imaging
- therapeutic use of ultrasound
- intra- operative optical techniques

C. Medical information technology systems

Medical information systems form a multi-disciplinary topic. Apart from software engineers (programmers, system architects,

hardware specialists, safety officers, etc.) other professionals, like economists, lawyers, business experts and physicists may be involved. The interest of the (medical) physicist concerns validity and accuracy of the information system.

- artificial intelligence 2.0. New theoretical developments in the 1990s have given a boost to a new level of artificial intelligence. Practical applications of AI are now involved in medical devices and physics-based methods.
- connectivity of medical devices
- use of AI in diagnostic imaging in monitoring and real-time predicting therapy outcome.
- 3D printing, especially valuable in orthopaedic surgery
- virtual reality, to aid therapeutic exercises in rehabilitation, by making them more attractive for patients and a virtual reality app for patients going for MRI scans to help prevent anxiety and fear.

D. Quality and safety issues

The quality of a medical system (this includes methods) is determined by its effectiveness and its efficiency. Effectiveness relates to health benefit, be it healing or bringing a halt to disease progress. Efficiency is more cost related and is influenced by production speed, cost of ownership, staff and disposables. The safety of a medical system concerns the risk of damage for the patient and to ineffective or contra productive treatment. Dosimetry is a good example of a quality and safety issue where MPEs are experts but there are more.

- cost reduction during the complete life cycle of medical equipment: purchase, acceptance tests, training of users, sterilization or disinfection where applicable, disposable materials, quality assurance, preventive and corrective maintenance, and disposal of equipment according to local restrictions.
- implementation of EU Medical Device Regulation 2017/745 including evaluation of the effectiveness of the device. Implementation of this law has consequences for the role of the MPE as more clinical trials are needed to demonstrate the efficacy and safety of

(new) medical devices. These clinical trials are part of both pre-market and post-market surveillance. A medical device expert should take part in these trials and the MPE might be this expert.

- personal medicine, now made possible through the use of medical informatics
- determining the effectiveness of expensive pharmaceuticals.
- automation in quality control acceptance testing

The future of the Medical Physics Expert

The list of new developments in health care and the need for support by physics trained professionals demonstrates that the MPE profession should expand to other medical specialties beyond that of radiotherapy, nuclear medicine and radiology. Examples of medical specialties which need MPE support are: surgery (gastro intestinal, vascular, urology, orthopaedics, plastic, ENT, ophthalmic, etc.), internal medicine (GI, dialysis), cardiology (catheterization, cardiac implantable electronic devices, intensive care), neurology (clinical neurophysiology). This is not to say that one MPE should be able to perform all tasks. Rather new medical physics subspecialties should evolve. Good examples of this can be found in the UK, the Netherlands and Finland. Together with this professional expansion, a new, more modern image of the MPE is needed. Therefore, the attitude of most MPEs has to be changed. This means more and better collaboration with virtually all members of the medical staff of the hospital. MPEs must abandon their overly narrow interest and be open to new things in diagnosis and treatment of patients.

Another aspect that was discussed was the role of the MPE in quality control and acceptance testing of new medical equipment. It appears that in some countries these tasks are exclusively reserved for manufacturers and sales companies. In addition, there is (sometimes serious) competition from radiographers and nurses. This is neither beneficial for patients nor for the hospital, as the saying goes ‘the butcher should not approve his own meat’ and ‘cobbler stick to your last’.

Organizational issues

Collaboration between PMC and E&TC

It is obvious that there is a close relation between education and training of medical physics professionals and professional matters. This brings the need for a close collaboration between these two committees. The meeting in Malta should be seen as a start for this.

Role and function of the committee secretary

The committee secretary should be the first line of contact between the external audience and the committee. As such the secretary is the communicator and gate-keeper for the committee. Therefore, messages from outside the committee should be directed to the secretary with a copy to the committee chair. The discussion continued with the role and function of the Secretary General (an extremely busy job) and opportunities to lighten the job when EFOMP’s Headquarters move from the UK to the European continent.

“...the MPE profession should expand to other medical specialties, including surgery, internal medicine, cardiology and neurology...”

Position and responsibilities of the MPE

There was a short discussion about the duties of the MPE as described in the EU Directive concerning radiation protection (EFOMP PS 16). With regard to the duties of the MPE as stated in the EU directive, it is the MPE who should decide what it

means to “be appropriately involved”. This is important for two reasons:

- Owing to excessive professional pride or personal psychological issues other healthcare professionals avoid asking for advice even when the patient’s health is at stake
- A high number of healthcare professionals do not even realize that advice is necessary.

The significance of this is that the MPE is entitled to act proactively. The MPE may give advice to physicians, clinical personnel and hospital administrators,

even without being asked. This requires a higher level of leadership qualities than presently taught in medical physics educational programmes. In the Netherlands some MPEs give mandatory lectures concerning radiation protection to radiographers.

The teaching of medical physics to non-physics healthcare professionals

Carmel Caruana mentioned that a Special Interest Group, set up when he was chair of E&TC, has published 3 articles in the EJMP and a final one is on its way. It was proposed that once this fourth arti-

cle has been published, Carmel will initiate the writing of a new policy statement for EFOMP based on a summary of the (four) articles. Since the work has already been done, no face-to-face meetings are necessary and the policy statement can be developed through email.



Dr. Ad J.J. Maas, MPE

Ad Maas is now a retired medical physicist expert after 35 years working in the Jeroen Bosch Ziekenhuis, a general hospital in ‘s-Hertogenbosch, Netherlands. Since 2018 he is chair of the EFOMP Professional Matters Committee working on a new procedure for international approval of national registration schemes for medical physicist experts. His main interests are hospital physics, hospital safety, quality systems, operating room, intensive care and cardiac pacing.



Brenda Byrne BA, MSc

Brenda Byrne is a Principal Physicist with over 19 years’ experience working as a medical physicist in the Mater Misericordiae University Hospital, Dublin, Ireland. Her primary areas of interest are diagnostic radiology, nuclear medicine and radiation protection. She completed her undergraduate and postgraduate studies in Trinity College Dublin. Brenda is an occasional lecturer with the University College Dublin, School of Diagnostic Imaging and the Royal College of Surgeons, Faculty of Radiology, Dublin. Brenda was elected as Vice-Chairperson of the EFOMP Professional Matters Committee in October 2019. In February 2019, Brenda undertook the EFOMP EUTEMPE Course MPE01 Leadership in Medical Physics, Development of the profession and the challenges for the MPE. She is now a module co-leader for this course.

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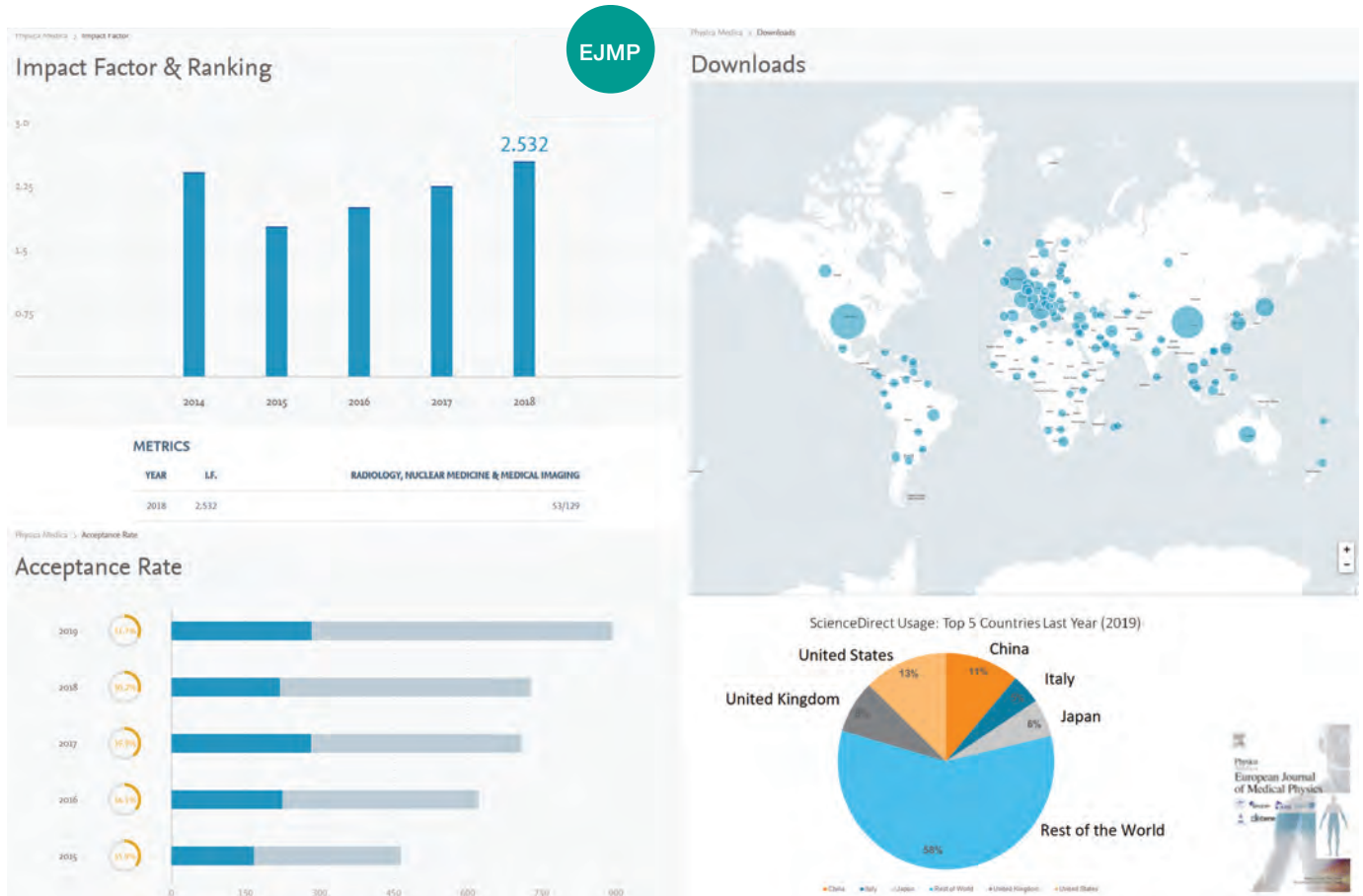
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Physica Medica: Editor's Choice

In this new, regular feature, the Editor-in-Chief of Physica Medica – European Journal of Medical Physics, Paolo Russo, explains his choice of recently-published articles.



For this Summer issue of EMP News I selected the following five articles, recently published in Physica Medica (EJMP), which attracted my attention.

Roberta Castriconi et al.: Knowledge-based automatic optimization of adaptive early-regression-guided VMAT for rectal cancer *Phys. Med.* 2020;70:58-64

Adaptive radiotherapy (ART) permits to tailor the radiation treatment to the tumor during dose fractionation, following its radiobiological response. Here, the authors investigated an automatic planning approach for rectal cancer ART, developed out of a knowledge-based (KB) optimization scheme. A robust strategy was developed for applying their KB model to the ART phase, by scaling from the preliminary (non ART) phase. Their validated strategy compared favourably with clinical plans. In terms of generalized equivalent uniform dose to organs at risk,

they found a significant reduction for the bowel. This nicely written article shows rationale and details of the implementation steps in this state-of-the-art ART procedure for automatic planning in new-adjuvant radio-chemotherapy for rectal cancer.

Alberto Traverso et al.: Machine learning helps identifying volume-confounding effects in radiomics *Phys. Med.* 2020;71:24-30

Radiomics is a field of active research. An important aspect in these studies is the statistical significance and the robustness of the findings, which determine the overall final quality of the study. This Open Access article points towards some possible bias in radiomics-based models, specifically as regards the dependence of radiomics features on volume, in datasets of lung and head and neck cancers. The authors propose machine-learning based methods for benchmarking radiomic studies. This approach is recommended, in my opinion, since

self-critical assessment of the results of a radiomics study is particularly relevant in scientific publishing in this field.

Alessio Elia et al.: A GATE/Geant4 beam model for the MedAustron non-isocentric proton treatment plans quality assurance *Phys. Med.* 2020;71:115-123

For the MedAustron proton therapy fixed beam line characterized at the nozzle exit window, the authors implemented a GATE/Geant4 Monte Carlo beam model, taking into account the nozzle geometry and the pencil beam optical properties. This permits a better characterization of the beam propagation from the exit window to the surface of the patient, an important step in devising and validating Monte Carlo simulations for independent dose calculations. The model was validated experimentally in terms of dose-area product, by assessing the 3D dose distribution in a water phantom. This study sets an important step for future Monte Carlo dosimetry studies at this centre, for independent dose calculations in the clinical routine.

Marc Kachelriess and Madan M. Rehani: Is it possible to kill the radiation risk issue in computed tomography? *Phys. Med.* 2020;71: 176-177

In this Letter, the authors address an important issue in radiation protection of patients related to medical exposures, namely, the possibility (as evidenced by recent studies) that some patients may undergo through repeated computed tomography (CT) scans which may expose them to cumulative effective doses higher than 100 mSv. There has been large debate in the medical physics and radiology communities in the last decade about the risk of CT exams on the population and the efforts to reduce unnecessary exposures and to continue devising dose-efficient CT scan procedures. This Letter points towards a reduction of the CT dose via a number of technological approaches, including the use of “smart” X-ray spectra produced via tube voltage and current modulation, filter thickness

modulation, adaptive bow-tie filters, and the adoption of photon counting detector for improved signal-to-noise ratio and for spectral imaging. Another point in their list of dose-efficient approaches is the use of deep learning software techniques for CT image reconstruction. Killing the radiation risk in radiological procedures, and in particular in CT imaging, is surely an issue on the top of the list of medical physics research, and I share with the authors the encouragement to the research community and to the CT imaging industry to dedicate continued R&D efforts for dose optimization and reduction.

Yuto Kimura et al.: Error detection using a convolutional neural network with dose difference maps in patient-specific quality assurance for volumetric modulated arc therapy *Phys. Med.* 2020;73: 57-64

Patient-specific quality assurance for intensity modulated radiation treatment plan verification is prone to positional error originating from the multi-leaf collimator (MLC) operation. In line with a recent approach in the literature which adopts radiomics or machine-learning based techniques, in this article the authors show an original way to detect and assess MLC positional errors in volumetric modulated arc therapy of prostate cancer, using a convolutional neural network (CNN) on retrospective data. A learning dataset of difference dose maps and gamma maps was generated, starting from calculated maps (from the treatment planning system) and the corresponding measured maps in a phantom with a 3D detector. A model for the CNN was then devised, analysed in terms of classification accuracy, sensitivity and specificity, based on dose difference maps or gamma maps. The best performance was obtained with the former approach, exceeding the positional error detection capability of the conventional gamma analysis approach. Though this study refers only to one type of cancer, I find it informative and clear in illustrating a very recent approach to patient-specific quality assurance in radiotherapy planning using artificial intelligence methods.



Paolo Russo

Professor of Medical Physics at University of Naples “Federico II”, Naples, Italy. His scientific interests are in the field of 2D and 3D X-ray breast imaging, photon counting pixel detectors, semiconductor based compact gamma cameras. He is Editor-in-Chief of *Physica Medica* (2013-2020), the official scientific journal of EFOMP. He is Past-Chair of the Communications and Publications Committee of EFOMP and Chair of the Publications Committee of IOMP.

Radiation Dose Management of Pregnant Patients, Pregnant Staff and Paediatric Patients



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This is another book of the IPEM IOP Series in Physics and Engineering in Medicine and Biology and an extended result of the well-structured EUTEMPE-RX module 11 of the same title, where emphasis is laid more on conceptus and paediatric dose estimation methods. The topic of this module as well as of the book is of great interest since the application of ionizing radiation dose to pregnant females and to children is always linked to great emotion. Therefore, well-written scientific information is needed to optimize the application of ionizing radiation by medical physicists as well as to be able to inform patients and staff of possible consequences of the radiation dose of an examination in the best manner based on reliable facts.

The book consists of 8 chapters by a set of five authors, all of whom are instructors of the above-mentioned EUTEMPE-RX module. The chapters cover topics of dosimetry, biological effects of ionizing radiation, parameters influencing conceptus and paediatric patient dose and the amount of dose absorbed by diagnostic and interventional radiology, methods to calculate this dose, optimization of examinations performed during

Radiation Dose Management of Pregnant Patients, Pregnant Staff and Paediatric Patients; edited by John Damilakis; published by IOP Publishing Ltd, Bristol, UK, 2020; 250 pages, printed hardcover: €113.81, ebook (PDF/epub/Kindle format): €85.27. ISBN-13 978-0-7503-1318-6;

<https://doi.org/10.1088/978-0-7503-1317-9>

pregnancy as well as on paediatric patients and finally the management of pregnant patients and staff linked to exposure with ionizing radiation. An appendix lists definitions of dose quantities for measurement in radiography/fluoroscopy and CT.

It might not be the best start for a book review in the perspective of the publisher to point out that the first (and extensive: 55 pages!) chapter of this book by Damilakis and Papadakis can be downloaded as a PDF for free from the publisher's website. I very much liked this chapter as a teacher of a dosimetry course, since it contains a lot basic information on phantoms and the material thereof, Monte Carlo simulations codes and phantoms respectively, as well as on thermoluminescence and optically stimulated luminescence dosimetry combined with a well-selected list of more than 115 references. This chapter on its own could be used for a submodule of a teaching course on dosimetry in radiology!

The second chapter by Perisinakis and Tsapaki gives, after an introduction to the basics of physiology and biological effects of radiation to a developing conceptus and children, a good overview on the existing reports of dose effects by various institutions. Chapter 3 on parameters influencing the dose by Damilakis is again dedicated to the basic technical knowledge on parameters like tube potential and current-time-product, automatic exposure control and geometric setup parameters like field size and distances, filters influencing beam quality, anti-scatter grids and detector technology; as with Chapter 1, this could be useful for teaching. Technical parameters of CTs are

included as well, and special emphasis is given to the anatomical geometry of a pregnant woman or a child.

Chapter 4 by Damilakis and Tsapaki presents information on results for the dose from different examinations by radiographic or CT diagnostics as well as fluoroscopic interventions, again like chapter 2, from a list of reference publications by IAEA, ECR, WHO and AAPM as well as a series of selected papers from the recent literature. So the interested reader can easily follow up special details if interested. Chapter 5 on methods to calculate these doses is written by the same two authors as chapter 4. It starts with calculations based on simple mathematical phantoms from papers by authors including Damilakis himself. It is very helpful for the reader that calculations of real examples are presented. Especially for doses from CT examinations, which nowadays include various kinds of automatic tube current control algorithms to lower the dose to the patient, conversion factors from Monte Carlo simulations have to be applied. Here, the free program CoDE (Conceptus Dose Estimation) for calculation of the dose to pregnant patients by Damilakis et al. for all major kinds of examinations is presented. Other programs to calculate patient doses from examinations are just mentioned, but not discussed in further detail in this chapter (but were mentioned in chapter 1).

The last chapters of this book are dedicated to the optimization of examinations if they have to be performed during pregnancy of a patient or a staff member or on a child. Perisnakis and Stratakis address in chapter 6 examinations linked to pregnancy, Papadakis, Stratakis and Tsapaki in chapter 7 those for children. One notices that these texts repeat some facts already stated in the introductory chapters, such as the

fact that danger is linked to ionizing radiation and that this is often emotionally specially treated for cases of pregnant patients or children. Nevertheless, both chapters offer detailed information on which parameters can be used with what kind of effect to limit the dose (e.g. listed in table 6.1 for interventional procedures). Chapter 7 for children is a bit more informative, as it gives many references to papers in the literature as well as results listed in tables of national Diagnostic Reference Levels (DRLs). A minor omission is that the initiative “Image Gently” is mentioned in the text but the web link www.imagegently.org is not given with it. The last short chapter 8, again by Damilakis addresses the management of intentional or accidental exposure of pregnant patients as well as regulatory measures for pregnant staff members. For the latter case calculations of scatter radiation doses for positions on a 50 cm x 50 cm grid are implemented in the CoDE software by Damilakis et al. for fluoroscopically-guided interventional procedures with a C-arm unit.

Finally, upon reading the text I have just found one typo in this whole book! On p. 108 the exponent “²” is missing in the unit of the dose area product [mGy cm²]. This might be taken as another proof of the quality of the texts presented here by the editor John Damilakis, that presumably have been used already for several repetitions of the corresponding EUTEM-PE-RX course and thus cross-checked by and improved from the feedback of the participants. I enjoyed reading the book and recommend it not only for teaching purposes as already mentioned, but as a reference book on the radiation exposure of pregnant women or children, not only for any medical physicist in diagnostic radiology, but also for interested radiologists or radiographers, too.



Prof. Dr. Markus Buchgeister, Beuth Hochschule für Technik Berlin, Germany

Markus Buchgeister entered the field of medical physics in radiation therapy at the university clinic of Tübingen in 1995. In 2010, he received a call for a position as professor for medical radiation physics at the Beuth University for applied sciences at Berlin. Since 2003, he is engaged as co-opted DGMP board member for public relations and communications of the German Society for Medical Physics. Parallel, he served as chairman of the EFOMP Communication and Publications Committee 2003-2009 and from 2009-2015 as German EFOMP delegate. In 2017-2018 he was chairman of the EFOMP Education and Training Committee and German EFOMP delegate for a second round.

AGFA: Radiotherapy dosimetry market research survey



The Agfa-Gevaert Group develops, produces and distributes an extensive range of imaging systems and radiology solutions, mainly for the printing industry and the healthcare sector, as well as for specific industrial applications. The Agfa-Gevaert Group has been one of the world's leading companies in imaging technology, it has more than 150 years of imaging experience. This division delivers diagnostic imaging solutions that set standards in productivity, safety, clinical value, and cost-effectiveness.

In the framework of a radiotherapy market research, the Agfa-Gevaert Group would like to deliver a survey to specialists in the field of radiotherapy, medical physicists, and dosimetrists to have a better understanding in terms of needs and future expectations regarding dosimetry and patient-specific QA.

The survey is aimed towards assessing the value of a dosimetry technology and to get a clearer insight into the dosimetry requirements in radiotherapy in order to evaluate the demands for an efficient, convenient, and affordable solution.

LINK

The survey will require a few minutes to be completed, by clicking the following link:

<https://forms.gle/2ruDEze5ijsJxCc18>



Paul Leblans

Paul Leblans is Technology and Innovation Manager in the Corporate Innovation Office of Agfa NV. He joined Agfa in 1990 to develop the storage phosphor and the plates for Agfa's Computed Radiography systems and to start up their production. He then became responsible for Agfa healthcare's consumables R&D before taking a role in technology and innovation. Paul Leblans is co-author of 37 publications, a number of book chapters and conference papers and co-inventor of some 70 patented inventions.

The Medical Physics journey in Lithuania: from student to scientist

Promotion of medical physics as a career or a field of science in Lithuania normally starts with Medical physics studies at Kaunas University of Technology (KTU), the only place in Lithuania where internationally trained and dedicated teachers and well-known scientists are sharing theoretical knowledge, practical skills and clinical experience with the students, who come not only from Lithuania but also from many other countries, including Japan, Canada, Germany, Turkey, India, Iran Iraq, Egypt, Lebanon, Georgia, Serbia, Bulgaria.... Many of the students are keen to be involved in the organization of the different science and public events, like the campaign “ask a MEDICAL PHYSICIST”, organized as part of the International Medical Physics Day or at an International science festival such as “Spacecraft-Earth”.



Medical physics students and teachers during the campaign “Ask a MEDICAL PHYSICIST”, which was organised at KTU.

Due to the fact that the Master’s in Medical physics degree has been offered at KTU for over 20 years, graduates of this programme are working in all oncology centres of Lithuania, in different hospitals and at the Radiation Protection Centre. Since all medical physicists are like a big family, it creates unique possibilities for the students to collaborate with experts in a clinical environment and perform a lot of investigations related to their research work or needed for preparation of their final MSc thesis. The results of these investigations are usually presented at the biennial International conference, “Medical Physics in the Baltic States”. This conference is organized by Kaunas University of Technology and Lund University (Sweden) and proceedings of this conference are included into the CA WoS database.

Programme graduates may explore the possibility of entering the clinical environment as a junior medical physicist with a well-predefined career path or as radiation protection officer, or they can choose to embark on a research path, continuing to PhD studies.

Independently of the chosen career path, medical physicists are actively participating in different national and international research projects related to the field. Topics include: analysis of clinical and physical aspects of HDR brachytherapy; development of optically transparent polymeric nanocomposites for radiation protection shields; development of 3D printed phan-

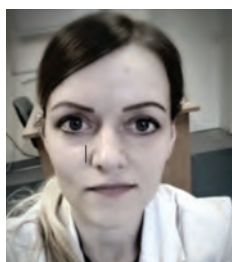
tom for individualized dosimetry in radiotherapy; development of new plasmon sensors for dosimetry; development of neurosurgical treatment options for Parkinson’s disease applying molecular markers, gamma knife technology and individualized dosimetry. These are only a few examples of projects conducted recently by young medical physicists under the guidance of experienced researchers.

However, even though they are internationally and nationally recognized by official authorities, medical physicists are still almost unknown as healthcare professionals in Lithuania. For this reason, we are trying to be prominent and conspicuous, spreading understanding and showing the importance of physicists’ involvement in medicine.



Diana Adliene

Prof. Diana Adliene, PhD in Physics, was a founder of the “Medical Physics” MSc programme at Kaunas University of Technology in 2004. She contributed significantly to the recognition of medical physicists as healthcare professionals in Lithuania. Being a supervisor of PhD students, she helps graduates from the Medical physics programme to configure their researcher career and promotes development of research in medical physics.



Evelina Jaselske

Evelina Jaselske is a final-year PhD student at KTU, funded by the Lithuanian Research Council, working on development of new free-standing dose gels for patient dosimetry purposes in radiotherapy. She is a medical physicist at the Radiotherapy and Neurosurgery departments of HLUHS. Her main experience is in dose planning, dose verification and dose reconstruction issues in radiotherapy. Also, she is a lecturer at Kaunas College and gives lectures for the students in the field of biomedical sciences. She participates in scientific projects related to medical physics issues in medicine.

Medical Physics in Estonia

The Estonian Society for Biomedical Engineering and Medical Physics (EBMÜ, www.ebmy.ee) was founded in 1994. Since the establishment it has promoted education, training and certification of Medical Physicists and Biomedical Engineers in Estonia.

In small countries, such as Estonia with a population of 1.3 million, it is probably unreasonable to have separate educational and professional activities in the Medical Physics and Biomedical Engineering specialties, because opportunities of employment within so narrow a field of qualification are quite limited. Therefore, the educational activities began in the framework of joint specialization in both fields.

The First European Conference on Postgraduate Education in Medical Radiation Physics, held in Budapest in 1994, was a milestone for the development of the profession of Medical Physicist in Central and Eastern Europe and triggered various international activities in this field. After the conference, data from 30 European countries and institutions were collected and published including information about the first initiatives at the University of Tartu (UT) and Tallinn University of Technology (TUT) in this field. It has become a very important contribution to provide medical physics and biomedical engineering specialists for hospitals.

The joint (TUT and UT) Master's curriculum in Biomedical Engineering and Medical Physics was initiated in 2009 as a European educational project. It covered two years of master's level studies in the amount of 120 ECTS. Over recent years 5-10 graduates have completed the programme every year. In 2019 the joint curriculum was reorganized and now it is based only in TUT.

The first professional standard for a Biomedical Engineers' qualification (including specialization in Medical Physics) in Estonia was issued in 2006. Recently (1st quarter of 2020) the standard was revised by a professional commission, including experts from hospitals, medical equipment providers, testing laboratories and universities. By the revision, the Chartered Biomedical Engineer (EQF level 8) may be specialized as Medical Physics Expert (MPE) in one of the following three fields: diagnostic and interventional radiology, nuclear medicine (NM) or radiotherapy (RT). The requirements for MPEs are based on European guidelines RP174. There is also differentiation for specializing in traditional Biomedical Engineering specialties



EBMÜ members in a summer school at Järvamaa county, Estonia

“The joint Master’s curriculum in Biomedical Engineering and Medical Physics was initiated in 2009 as a European educational project”

– e.g. anaesthetic and intensive care equipment, intracardiac equipment etc. This standard is effective for the next 5 years.

EBMÜ has recently received the authority to carry out certification by this standard.

By the Estonian legislation (Radiation Act), only persons who have such MPE qualification can act, consult and participate in the use of medical radiations. RT, NM and interventional radiology departments are required by law to have or involve MPEs in the medical procedures. Currently there are 25 Medical Physics Experts recognised by the competent authorities in Estonia; 17 of them are specialised for diagnostic radiology/NM and 8 for RT.

There are 65 public and private hospitals in Estonia including 35 nursing and rehabilitation hospitals. Public hospitals are divided into regional, central, general, and local hospitals. Regional hospitals – North Estonia Medical Centre (located in Tallinn) and Tartu University Hospital – deliver the full range of services, including RT. Both regional hospitals have at least three MPEs specialised in RT and enough Medical Physicists specialised in diagnostic and interventional radiology and NM. Altogether, in Estonia we have six linear accelerators, which are capable of performing state-of-the-art external beam RT procedures (IMRT, VMAT, SBRT, SRS and gating) and two HDR brachytherapy units. Four of our central hospitals deliver most services except for RT; their MP teams contain a number of MPEs specialised to diagnostic and interventional radiology. General and local hospitals provide 24/7 emergency care, intensive care and some surgical and medical specialties, these hospitals and dental practices outsource the MP services.



Kalle Kepler

Kalle Kepler holds a PhD in Physics and is a Medical Physics Expert (Diagnostic Radiology). He is Head of the Accredited Testing Laboratory for quality control testing of X-ray diagnostic equipment in Estonian hospitals and health centres; since 1997 has taught and supervised Medical Physics MSc students at the University of Tartu and Tallinn University of Technology; currently part-time Associate Professor at Tartu Health Care College, teaching Radiography students.



EFOMP e-learning

EFOMP's e-Learning platform was launched in January 2019. It contains a wealth of information, including video recordings and pdfs of lectures given during seven recent editions of the European School for Medical Physics Experts (ESMPE), as well as complete recordings of the highly-informative "Lockdown webinars" organized by EFOMP and IAPM in Spring 2020.

Access to the EFOMP e-Learning platform is provided to all **Individual Associate Members (IAM) of EFOMP**. Becoming an IAM is very simple – **just complete an online registration form** and pay a subscription fee of €15 (renewable annually). You will receive immediate access to the e-Learning platform.

Registration as an EFOMP IAM is available to anyone, in any location (including outside Europe) who is interested in continuing and supplementing their education and training in Medical Physics.



The History of Medical Physics Project

Vice-President of IUPESM,
Professor Slavik Tabakov writes
about this important and fasci-
nating initiative.

The idea about this History of Medical Physics project came at one of the meetings associated with the [Encyclopaedia of Medical Physics](#) in 2007. The following years were very busy with the online Encyclopaedia and Dictionary development and it was in 2015 when it was discussed at the IOMP Publication Committee. This was accepted very well also by the IOMP Executive Committee and the Regional Coordination Board (including the leading medical physics officers from all IOMP Regional Organizations and leading Societies).

In 2017 the brief project description was published for the first time in the Medical Physics International (MPI) Journal [1]. Following this, all Special Issues of the MPI Journal (Edited by S. Tabakov, P. Sprawls and G. Ibbott) have included topics associated with the History Project, thus forming the MPI Special Issues (cover page shown above) for description of the history of our profession.

The main objective of the History project is to trace the creation and the evolution of different equipment and methods, as well as their clinical application; the overall development of the profession and the main contributors in the various topics of medical physics.

The project is very big in scope and its development will take a number of years. It will use the methodology of the Encyclopaedia projects – parallel development in the various sub-branches of our profession. The result will be a Compendium of various independent Volumes, as per the different branches of the profession.

Each Chapter/Sub-chapter inside a specific Volume will refer to specific types of equipment and/or methods. The evolution of these will be described in a chronological manner – e.g.: what medical need existed, how the equipment/method idea has emerged; how it has developed; how it has been introduced into practice; how it has evolved; how it has been replaced by

others OR has phased out OR has provided the background of something else, etc. These will be supported by a Reference list of the main publications. The Chapters are published in the MPI Special Issues, as they are being prepared and later these will be combined in the respective volumes.

All MPI Special Issues related to the History of Medical Physics project can be found at the MPI website (www.mpijournal.org/history.aspx). To this moment three MPI Special Issues have been published:

MPI Special Issue 1 [2]:

- X-ray Tubes Development - IOMP History of Medical Physics (R. Behling)
- Film-Screen Radiography Receptor Development – A Historical Perspective (P. Sprawls)
- History of Medical Physics e-Learning Introduction and First Steps (S. Tabakov)

MPI Special Issue 2 [3]:

- Fluoroscopic Technology from 1895 to 2019 Drivers: Physics and Physiology (S. Balter)
- The Scientific and Technological Developments in Mammography (P. Sprawls)
- Review of the Physics of Mammography (C.R. Wilson)

MPI Special Issue 3 [4]:

- History of Dental Radiography: Evolution of 2D and 3D Imaging Modalities (R. Pauwels)
- The History of Contrast Media Development in X-ray Diagnostic Radiology (A.M.K. Thomas)
- Medical Physics Development in Africa –Status, Education, Challenges, Future (T. Ige, *et al.*)

In addition to a Summative paper about the professional development in Africa, MPI published such Summative papers related to the development of medical physics in the Middle East [5] and in Central America [6].

MPI Special Issue 4 is now in preparation and will cover Cobalt-based Radiotherapy, Computed Tomography, Professional Development in South-East Asia, and other topics.

The results of this large international project will be used not only by medical physicists, but also by medics and other related professionals. The History project will be useful also to researchers dealing with the stages of development and evolution of specific methods and equipment. At the World Congress WC2018 the project was reported as one of the elements of the IOMP strategy for the future growth of the profession [7].

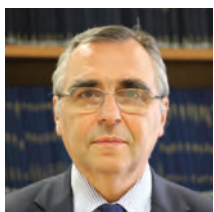
The interest in this project from our professional community is illustrated by the thousands of downloads of the free MPI publications. As an example, during its 5 weeks of existence the MPI Special Issue No.3 has had 8967 downloads. The AAPM History Committee actively supports the History project and since 2019 includes topics from it in its History Symposia.

There are some very useful Overview articles in various Journals related to the historical development of specific methods or equipment. We would encourage their authors to consider their inclusion in the MPI Special Issues (updated or re-print) in order to have all the history of our professional development available in one location. We welcome the contribution of colleagues from all societies, organizations and companies, who plan to join the History project in its various volumes.

The History project will have an additional dimension for medical physics – it will create an excellent visibility for our profession and will secure its place in healthcare development.

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Slavik Tabakov,

Vice-President IUPESM, Past-President IOMP

Prof. Dr. Slavik Tabakov, FIPEM, FIOMP, is Vice President of the International Union of Physical and Engineering Sciences in Medicine (IUPESM, 2018-2021) and was President of the International Organization for Medical Physics (IOMP, 2015-2018). He started his career in Bulgaria and since 1991 has worked at King's College Hospital and King's College London, UK. He is also Co-Director of the International College on Medical Physics, ICTP, Trieste, Italy. He is known for his work in medical physics education and training and for pioneering e-learning in the profession.

European Board for Accreditation in Medical Physics (EBAMP)

2019 Annual Report

EBAMP is an independent organization that accredits medical physics education and training events to improve the education of health professional involved in the practice of medical physics. EBAMP encourages medical physics organizations and any other provider of educational events to participate in an accreditation process as an external assessment of quality. The EBAMP Annual Report 2019 and a summary of accredited events is presented here.

Introduction

The European Board for Accreditation in Medical Physics (EBAMP) arose from the EFOMP Council meeting held in Athens on 13th September 2014, as an independent organization that accredits medical physics education and training events. EBAMP is grateful to EFOMP for providing their support.

EBAMP is mainly aimed at improving the education of health professionals involved in the practice of medical physics, by accrediting medical physics education and training events such as workshops, conferences, hands-on training and courses as well as on-line educational events. Mainly, this task is carried out by allocating Continuous Professional Development (CPD) credits based on quality and quantity criteria in order to ensure the effectiveness and usefulness of the education provided. EBAMP accredits educational events by means of an assessment of planning, promotion, staff, teaching methods, facilities and design of the educational activity being provided through appropriate policies and protocols developed for that purpose.

It is not intended, at any stage, to replace any local accreditation scheme. EBAMP will work to set European standards for education and training event accreditation for any training provider and offers an accreditation process to those EFOMP national member organizations (NMOs), consortia, entities and international educational events providers that do not have one at present. EBAMP aims to set the standard for accreditation systems for education and training in medical physics in Europe.

EBAMP firmly believes that an accurate, well-designed Continuous Professional Development programme and training is essential for any qualified professional and more specifically for health professionals as medical physicists to improve knowledge, competence, skills, quality and safety within the performance of their professional activities.

Background

EBAMP was set up by EFOMP in June 2016 with the election of Board members among those proposed by NMOs. EBAMP activities for accreditation started on November 7th, 2016.

Board members approved a Quality Manual, CPD points criteria to be assigned once the assessment of the educational event is completed and the accreditation fee is duly paid.

The accreditation process is handled and managed online by a specific website to be used by applicants and Board members to assess the educational event.

Since November 2016, a broad range of educational events have been assessed and accredited: educational events scheduled by EFOMP, medical physics organizations and further institutions from Europe and abroad.

EBAMP accreditation policies and protocols

EBAMP's Quality Manual and Continuous Professional Development points criteria can be found in the EBAMP website (www.ebamp.eu)

EBAMP's criteria to assign CPD credits are substantially more complex than assigning 1 point per scheduled learning hour; EBAMP's requirements are based on two main criteria:

“Quantity” criteria to assign 1 point to 1 learning hour scheduled, including hours of effort time for online activities, with a slight restriction for those activities with more than 35 hours scheduled. An additional restriction for total training hours scheduled including assessment time has been established by applying educational criteria: a maximum of 7 hours per day and a maximum of 35 hours per week.

In order to promote practical sessions, assessment of attendance and diffusion of activity, additional “Quality” criteria have been considered to assign points to each one of these items.

These two criteria comprise the total CPD credits assigned to the learning activity accredited.

For those courses with examination scheduled, two different schemes for CPD credit points can be assigned and included in the EBAMP Certificate of Accreditation: with assessment for those participants who pass the examination and without assessment for those participants who do not sit for or do not pass the examination.

Accredited Events

This summary refers to the educational events accredited up to December 31st, 2019.

The total number of accredited events up to 2019 was 76 which were divided into 52 courses, 15 congresses or conferences and 9 workshops [Fig 1]. A substantial number of educational events have been provided within the international scope (60), including two events organized by institutions outside Europe, and the remaining were provided within the national scope (16) [Fig 2]. Out of the total number of providers of educational activities, the applicants for accreditation may be classified into international institutions (61%) [Table 1], medical physics organizations (22%) [Table 2], and others (17%). In Table 3 is presented the number of events held in different countries.

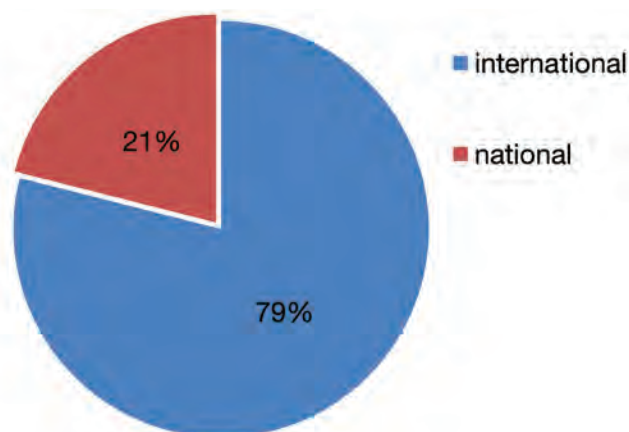
EBAMP is fully committed to work to keep counting on the confidence placed by the educational events providers.

Final Remarks

EBAMP highly appreciates the dedication of those institutions providing learning activities and promoting Continuous Professional Development programs to improve the continuous training of health professionals involved in the practice of medical physics.

EBAMP encourages any institution to continue holding learning activities intended to provide continuing professional development to medical physicists as well as to take part in an accreditation process for any educational event as an external assessment of quality.

Scope



Events by International Institutions

| | | | | |
|---------|-----------|---------|-----------|---------------------|
| IAEA: 1 | ESTRO: 14 | EANM: 5 | EFOMP: 10 | EUTEMPE Project: 16 |
|---------|-----------|---------|-----------|---------------------|

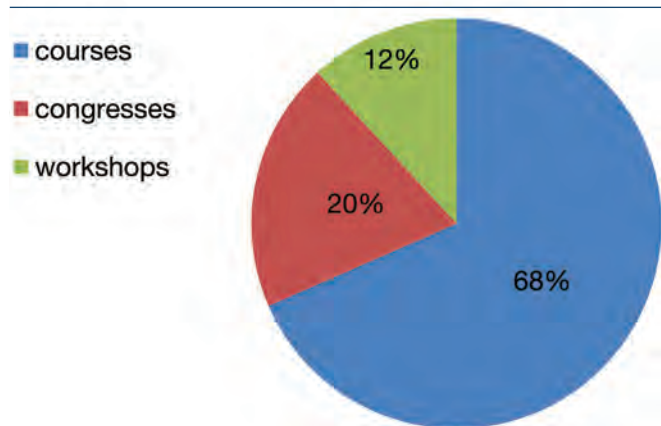
Events by Medical Physics Organizations

| | | | | |
|---------|----------------|------------|-----------|-----------------|
| CAMP: 1 | CFMR: 1 | DFM/SPF: 1 | IAPM: 4 | MAMP: 2 |
| NACP: 2 | SAMP/DZZSCG: 1 | SEFM: 3 | SCMPCR: 1 | SCMPCR/NICRH: 1 |

Event venue countries

| | | | | |
|--------------------|---------------|------------|-------------|---------------|
| Austria: 6 | Bangladesh: 2 | Belgium: 2 | Bulgaria: 1 | Czech Rep.: 7 |
| Denmark: 4 | Germany: 5 | Greece: 1 | Hungary: 1 | Ireland: 8 |
| Italy: 3 | Latvia: 1 | Malta: 1 | Norway: 1 | Poland: 2 |
| Portugal: 2 | Romania: 1 | Serbia: 1 | Spain: 9 | Sweden: 1 |
| The Netherlands: 2 | UK: 11 | on-line: 4 | | |

Accredited events



Pedro Galan Montenegro, PhD

President of EBAMP

Obtained his PhD in physics. Taught physics at the University of Málaga; Head of Medical Physics Department of the Regional University Hospital of Málaga (Spain). Lecturer on Master's Degree of University of Granada (Spain) and University of La Frontera (Chile). President of SEFM (2003-2007).

Breast radiotherapy with kilovoltage photons and gold nanoparticles as radiosensitizer

In my medical physics thesis for an M.Sc. degree in Physics at the University Federico II (Naples, Italy), I investigated a new approach for radiotherapy of breast cancer with external photon beams [1, 2]. The approach involved the synergic action between kilovoltage X-rays (< 200 kV) and gold nanoparticles (AuNPs) injected in the body and accumulated in the tumour volume. The purpose was to reach a radiation dose enhancement in tumour with respect to the dose released in surrounding normal tissue, when compared to the conventional breast radiotherapy with 6 MV photons from a medical accelerator. This occurs by taking advantage of the high photoelectric cross section in Au at kilovoltage energies, with respect to megavoltage photons adopted in the conventional adjuvant radiotherapy of breast cancer. The research field of radiotherapy with radiosensitizing agents received attention in recent years due to the evidence of some increase of the target dose delivery after administration of metal nanoparticles, in particular AuNPs [2].

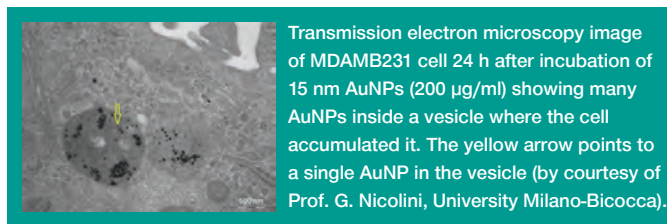
In my thesis I studied the radiosensitivity of mammalian cancerous cells (MDAMB231 cell line) incubated with 15 nm AuNPs, when irradiating them with a kilovoltage X-ray beam or a 6 MV beam. During my work, I collaborated with a research group of experimental biologists of the Experimental Neurology Unit at University Milano-Bicocca (Monza, Italy) and with researchers from the Medical Physics team of San Raffaele Hospital (Milan, Italy).

Irradiation with kilovoltage X-rays was carried out with a commercial irradiator based on an orthovoltage X-ray tube operated at 100 kV or 190 kV (0.3 mm Cu added filtration); 6 MV photon irradiation was performed with a medical linac at San Raffaele Hospital. We treated MDAMB231 cells with 200 µg/ml 15 nm AuNPs, commercially available as a contrast agent for microCT. Transmission electron microscopy provided evidence of internalization and localization of AuNPs in the cells, at 6h and 24h after administration. Most AuNPs were found outside of the cell nucleus, with preferential localization in endosomal vesicles, forming clusters of AuNPs (Fig. 1). Fewer AuNPs were internalized after 6h incubation than after 24h. To investigate the toxicity of nanoparticles we assessed the effect of 15nm AuNPs on cell proliferation via the SulfoRhodamine B assay: no toxicity effect was observed with AuNPs concentrations up to 200 µg/ml.



Alessia Tudda

Alessia received her B.Sc. (Phys.) degree in Physics (2017) with a thesis on Radiotherapy with charged particles and her M.Sc. (Phys.) degree in Physics (2020), at University Federico II (Naples, Italy). She plans to enroll in the Specialty School of Medical Physics in Italy (3 year course). Her dream is to become a good Medical Physicist, believing that Medical Physics is the noblest branch of Physics, for its humanitarian purposes. For many years she has been a volunteer at a pediatric hospital for psychological assistance (clown therapy). She studied classic and contemporary dance in academy, and she is now a dance teacher and a performer. She believes that Medical Physics and dance are the sides of the same coin: both are animated by love for knowledge and for one's neighbour.



Transmission electron microscopy image of MDAMB231 cell 24 h after incubation of 15 nm AuNPs (200 µg/ml) showing many AuNPs inside a vesicle where the cell accumulated it. The yellow arrow points to a single AuNP in the vesicle (by courtesy of Prof. G. Nicolini, University Milano-Bicocca).

We then performed irradiations of MDAMB231 cells, treated with 0, 100 or 200 µg/ml AuNPs 24h before irradiation, with 100 kV or 190 kV X-rays, at doses of 1 Gy and then of 2Gy. After exposing the cells to such high doses of X-rays, we observed that the fraction of surviving cells decreases as the absorbed dose increases. In a series of *in vitro* experiments we produced survival fraction (SF) curves vs. absorbed dose in the cell cultures using a clonogenic assay.

In terms of Dose Enhancement Factor (DEF) (i.e. the ratio of dose needed to obtain a 50% SF with radiation only, to dose needed to obtain the same SF with the same irradiation plus injection of AuNPs), some results are shown in Table 1.

As shown in Table 1, the DEF increased with increasing AuNP concentration, and it is higher at kV energies than at 6 MV; at 190 kV the DEF is higher than at 100 kV. These findings are consistent with the interpretation of the higher efficacy of photoelectric absorption in producing a largely significant radiation enhancement in MDAMB231 breast cancer cells, in particular for photons of energy higher than the K-edge of Au at 80.7 keV.

I have submitted an abstract of this work to ECMP 2020 (European Congress of Medical Physics), scheduled for June 2021 in Turin, Italy [4].

My thesis was carried out in the framework of the project SR3T funded by INFN, Italy.

| CELL LINE | X-ray tube voltage | AuNP concentration | DEF at 50% Surviving Fraction |
|-----------|--------------------|--------------------|-------------------------------|
| MDAMB231 | 100 kV | 100 µg/ml | 1.2 ± 0.3 |
| MDAMB231 | 100 kV | 200 µg/ml | 1.6 ± 0.3 |
| MDAMB231 | 190 kV | 100 µg/ml | 2.3 ± 0.3 |
| MDAMB231 | 190 kV | 200 µg/ml | 2.8 ± 0.3 |
| MDAMB231 | 6 MV beam | 200 µg/ml | 1.4 ± 0.4 |

References

- [1] http://www.infn.it/thesis/thesis_dettaglio.php?tid=14632
- [2] F. Di Lillo et al., "Synchrotron radiation external beam rotational radiotherapy of breast cancer: proof of principle", *J. Synchrotron Radiat.* **25**, 857-68 (2018)
- [3] D. Chithrani, S. Jelveh, F. Jalali, "Gold nanoparticles as radiation sensitizers in cancer therapy", *Radiat. Res.* **173**, 719-28 (2010)
- [4] G. Mettivier et al., "Radiation enhancement for kV and MV X-ray irradiation of breast cancer cells incubated with gold nanoparticles", Abstract submitted to ECMP2020, Turin, Italy, 16-19 June 2021.

Sun Nuclear: Patient Safety Through the 2010's & Beyond: A Focused Perspective

When looking at RT patient safety progress, it is helpful to frame it in terms of upstream and downstream patient safety. RT patient safety progress is not static and is shaped by upstream treatment technology, the clinical use of that technology and independent downstream checks and balances that verify, monitor and improve that technology.

Upstream, patient safety is shaped by the quality of the RT treatment technology. Progress here has been considerable, with IGRT, MLC-based stereotactic, and VMAT technologies becoming widespread. These technologies can improve patient safety by providing higher quality and safer treatments.

Downstream, patient safety is shaped by the ability to monitor and improve the quality of the fulfillment of RT technology. Here too, capabilities have progressed significantly. Once abstract technologies such as 3-D anatomical dose verification and in-vivo monitoring have become widely available, improving the ability to detect myriad intra- and inter-fraction patient and machine errors. These downstream technologies improve patient safety by enabling clinicians to answer the critical question: was the Rx delivered as intended?

As one of several companies focused exclusively on patient safety, we see three key areas for improvement to support a continued culture of patient safety in RT as we enter the next decade.

The first is improving understanding of the importance of independent downstream Patient Safety checks, or QA. Today's RT systems are so complex that it is simply not possible to internally mitigate every potential risk without independent routine checks. ASTRO's Safety is No Accident Framework specifically calls out "independent" no less than 11 times when describing details of a framework for quality RT care.

The second is improving access to data. Open access to machine and treatment data is critical for independent evaluation of the quality of RT fulfillment. A 2019 publication revealed that in a single year, a site identified 4,000 actionable errors and opportunities for improvement within 56,000 delivered fractions [Bossuyt et al., ESTRO 2019]. These discoveries directly benefit all parties including the clinic, the patient and the delivery vendor, and are made possible by independent downstream QA and access to data.

The third is avoiding the risk of complacency. As with all complex systems which are typically stable, safety can be taken for granted, until it is too late.

When we are informed, proactive and work together, we establish the best possible environment to continue to enhance patient safety and advance RT for cancer treatment.

Learn more at sunnuclear.com/patient-safety.

This article was originally published in the **2020 Winter edition of ASTROnews (Volume 23, Number 1)**.



Jeff Simon

Jeff Simon is the CEO of Sun Nuclear, the leading provider of innovative solutions for Radiation Therapy, Diagnostic Imaging and Patient Alignment. More than 5,000 cancer centres worldwide rely on Sun Nuclear for independent, integrated Quality Management.

Organic olive oil production

Dimos Baltas, Germany (and Greece!)



Our olive tree plantation in Kyparissia

“The best way to find a very good olive oil is to make it by yourself” A sentence I have heard numerous times from my father. And believe me, it is true! Since the death of my father, I took over all responsibility for our olive tree plantation in the southeast region of Peloponnese in Greece. Our plantation with ca. 400 olive trees is located 180 metres above sea level in the area of Kyparissia. I was born and raised in Kyparissia and also visited primary school and High School there, before moving to Athens for studying Physics at the National and Kapodistrian University. After more than 15 years we changed over to controlled organic cultivation of our plantation which is why our olive oil is titled as extra-virgin olive, cold pressed. About the care: I, myself, visit the plantation two to three times a year. And then there are of course the olive harvest and pressing which occur in the second half of October.

It is quite beneficial that fully-grown olive trees admittedly need regular care but it is a seasonal care we are talking about. That is perfectly compatible with my time and possibilities.

For the controlled organic cultivation I have to follow strict rules and it requires taking track with a logbook of all activities concerning the plantation. But who takes care of it since I am not around most of the time? This is where my good friend Tasos steps in. Tasos is an agronomist and my official consultant for everything connected to the olive tree plantation. We have established a T-Con every two weeks or on demand (e.g. insect attacks, etc.). When actions need to take place such as pruning of olive trees, mechanical weed-clearance etc. Theodoris comes into play. Theodoris with his small crew of three to five workers implements any measure required and indicated by Tasos.

The next question that comes to mind is who is doing the commissioning, the invoice payments and the required accounting for the Greek tax authorities? This is the domain of my brother-in-law, Dimitris. He is a financial and tax advisor and owns a small plantation in the same region with his wife, my oldest sister, Constantina. He is a perfect fit for this job.

Our weekly T-cons take place during the weekend. For the photo documentation, my friend Spiros, a school teacher, is responsible.

So what is my role in all of this? OK, besides the intensive networking I previously described, I spend a significant time during my visits to Kyparissia taking care of the olive tree plantation, usually with Tasos, Theodoris, Spiros and Dimitris all together, assessing the status of the trees, deciding on upcoming maintenance tasks and forecasting the harvesting season. The pe-



Cold-pressed olive oil during production

riod from the middle of October to the first week of November is always blocked in my calendar and a flexible flight reservation for that period is always in place. The side effects of this strategy are well known to my department and to all colleagues, companies and organisations I am working with. In so far as the point of time of the optimum level of ripeness of the olives can be estimated, the final plane booking is done and after a short stop in Athens, I finally arrive to Kyparissia. I have come to the pleasure of taking some friends and colleagues with me to this harvest-adventure since I have started my life in Freiburg. These days, one of my colleagues, Felix, has become a true companion, being my company in Kyparissia with pleasure and devotion. The harvesting of olives is done completely manually. Arriving in Kyparissia, life is determined by harvesting and pressing of olives. Pressing begins at 4 pm every day. The owner of the CE-certified olive mill in Kyparissia is Andonis, an old friend of mine who I grew up with. The pressing of my olives is always scheduled first, since the water used for the washing process

of olives and the containers of the milling system have to be clean, not contaminated by olives from conventionally-cultured olive trees. Every day at around 6 pm the cold pressed olive oil with its deep green colour and the unique slightly bitter scent of the olive fruits rewards us for the efforts of the last 12 months.

The daily ritual of testing the fresh pressed oil with roasted slices of bread, fresh tomatoes and salt, pepper and oregano and regional red wine prolongs the working day late into the evening!

It takes five to eight days to finalize the harvesting and pressing of olives; it always depends on the weather. Part of the freshly pressed and unfiltered olive oil is filled into dedicated storage containers and distributed among family members and friends. The remainder is filled into dedicated transport containers which are shipped to our home in Germany. In regular intervals during weekends from January to May, I carefully bottle the olive oil in dark green glass bottles in order to preserve the unique quality of the oil. Special closures with olive oil pourer liners are used to close the bottles. The final steps are the labelling and the storage in special protective boxes, ready for transport as soon as an order arrives.

“The best way to find a very good olive oil is to make it by yourself” This was the motivation. Is that a hobby? Probably yes. I hope this will change some day in the hopefully not too far away future.



The final product



Dimos Baltas

Since 2015 Dimos Baltas has been Chair of Medical Physics Division, Radiation Oncology Department, University Medical Centre and full Professor of Medical Physics for Radiation Oncology at the Albert Ludwig University, Faculty of Medicine, Freiburg, Germany. He is member of the German Association of Medical Physics (DGMP), of the German Association for Radiation Oncology (DEGRO), of the European Society for Therapeutic Radiology and Oncology (ESTRO) and of the American Association of Physicists in Medicine (AAPM). He is member of the medical physics experts group BRAPHYQS of ESTRO. He was honored several times, among others 2014 with the Alfred-Breit-Prize by DEGRO, the highest remunerated prize of Radiation Oncology in the German speaking world. He is President-Elect and Member of the Executive Committee of DGMP.

Choral singing: mixing contemporary with traditional

Una Molnar, Serbia

I grew up in a family of diverse nationalities and traditions. Both of my parents were active in local cultural-artistic society and their love for traditional dances and music was transferred to both my brother and I. Although I participated in dancing (folklore), singing was my thing. In the beginning, I sang in the school choir and annual concerts of cultural-artistic society. It was mainly for fun but it was enough to capture my interest. The first serious involvement with music was after I finished primary school and

and formed a vocal group “Vasilis”. The rhythm of traditional Serbian music is the main “culprit” that made this music our main choice. It proved to be a great challenge to breathe new life into old traditional songs with new musical arrangements, but at the same time, it is a great pleasure to hear and take part in the final performance. The selection of the songs consists of several steps. First, we choose the song we would like to arrange by voting among the suggestions we all made. Because most of the



The vocal group “Vasilis”, with which Una performs

started singing in the choir “Rozanov”. I was a member for 10 years during which I realized the beauty of choral singing and learned about singing techniques. During the following years, my love and interest in music grew. Wanting to upgrade and develop, not just my vocal abilities but knowledge of music as well, I finished elementary music school at the solo singing department. Unexpectedly, this opened up the opportunity for me to sing as a backing vocalist at the local television station.

Two years ago my friends, with whom I had sung in other choirs, and I gathered on account of a love of music that we all shared

traditional songs are passed down from generation to generation, lyrics can often vary, so the next step is to find the original lyrics. When it comes to musical arrangement we try to be original and to incorporate something contemporary in every song but within the available instruments and singers. Most often it is a mixture of polyphony, guitar, piano, percussion, and traditional instruments like kaval, tapan, frula, and tarabuka.

During the process, it is important to be aware of the performances that already exist so as not to violate the copyright or to ask for permission to perform their arrangement.

What is interesting about the traditional songs is that they are always followed by a story. At our performance we like to tell this story so that the audience gets a grip on the song's character and the circumstances in which it was created. As we tend to bring our history and culture closer to young generations, much effort goes into costumes, which girls from the group particularly enjoy. We found inspiration in national costumes from different parts of Serbia, which vary from simple dresses in Vojvodina to ones rich with embroidery and beads in Central and South Serbia.

On the first anniversary of the group's foundation, we succeeded to organise a concert that I am very proud of.

With time I became accustomed to performing in front of audiences and I can say I enjoy it. For me, music unifies research work and creativity. It inspires me, gives me the freedom to create and express myself. Singing in a group taught me teamwork, how to support, cooperate with, and rely on others. Through various tours and singing competitions I learned about different cultures, people and made some lifelong friendships. Music opened the door to the world for me at an early age and I am grateful for that.



Una Molnar

Center for Radiology, Clinical Center of Vojvodina, Novi Sad, Serbia.

Una studied medical physics at the Faculty of Science, University of Novi Sad, gaining a Master's degree in 2019 with the thesis "The influence of Compressed SENSE factor on diagnostic accuracy of MR image in standard brain protocol". She works as a medical physicist at the Center for Radiology at Clinical Center of Vojvodina. Her main interest is Magnetic Resonance Imaging and she strives to get her PhD in this area. She is a member of the Serbian Association of Medical Physicists. She participated in the IAEA workshop and survey on Patient doses in Fluoroscopy Guided Interventional Procedures and SAFRAD triggers. She is interested in gaining new knowledge, improving personal abilities and looking forward to new challenges. In gaps between physics and music she likes to spend time discovering spots off the beaten track on Fruska Gora.

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Results of the 3rd EFOMP Photo Contest

For the third EFOMP Photo Competition, we received an excellent selection of entries on the theme of “It Happened in the Spring”. The submitted photographs were evaluated by members of the Communications and Publications Committee.

first place

“Spring Afternoon by the River, 2019” by Eugene O’Sullivan (IE).



Eugene O’Sullivan has been working at the Cork University Hospital, Ireland as a Senior Medical Physicist since June 2001. Currently working in the Quality Assurance arm of the Radiotherapy section of Medical Physics department, performing quality assurance on 4 Siemens Accelerators, Siemens Ct, GE CT, Varian Simulator & Extrahl Superficial unit. Administrator for Lantis & Aria databases. Responsible for ordering seeds for Brachytherapy prostate patients. Give lectures to junior doctors in CT Tube and PACS. Presently preparing for move to new Radiotherapy Department on the campus.

second place

“Magnolia in the Spotlight” by Niki Fitousi (BE).



Niki Fitousi, PhD, is a certified medical physicist, working as Head of Research in Qaelum NV (Leuven, Belgium). Her professional experience spans across multiple fields of Medical Physics (Radiation Therapy, Diagnostic Radiology, Nuclear Medicine). Currently, her main focus is dosimetry, image quality and optimization in medical imaging.

third place

“Ancient Woodland, Galway, Ireland” by Niall Phelan (IE).



Niall Phelan is Chief Physicist at Breast-Check which delivers population-based mammography screening in Ireland through a network of clinics and mobile units. Niall leads the medical physics team which provides centralised scientific support of equipping, quality assurance, imaging optimisation and radiation safety. Niall also participates as a consultant member of the EFOMP DBT QC working group and is a member of the European Commission Initiative on Breast Cancer (ECIBC) QA Scheme Development Group.



The Aurora project – informing about ionizing radiation through comic strips

This is the second comic strip from the Czech Republic's Aurora team, aimed at educating the public about the benefits of ionizing radiation in medicine, in a highly-original way. This time, our friendly lion discusses his recent nuclear medicine scan with his friend, over a beer!

Aurora is a project of the Prague section of the European Physical Society (EPS) Young Minds initiative. The main aim of Aurora is to spread knowledge about ionizing radiation in general, ionizing radiation in medicine and cancer. And how do we intend to spread this knowledge? For example, by creating topical comics! Our team is still expanding. Now, we have two main painters, Marketa Hurychova and Anezka Kabatova. Then, there are four people who create stories for the comics, consult with the painters and translate texts, Barbora Drskova, Petra Osmancikova, Jana Crkovska and Anna Michaelidesova. Anna Michaelidesova is also the coordinator and the person in charge of the whole project.

The Aurora team grants permission and consent to EFOMP and EFOMP NMOs to use the comic strips for educational purposes. In case you would like to translate the comics into another language, email us the translated text and we will modify the comic and send it back to you. No other modifications to the content are allowed. You can contact the Aurora team at aurora@youngminds.cz

The Aurora team are:



Marketa Hurychova studied Medical Physics at the Czech Technical University in Prague, gaining an MSc degree in 2019. She worked at the Department of Medical Physics at Hospital Na Homolce from 2018, at the Department of Radiation Dosimetry Nuclear Physics Institute of the Czech Academy of Sciences from 2019 and since 2020 she has worked at the Department of Medical Physics at Motol University Hospital.



Anezka Kabatova has been studying Experimental Nuclear and Particle Physics at the Czech Technical University in Prague since 2015. After receiving her MSc degree, she plans to start a PhD in Astronomy. She has been an active member of the Prague section of EPS Young Minds since 2017, acting as a vice-president of the section between 2018 and 2019.



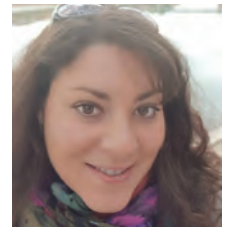
Barbora Drskova finished her Medical Physics Masters programme at the Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering in 2019. Since then, she has been working on her PhD. She works as a medical physicist in radiotherapy at General University Hospital in Prague and University Hospital Královské Vinohrady.



Petra Osmancikova graduated from the Czech Technical University in Prague and holds MSc and a PhD degrees in Medical Physics. She is a clinical medical physicist in radiotherapy in Motol University Hospital in Prague.



Jana Crkovska received her PhD in High Energy Nuclear Physics from the Universite Paris Sud in 2018. Since then, she has continued her research on charmed particles production in the Los Alamos National Laboratory. She is part of the LHCb Collaboration, one of the experiments at the Large Hadron Collider (LHC) in CERN.



Anna Michaelidesova received her MSc and PhD degrees in Medical Physics from the Faculty of Nuclear Physics and Physical Engineering of the Czech Technical University in Prague. She worked as a researcher at the Nuclear Physics Institute of the Czech Academy of Sciences from 2010 to mid 2019. In the period 2012-2017, she was employed as a medical physicist at the Czech Proton Therapy Center. From 2018 to mid 2019, she also worked as a researcher at the Faculty of Nuclear Physics and Physical Engineering of the Czech Technical University in Prague. Since June 2019, she has been a postdoctoral researcher at the department of Translational Radiooncology and Clinical Radiotherapy of the OncoRay® - National Center for Radiation Research in Oncology at the Medizinische Fakultät Dresden Carl Gustav Carus in Germany. She has been a member of the leadership committees of the Prague section of EPS Young Minds and of the IRPA YGN since 2019.

So I went for a chest x-ray today."



Ooooo



Oh... and how did it go?

It's all good. You were supposed to get an examination too though, weren't you?

Yeah, my doctor sent me for a nuclear medicine kidney examination.



Damn, is that something to do with the power plants?



Calm down, don't be so radiophobic all the time,

no reactor but an ordinary hospital. It's an examination to see how well my kidneys work.

I see, and how is it done? And why is it NUCLEAR?



First, they gave me an injection with a radioactive liquid, called a tracer. Then they asked me to lie under a special machine - a gamma camera - and it recorded the radiation coming out of me.

Wait, what, radioactive?! What radiation!?

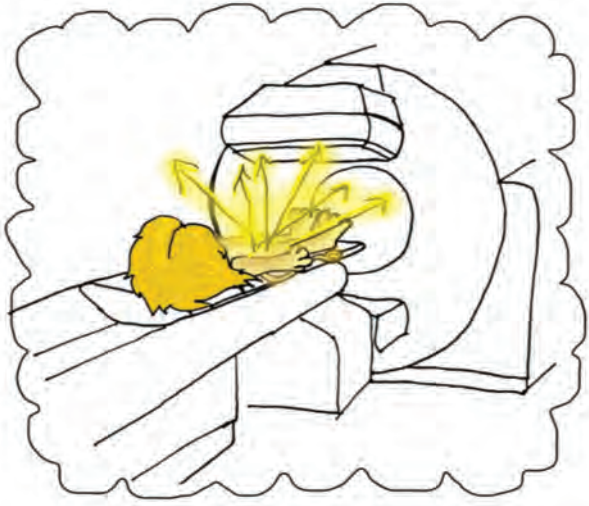
The injected substance contained a radionuclide which converted in my body and emitted gamma radiation.

Oh, I see. And what dose did you receive? They said the chest x-ray effective dose was equal to about three days on Earth.

Well, it was a bit more in my case, about eight months on Earth, but I ain't turning into no Hulk, anyway!



Anyway, my kidneys are at 98%, so another round of beer?



AURORA



Young Minds

Upcoming Conferences and Educational Activities

This list was correct at the time of going to press.

For a complete, up-to-date list, please visit our Events web page at www.efomp.org/index.php?r=events

Jun 22nd, 2020 - Jun 24th, 2020

Optimisation in X-ray and Molecular Imaging 2020
Gothenburg, Sweden

Jul 15th, 2020 - Jul 19th, 2020

European Congress of Radiology - ECR2020
Vienna, Austria

Jul 6th, 2020 - Jul 10th, 2020

Second European Nuclear Competition for Secondary
School Pupils
Budapest, Hungary

Aug 17th, 2020 - Aug 21st, 2020

Niels Bohr Summer School on therapeutic and diagnostic
medical physics
Copenhagen, Denmark

Jul 12th, 2020 - Jul 16th, 2020

2020 Joint AAPM | COMP Virtual Meeting
Virtual

Sep 9th, 2020 - Sep 12th, 2020

51st Annual Meeting of the German Society for Medical
Physics (DGMP)
Leipzig, Germany



IT'S PERSONAL

Machine learning in RayStation is our latest contribution to the fight against cancer. Almost 10 million people die from cancer annually. People we all know. For us, it's personal.



Upcoming Conferences and Educational Activities

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Sep 29th, 2020 - Oct 2nd, 2020

ESMRMB 2020

Virtual

Nov 28th, 2020 - Dec 1st, 2020

ESTRO39

Vienna, Austria

Nov 5th, 2020 - Nov 6th, 2020

British Institute of Radiology Annual Congress 2020

London, UK

Dec 17th, 2020 - Dec 18th, 2020

ESMIT L3 Course in Advanced Features of Quantification

Vienna, Austria

Nov 5th, 2020 - Nov 7th, 2020

Data Analysis with Python for Medical Physicists

Siggiewi, Malta

Apr 11th, 2021 - Apr 13th, 2021

NACP2021 Symposium

Reykjavik, Iceland

Nov 6th, 2020 - Nov 8th, 2020

BSBPE 13th National Medical Physics and Biomedical
Engineering Conference – NMPEC 2020

Bulgaria

Jun 16th, 2021 - Jun 19th, 2021

EFOMP - 3rd European Congress of Medical Physics

Torino, Italy

Nov 19th, 2020 - Nov 21st, 2020

EFOMP - European School for Medical Physics Experts
(ESMPE) Statistics edition 2020

Athens, Greece

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EFOMP

EUROPEAN FEDERATION
OF ORGANIZATIONS
FOR MEDICAL PHYSICS

The European Federation of Organisations in Medical Physics (EFOMP) was founded in May 1980 in London to serve as an umbrella organisation for medical physics societies in Europe. The current membership covers 36 national organisations which together represent more than 9000 medical physicists and clinical engineers working in the field of medical physics. The motto developed and used by EFOMP to underline the important work of medical physics societies in healthcare is “Applying physics to healthcare for the benefit of patients, staff and public”.

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