



# EFOMP



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The European Federation of Medical Physics Organizations Bulletin

## EMP News Autumn 2016



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THE EUROPEAN MEDICAL PHYSICS  
NEWS A BIENNIAL PUBLICATION OF  
THE EUROPEAN FEDERATION OF  
MEDICAL PHYSICS ORGANIZATIONS  
November 2016

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Dear Readers,

Welcome to the autumn edition of the EFOMP newsletter that arrives with delay due to major changes in the general look of the EMP News that must be evident to you right now. This is my first issue as editor of the EMP News, and I must admit that, although it has not been an easy task, I have now the heartwarming feeling one has when a long work arrives to its end. Those who precede me in putting together the past newsletters have done an astonishing work, so I hope to live up to it.

This issue includes a wide range of news, and gives you a chance to catch up with some of the activities within the EFOMP community. We begin with a message from our president, John Damilakis on the essential role of medical physicists in the growing market of imaging equipment; it ends with reminder about upcoming Day of Medical Physics. From IPEM, Elly Castellano addresses the question of the EU referendum and points out the importance for the physics community of continue working together despite the result of the EU referendum in the UK. Peter F. Sharp contributes with his thoughts in relation with the EFOMP's specifics.

We're opening up a new section in this issue, namely the article by the editor's invitation. Claudio Fiorino and Jan Seutjens kindly accepted our invitation to summarize the content of the recently published Focal Issue of Physics Medica dedicated to the contributions of medical physics to prostate cancer. Our chair of Education and Training Committee makes a big contribution to this number with three articles with three other authors: one with Gisella Gennaro about the successful 2015 Winter Mammo School; a second one with Hugo de las Heras, explaining the EFOMP-ESTRO-IAEA guideline for quality control of CBCT devices presented during the first European Congress of Medical Physics in Athens. And last but not least, the third with Annalisa Trianni, about the organization and work carried out by the DICOM WG-28. Stephen Evans contributes with a report on the face to face course of the European Radiation Protection Expert Training Course. Marco Brambilla presents a summary about the six editions of the European School of Medical Physics Experts attended by more than 230 people from all Europe. And finally, Pedro Galán introduces the European Board for Accreditation in Medical Physics.

We end this issue with a Shakespearean farewell by our former president Peter F. Sharp looking back through his EFOMP memories and also giving up a bunch of -live up to his surname- sharp advices.

We hope you have enjoyed your Summer holidays and remember we are always on the lookout for news items or other contributions and would encourage authors to contact with the editorial team. We also invited you to visit -and follow!- our [LinkedIn](#) and [Twitter](#) accounts to stay in the know with what's happening in the community of European Medical Physics and to share your opinions with us.

Gaspar Sánchez Merino &

Your editorial team

European Medical Physics News, November 2016



**Gaspar Sánchez Merino**

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Publications Committee of the EFOMP.  
Medical physicist at the Araba  
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**Nuria Jornet Sala**

Medical Physicist at Hospital Sant Pau  
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European Society for Radiotherapy  
and Oncology, ESTRO

Message from the president of the EFOMP with a reflection highlighting important events and news for the European physics community

# As the availability of imaging equipment increases, where are the Medical Physicists?

The availability of medical imaging equipment has increased rapidly in most European countries over the past years. In a publication entitled "Medical technologies: CT scanners and MRI units" ([Health at a Glance: Europe 2012, OECD Publishing](#)) the Organization for Economic Co-operation and Development (OECD) states that in the Netherlands, the number of MRI scanners per capita was multiplied by ten between 1990 and 2010, while the number of CT units nearly doubled. Similarly, in Italy, the number of MRI units per capita was increased by nearly six times between 1997 and 2010, and the number of CT units more than doubled. Moreover, hybrid systems have become increasingly available. To make optimal use of modern medical imaging technology in patient care, medical physicists must be available and thoroughly trained.

Medical Physicists contribute significantly to patient care and ensure quality in medical imaging.

Medical Physicists play an important role in research and development of healthcare technologies and clinical techniques. It is also true that Medical Physicists educate and train healthcare professionals in medical radiation protection and medical technology. Nevertheless, there is a fraction of the true need for Medical Physicists in many healthcare organizations and radiation protection authorities. The shortage will grow more acute as the number of imaging units continues to increase. A survey on medical physics status has been recently carried out jointly by the European Federation of Organizations in Medical Physics (EFOMP) and the International Atomic Energy Agency (IAEA) among national medical physics societies in 36 European countries. The survey data indicated that there is shortage in medical physicists in many countries in Europe. IAEA organized a meeting in Vienna on 7-8 May 2015 to discuss the current status of and

future perspectives for medical physics in Europe. The meeting recommended that 'the Member States of the Europe Region fully recognize the clinically qualified medical physicist (CQMP) Morbinis eros, dignissim nec, as a health professional with specialist education and training in the concepts and techniques of applying physics in medicine and competent to practice independently in one or more of the subfields (specialties) of medical physics' (J. Izweska, Summary of the IAEA 'Regional meeting on Medical Physics in Europe: Current



**John Damilakis**

President of the EFOMP. Professor and Chairman, Department of Medical Physics, Faculty of Medicine, University of Crete, Iraklion, Crete, Greece and Head of the Medical Physics Department, University Hospital of Iraklion, Crete, Greece.

status and future perspectives' Medical Physics International, 2015 vol. 3, p. 33-34). To meet the demand, postgraduate schools should train additional medical physicists and the profession should receive the recognition it deserves. Furthermore, medical physicists in many countries should be better valued and compensated.

To make optimal use of modern medical imaging technology in patient care, medical physics must be available and throughly trained.

# International Day of Medical Physics 2016

November 7, 2016

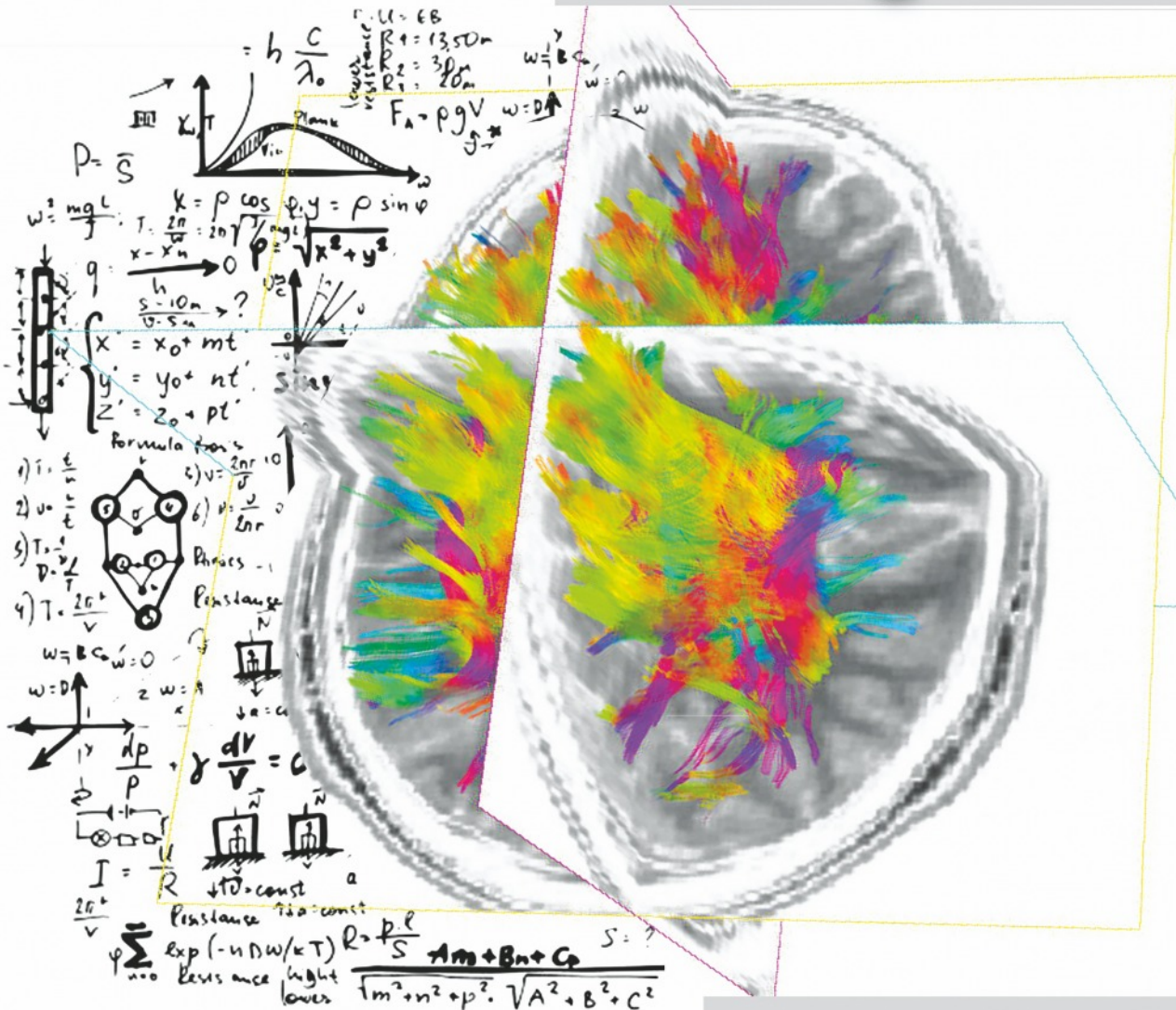
To raise awareness of our profession, the International Organization for Medical Physics celebrates annually the International Day of Medical Physics (IDMP) on November 7, an important date in the history of medical physics. On that day in 1867, Marie Curie, known for her pioneering research on radioactivity, was born in Poland. We will celebrate the 4th IDMP on November 7, 2016. The theme of the International Day of Medical Physics (IDMP) 2016 is 'Education in Medical Physics: The Key to Success'. Education and training in Medical Physics is of crucial importance for the effective use of medical equipment and protection from associated physical agents, ionizing radiation being the agent of greatest importance. High-standard well-planned continuing professional development (CPD) delivers great benefits to Medical Physicists and ensures excellence in radiation safety. However, education in Medical Physics is the key to success not only for Medical Physicists but also for many medical professionals. It is important to inform the public on the responsibilities of medical physicists and draw attention of the media to the important role that medical physics play in the health care system but also in education and training. For more information about IDMP 2016 please visit [HYPERLINK "http://www.iomp.org/idmp/"](http://www.iomp.org/idmp/)

I look forward to your active participation in the IDMP events in November!

John Damilakis

# Education in Medical Physics

## The Key to Success



November 7, 2016

International Day of Medical Physics

# IPEM statement to EFOMP following EU Referendum result

Last month, representatives of a number of scientific organisations within the UK, including the Institute of Physics and Engineering in Medicine (IPEM) attended the annual 'Parliamentary Links Day' meeting, where representatives from Government, science organisations and others discuss key issues of the day.

This year's meeting was entitled 'Science after the Referendum', and given the narrow result of the vote in the UK to leave the European Union (EU), the meeting was particularly relevant and well-attended.

All polls suggested that up to 93% of scientists in the UK were in favour of remaining within the EU, and the meeting was full of concern about what might happen now that the result has gone the other way.

It was clear throughout the meeting that science-based organisations here in the UK wished to stress that they remain very keen to continue to work and collaborate with their European (and other) partners.

IPEM wishes to re-iterate that message, and would like to re-assure our friends and colleagues

within EFOMP that IPEM and its members remain committed to working in partnership with you, whatever the political consequences of the Referendum vote.



Elly Castellano

Medical Physicist at The Royal Marsden NHS Foundation Trust



Peter F. Sharp

Former President of the EFOMP

## The UK and the EU

I think that the outcome of the UK's referendum on membership of the EU came as an unpleasant shock to many of us. The campaign was an unpleasant one and, in my view, with many lies being told about the issues around EU membership. To those of us working in science, membership is seen to carry with it many advantages. The opportunity to access to European research funds also meant that we were encouraged to form partnerships with scientists in other member countries of the European Community, which was to our mutual benefit.

We don't know what will be the future relationship between the UK (if indeed it remains united!) and the EU. My main concern is that one of the major issues in the referendum was about mobility of labour, one of the fundamental planks of the EU. I think it almost inevitable that the post-referendum agreement will, to a degree, stifle mobility which, for those of us working in science, will be disadvantageous.

However, despite the referendum, the UK remains part of Europe and the statement issued by IPEM is very welcome, showing that it will continue to play an important role in EFOMP.

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In each number of the EMP News the editors invite some colleagues to explain their current work and publications. In this number, that opens this section, we have invited Claudio Fiorini and Jan Seuntjens to speak about the Focal Issue of *Physica Medica* they have put together.

# The Role of Medical Physics in Prostate Cancer Radiation Therapy

It is with pleasure that we accepted the invitation to summarize the content of the recently published Focal Issue of *Physica Medica* dedicated to the contributions of medical physics to prostate cancer (PCa) radiation therapy. In our minds, this issue constituted an excellent opportunity to feature the relevant, and often hidden impact of medical physics (as a both scientific and professional discipline) in improving the care of PCa patients and its smart perspectives for the future.

The traditional role in developing and safely implementing new technology and methods for better optimizing, delivering and monitoring the treatment is rapidly expanding to include new fields such as quantitative morphological and functional imaging and the possibility of individually predicting outcome and toxicity. The pivotal position of medical physicists in treatment personalization probably represents the main challenge of current and next years and needs a gradual change of vision, without losing the traditional and fundamental role of medical physicists to guarantee a high quality of the treatment.

The focal issue covered both conventional and new areas in medical physics with the aim to provide up-to-date reference material to medical physicists (and likely, radiation oncologists) daily working to cure PCa patients. In total, one editorial and thirteen scientific papers were published in the issue: aside from the opening Editorial, the first paper dealt with a physician's perspective on the role of RT in the management of PCa. Then, the main physics contributions focused on developments in imaging, planning and delivery, image-guided/adaptive radiation therapy and outcomes assessment using predictive models. Regarding imaging, two reviews concerning MRI and PET for radiation therapy are available. Then, for the planning and delivery part, six papers cover several topical fields, from brachytherapy optimization for focal therapy to planning optimization with rotational techniques including pelvic nodes irradiation, up to the emerging use of protons, FFF Linacs and stereotactic techniques. Then, for the



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**Jan Seuntjens**

James McGill Professor & Director of  
Medical Physics at Cedars Cancer  
Centre, McGill University Health  
Centre, Montreal, Canada.

IGRT/ART part, one review and two original studies on a new IGRT system using ultrasounds and on the impact of bladder motion on bladder dose-surface maps are presented. The issue is completed by two reviews dealing with the prediction of treatment outcomes, one focused on advanced methods for modeling and the second one reporting a quite complete update of dose-volume effects of the organs at risk to be taken into account during optimization.

The focal issue clearly shows the vitality of the field, suggesting a smart future for medical physicists willing to perform research and/or to consistently provide a high-quality clinical service. In particular, we wish to underline that, as is happening in other branches, medical physicists are increasingly expected to actively integrate their implicitly translational, flexible and high-level skills within multi-disciplinary teams that include clinical-medical professionals as well as scientists from other disciplines. This evolution also has repercussion on the training of medical physicists: advanced academic medical physics programs have already started to adopt network-type approaches to train the new-generation innovators that will fulfill this multi-disciplinary role.

In the specific case of PCa radiation therapy, physics contributions are expected through the investigation of imaging modalities such as multi-parametric MRI, MR spectroscopy, choline-PET, PSMA-PET, etc. The use of imaging techniques that contain morphologic, functional and metabolic information has also provided the opportunity to investigate, using advanced data-mining techniques, the relationship between outcome and texture features on the images, also known as imaging biomarkers. As such, it is expected that target delineation will ultimately become more quantitatively guided by the relevant features calculated from multimodality imaging. To these imaging biomarkers, genetic biomarkers can be added to arrive at more personalized and quantitative models for the prediction of treatment success. This avenue will gradually allow the design of dose escalation, dose-painting and focal therapies while maintaining the already achieved superior sparing of normal structures. This is further aided by the increased ability to individually predict the risk of side-effects by quantitative models combining dose-volume effects with other clinical and genetic predictors.

In conclusion, we wish to thank the authors for their outstanding contributions to this focal issue that is intended to be a practical and up to date resource for young as well as experienced medical physicists daily working with passion and dedication to continuously improve the way we treat and cure our PCa patients.

The pivotal position of medical physicists in treatment personalization probably represents the main challenge of current and next years and needs a gradual change of vision, without losing the traditional and fundamental role of medical physicists to guarantee a high quality of the treatment.

Physica Medica

European Journal of Medical Physics

March 2016 Volume 32, Issue 3, p435-532

Focus Issue: [The Role of Medical Physics in Prostate Cancer Radiation Therapy](#)

Edited by Jan Seuntjens, Claudio Fiorino



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# 2015 Winter Mammo School

Following the results of the 'Guidelines on the Medical Physics Expert' project the Education Committee of EFOMP, EFOMP decided to open an European School in collaboration with the Czech Association of Medical Physicists (CAMP) targeted towards Medical Physicists who would like to achieve Medical Physics Expert (MPE) status.

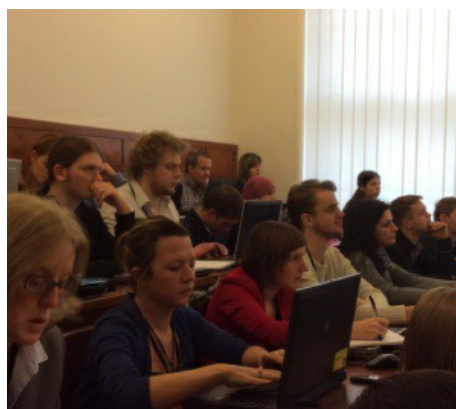
Until now two Summer School for MPE was organized in Prague: the first module was " Clinical Medical Device Management: Specification, Acceptance testing, Commissioning" , July 4 – July 6, 2013; the second was Advanced Kinetic Modeling and Parametric Methods Advanced SPECT and PET Applications in Cardiology, Neurology and Oncology QC and Advanced applications in Whole-body PET/CT, July 10 – July 12, 2014

The first EFOMP Winter School 2015 in Radiology application took place in Prague (Czech Republic) between Jan 29 and Jan 31, 2015. The school was on "Digital Mammography and Quality Controls", and included both theoretical and practical sessions on the subject. It aimed to provide a general overview of current clinical challenges in breast imaging, with special care to digital mammography and advanced applications as breast tomosynthesis, breast CT and contrast mammography. A significant portion of talks and discussion were focused on quality controls (QCs), with particular interest to the image quality (IQ) and the possible methods/criteria for IQ assessment.

Forty-three participants attended the EFOMP School from several countries: Austria, Belgium, Cyprus, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Lithuania, Oman, Poland, Portugal, Serbia, Slovenia, Spain, and Sweden. Scientific contents were "dense" and the discussion well balanced across the different topics. The attendees were mostly experienced on the School subject, as proven by their active participation asking questions, commenting lecturers' messages, and sharing their experience. This contributed to raise the level of discussion, and to make the school atmosphere open and relaxed.

Eighty-eight percent of participants had the final exam, with very good results.

During the conference the new "Quality Controls in Digital Mammography Protocol of the EFOMP Mammo Working Group" was discussed. His publication inside the EFOMP webpage is scheduled in the next week.



We hope to see you at the next EFOMP School, Summer School!!



**Gisella Gennaro**

Medical Physicist at the Veneto  
Institute of Oncology, Padova Area,  
Italy



**Alberto Torresin**

Chair of Education and Training  
Committee of EFOMP. Medical  
Physicist at ASST Grande Ospedale  
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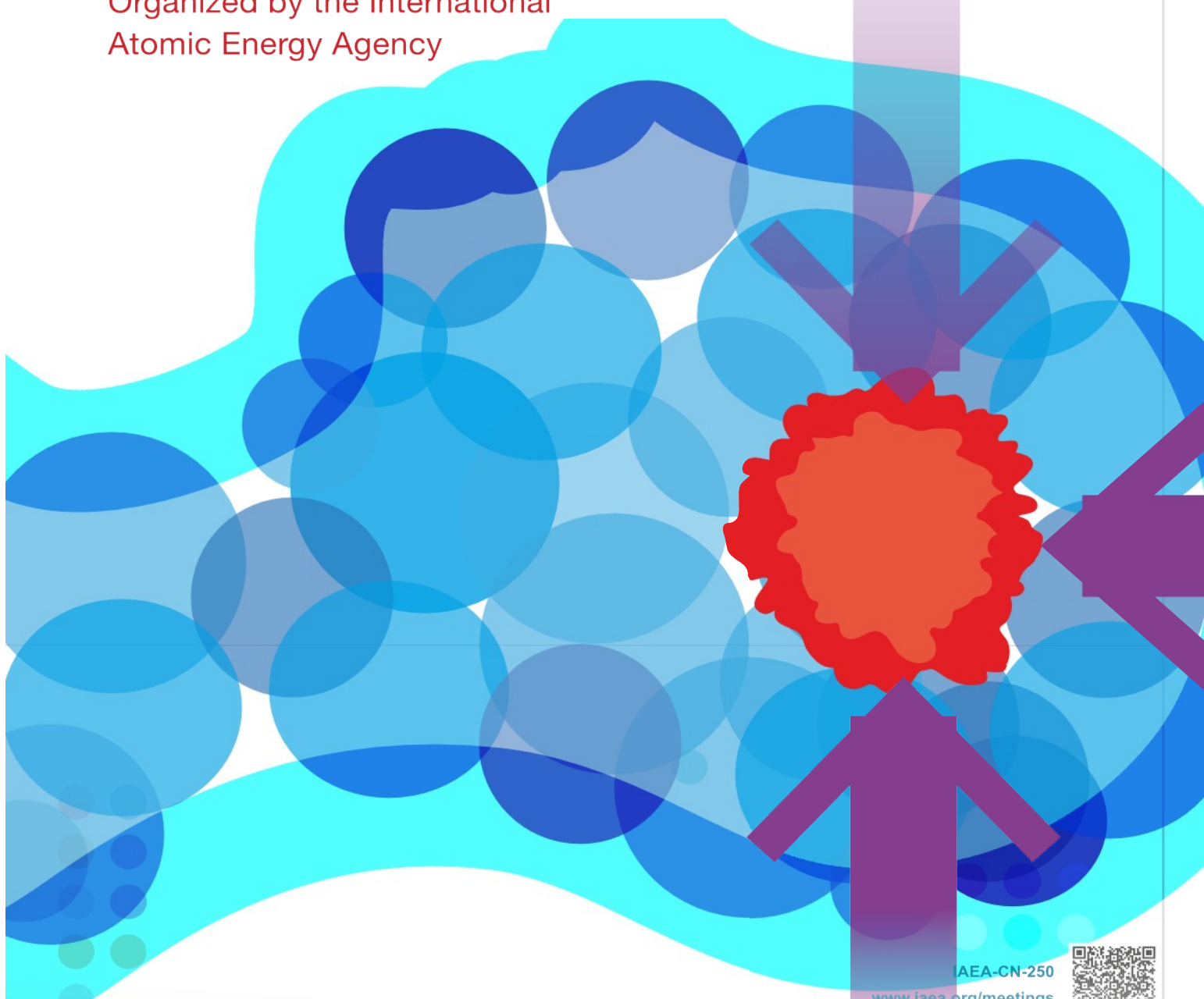
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# European “Radiation Protection Expert” Training Course. Specialised Module for RPE's working in the Medical Field



Participants attending the RPE Medical  
Module Face to Face

## Course Overview

The ENETRAP III RPE module in the given 9 months to prepare their programme for various reasons (mainly medical sector attracted originally 16 portfolios and were assisted in their not being able to complete the required applicants at the beginning of the e- preparation using an e-learning portfolios) before the start of the face to face learning phase. Each participant was approach. The length of each portfolio face. The face to face was held in required to prepare 4 portfolios that was 2500 words plus evidence Hungary at the Budapest University of dealt with detailed learning outcomes (examples of reports, communications, Technology and Economics during 4-8 before attending the face to face phase presentations etc.). Seven participants July 2016. of the course. The participants were subsequently dropped out of the



Each day of the face to face was split into 4 sessions of equal length (each lasting 1.5 hours): Monday to Thursday consisted of; Lectures, Portfolios, Interactive Tutorials and Interactive Workshops. On Friday the sessions were; Group Revision, Exam and Feedback.

Of the remaining 9 participants who attended the face to face course, 6 provided draft portfolios for assessment prior to the face to face course. Several participants did not understand clearly the concept of 'portfolio'. Consequently, a new talk on the production of portfolios was given on the first day of the face to face and the participants' feedback of this presentation was very positive. Feedback on the portfolios were provided to each participant that submitted their portfolio in a one-to-one sessions. Participants were then given a further 3 months (until the end of September 2016) to provide their completed portfolios after reflecting on the feedback they received.

## Participants' Feedback

A course questionnaire was issued at the start of the face to face and participants were required to return the completed forms on the last day of the face to face course.

Some general observations from the participants' feedback were:

- The need to explain the portfolio requirements should be provided at the start of the e-learning phase. The new talk presented on portfolio guidance will be placed on the CLP4NET platform.
- The level of the course was set appropriately at EFQ Level 7.
- The face to face was run well with the faculty having the appropriate experience to deliver the content.
- The content at the face to face was appropriate to meet the participants' expectations and help them seek recognition as RPE by their national authorities.
- The online e-learning phase was easy to access and broadly sufficient although further examples of how to meet the LOs were thought to be beneficial.
- Active participation in the e-learning phase was not adequate. This was due to a number of reasons: the timing of contacts during the work-day conflicted with other work duties and the participants did not know each other making them reluctant to communicate. Future developments should include out of hours contacts on the e-learning platform (such as use of the chat facility) and the CVs of the participants should be made available on the platform so that the participants know about each other.
- The assessment process was appropriate to identify the level achieved by the participants.
- More practical workshops were thought to be useful but this would affect the cost and timings of the course.

## Examination

An examination consisting of multiple choice questions (MCQs) was attempted by all participants. The exam had 20 short MCQs requiring the selection of the correct single answer out of five possible answers and a choice of 3 out of 5 long questions each of which had one or more possible correct answers out of 5 possible answers and required the candidates to detail their calculations or justify their selection(s). Candidates were allowed 60 minutes to complete the exam which most thought was sufficient although some thought was too short for the non-native English speakers.



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The results show that, taking into account the results from both the short and long questions, all participants managed to exceed the 70% pass mark for the MCQ although the specific marks were not indicated on the certificates presented at the end of the face to face course.

The faculty believed the range of results was supported the general assessments by the faculty of the participants' competence during the face to face (i.e. the results were in line with the faculty's assessments of the Knowledge, Skills and Attitudes (KSAs) demonstrated by the participants' during the interactions in the workshops and tutorials).

The view of the faculty is that the course succeeded in the primary objective of producing a system that could evaluate the participants' ability to provide expert radiation protection advice to employers, staff and members of the public in the medical sector



## Conclusion

The faculty's general assessment of the course was that there was excellent active engagement of the participants with many lively and informative interactions. This was due to a number of factors, the time-table was designed to provide active participation, the venue was conducive to informal contact which the faculty supported through positive engagement techniques and non-critical reactions to open questions and discussions. The number of participants was also small enough to allow the participants to feel part of a team working towards common goals and being supportive of each other. A social evening also encouraged team bonding with a course dinner on the river Danube organized by the conference facilitator.

The view of the faculty is that the course succeeded in the primary objective of producing a system that could evaluate the participants' ability to provide expert radiation protection advice to employers, staff and members of the public in the medical sector.

Improvements to the course in some specific detailed areas are thought appropriate although the general approach taken and the vast majority of the LOs used should be retained.

The number of participants during this face to face course enabled strong and active participation and was thought to be ideal, although a maximum of 12 participants was also thought to be a good number for effective, interactive sessions. The faculty thought the selection process of candidates for a future course is therefore critical. Early registration fee payments would help ensure engagement and the selection process of the appropriate participants to meet the maximum (12) allowed on the course should be based on the level of their interactions during the first phase (2 months) of the e-learning phase.



**Stephen Evans**

Former Head of Medical Physics and Radiation  
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Hospital, Cliftonville, Northampton, UK.

ENETRAP III, an FP7 EC funded project (nr. 605159 Fission-2012-5.1.1)

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### Disclaimer

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# The EFOMP-ESTRO-IAEA guideline for quality control of CBCT devices was presented in Athens in September 2016

In December 2013, an EFOMP initiative started a working group to design a quality control procedure for cone-beam computed tomography, including dental, fluoroscopy and radiotherapy applications. The working group has united 20 authors from 12 different countries (in Europe and abroad). The final version of the guideline was presented at the 1st European Congress of Medical Physics on Sunday, the 4th of September in Athens. This effort represents the first international guideline with the cooperation and support of EFOMP, ESTRO and IAEA together. We are very proud of having achieved a consensus among all authors and participating associations. We hope that the work of these past years will be useful to all professionals performing quality control of x-ray devices around the globe.

Below we advance an extract from the introduction of the guideline.



**Hugo de las Heras Gala**

Scientific Consultant at Quart GmbH,  
Munich Area, Germany



**Alberto Torresin**

Chair of Education and Training  
Committee of EFOMP. Medical  
Physicist at ASST Grande Ospedale  
Metropolitano Niguarda, Milano, Italy

## Motivation

The EFOMP-ESTRO-IAEA guideline for quality control of CBCT devices will be presented in Athens in September 2016. Current guidelines for quality control of cone-beam CT (CBCT) and general documents on radiology physics regard the different CBCT applications (dental, radiotherapy, interventional radiology and guided surgery) as different entities<sup>1,2</sup>. However, the data acquisition, reconstruction and the test parameters for image quality and dose evaluation are the same. This guideline was born to unify the image quality controls for all CBCT systems. A further unification with multi slice CT systems, which are closely related to CBCT, is planned for a future edition.

In the past few years, the concern about doses received by patients undergoing CT scans has grown in parallel to the number of examinations performed per year worldwide. Different initiatives, like the EUROsafe<sup>3</sup>, Image Gently<sup>4</sup>, Image Wisely<sup>5</sup> or recent efforts by the AAPM and EFOMP recommending standard protocols for different common indications have been developed. This document is part of them. In the particular case of external radiotherapy, patients undergo high energy x-ray treatments with

total absorbed doses in the range of several tens of Gy. In addition, for image-guided radiotherapy (IGRT) several CBCT scans are performed to the patient during treatment<sup>6</sup>. In this regard, the present document focuses on the quality control of the CBCT system and not of the whole IGRT system. Adaptive radiotherapy (ART) has been considered as an extension of IGRT.

## Our unifying approach

Test parameters and methods have been sought so they can be used to assess the image quality and the exposure related to any CBCT device. Detailed procedures using free software have been included for the image quality evaluation. Action levels and frequency of the tests are indicated together with references wherever possible. However, due to a lack of long worldwide experience with applications of CBCT in radiotherapy, interventional radiology and guided surgery, the recommended action levels for these modalities are still not as well established as in the dental field<sup>7,8,9</sup>.

For quantitative (or technical) image quality evaluation, the recently developed technology for CBCT has served to settle objective measures for quality

control, such as contrast-to-noise<sup>10</sup> ratio and the modulation transfer function<sup>9,10</sup> (MTF). These objective measures are reproducible, they are not dependent on the observer and they can be conveniently assessed by computer software. The new measures have been proposed as methods to quantitatively assess image quality, do replacing the evaluation and measurements based on contrast detail objects and bar patterns, which have been in use for quality control for more than 20 years<sup>11,12,13</sup>. The new measures allow an objective evaluation of image quality<sup>14,15</sup>.

This guideline includes the minimum tests that should be performed to ensure proper functioning of the CBCT devices. The tests have been limited to image quality and dosimetric checks, which can be easily (and thus often) performed by technicians and physicists with a minimum of experience anywhere in the world. They provide a means to evaluate the whole imaging chain with a minimum effort. If the dose or the image quality deviate from expected values or exceed the action levels a service engineer or a more time-consuming analysis of the device is required.

---

## Purpose

The purpose of this document is to present an objective, practical and unifying procedure for quality control of CBCT. This includes CBCT for dental, radiotherapy, interventional radiology and guided surgery applications. Simplicity in terminology and methodology has been favoured in every occasion where different but equivalent terms or methods were available. The presented tools and procedures aim to simplify the work of professionals involved in the quality control of CBCT, but they may also satisfy the research interest of many physicists in objective comparisons among different technologies [16,17,18,19,20](#). Finally, consensus among the group and with existing national and international guidelines has been pursued to define action levels for the different technologies.

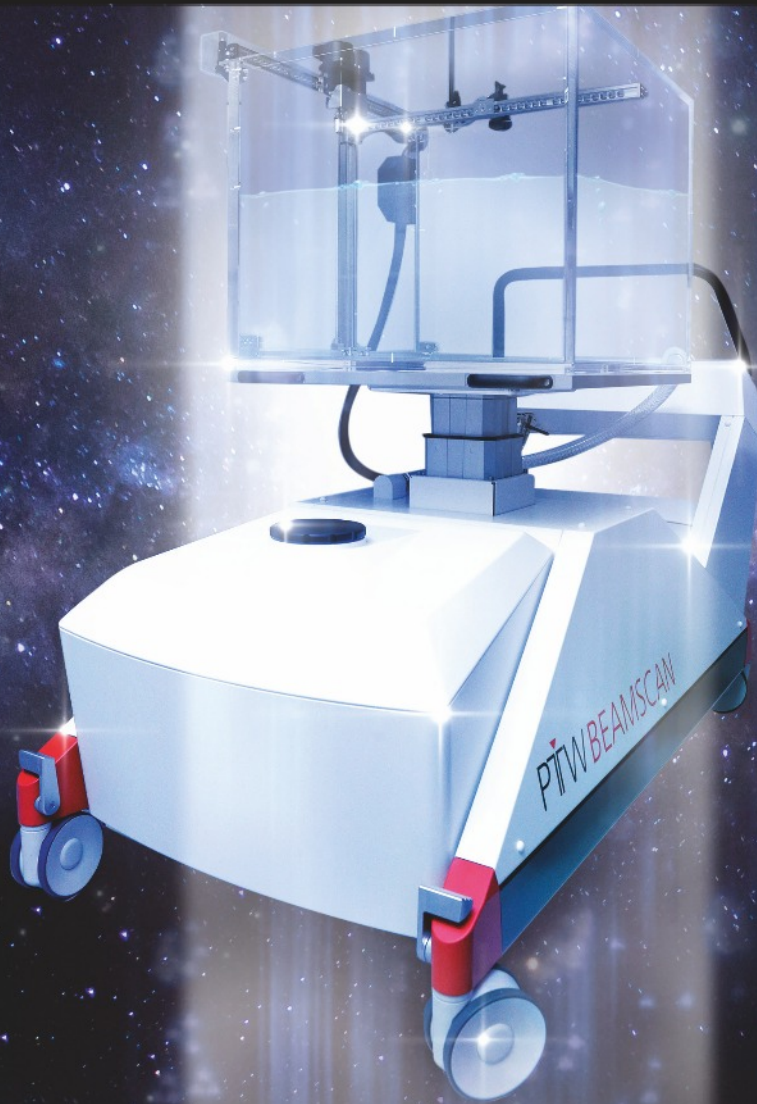
## Structure

Previous work related to CBCT devices is outlined in chapter 2, together with short descriptions and references to perform conventional tests that are necessary, but not specific for CBCT. Chapter 3 describes the image quality test parameters. Each section provides a definition and an explanation for the need to perform the test. Afterwards, the recommended methods to measure this parameter are described in detail, and action levels are suggested. Several phantoms that enable to perform the recommended tests are presented in chapter 4. Two alternative solutions for radiation dosimetry for quality control are described in chapter 5. The appendix contains important remarks that are not necessarily part of the quality controls described in this document.

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# European School for Medical Physics Experts (ESMPE)

Six successful editions attended by more than 230 people coming from all Europe have been organized so far under the umbrella of the ESMPE Brand. After this initial pioneer's era it is now time to have a balance of the pro and cons of running such a school and of the objectives of EFOMP in the domain of Education and Training.

Edition	Period	Title	Domain	Duration (hours)
1 <sup>st</sup>	2013 Jul 4-6	Clinical Medical Device Management: Specification, Acceptance testing, Commissioning, QC and Advanced applications in Whole-body PET/CT	Nuclear Medicine	19
2 <sup>nd</sup>	2014 Jul 10-12	Advanced Kinetic Modeling and Parametric Methods Advanced SPECT and PET Applications in Cardiology, Neurology and Oncology	Nuclear Medicine	19
3 <sup>rd</sup>	2015 Jan 29-31	Digital Mammography and Quality Controls	Diagnostic Radiology	18
4 <sup>th</sup>	2015 Jul 2-4	Radiopharmaceutical dosimetry	Nuclear Medicine	17
5 <sup>th</sup>	2016 Jan 28-30	Computed Tomography Imaging: Dosimetry, Optimization and Advanced Clinical applications	Diagnostic Radiology	20
6 <sup>th</sup>	2016 Jul 7-9	Practical aspects of Radiation Dosimetry in Targeted Radionuclide Medicine Therapy	Nuclear Medicine	18
7 <sup>th</sup>	2017 Jan 26-28	Imaging in Radiotherapy (planned)	Radiotherapy	19

## Scope

The ESMPE organise medical physics education and training events specifically targeted towards Medical Physicists who are already MPEs or would like to achieve MPE status. These events are open to all European Medical Physicists and, in the future, they will be accredited by an independent body to ensure that they are at the required educational level, i.e., Level 8 of the European Qualifications Framework. The attendance is limited to 50 or 40 places to guarantee the possibility of individual interaction between lectures and attendees.



**Marco Brambilla**  
Secretary of the EFOMP. Medical  
Physicist at University Hospital of  
Novara, Novara, Italy



## Organisation

The ESMPE is a school led directly by EFOMP under its direct responsibility. It is organized in collaboration with CAMP (Czech Association for Medical Physics) which is responsible of all the logistic arrangements (venue, accommodation for lectures, registration, etc).

The ESMPE is usually under the joint responsibility of a scientific chair, who is chosen for his expertise in the specific field, and a school chair, who is usually chosen among EFOMP Officers in order to guarantee that the program meets the standard of the ESMPE.

It must be underlined that neither the organizers, nor the lectures receive any fee for taking part in the ESMPE. Their contribution is done on a complete voluntary basis. This choice was dictated by the need of keeping the attendance fee down to an affordable price also for attendees coming from low income European countries. Therefore EFOMP is grateful to all the lecturers who accept to take part in this school and, in particular to the local committee (Jaroslav Ptáček and Tereza Hanušová) which since many years ensured a perfect organization of the School.

## Attendance

**Participants**

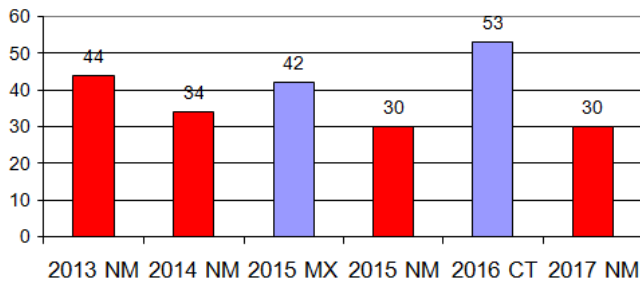


Fig 1: Reports the attendance to the six editions lead so far

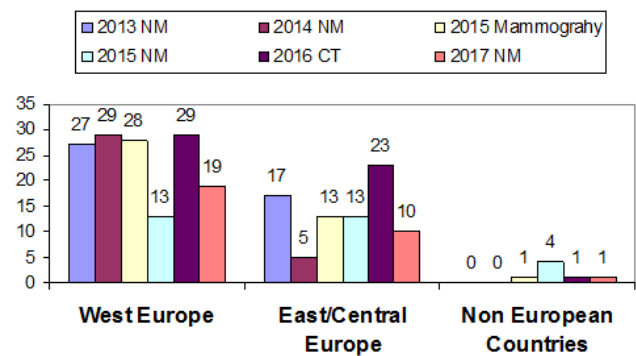


Fig 2: Reports the geographical provenance of the attendees in terms of macro-areas

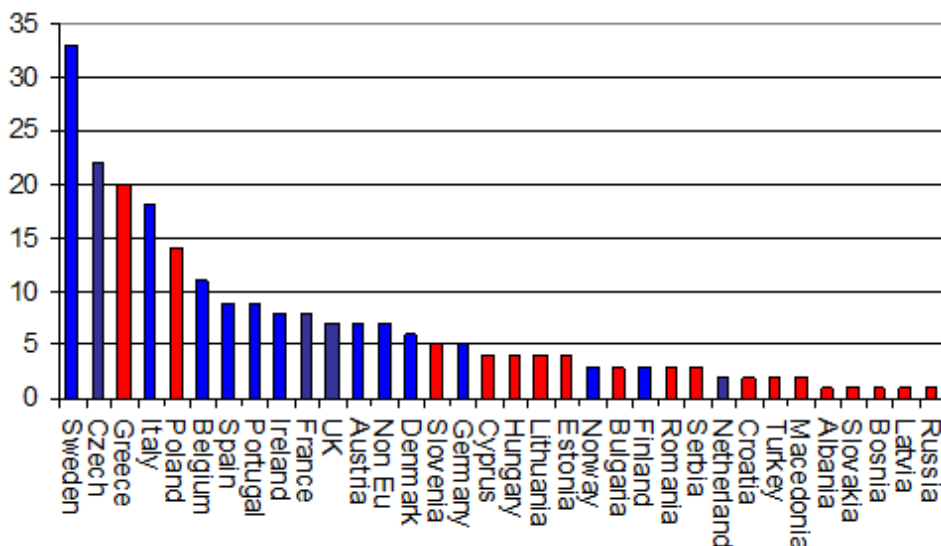


Fig 3: Reports the nationality of the attendees. In red the countries with a subsidized fee from EFOMP

## Policy on subsidized fees

Particular attention has been given by EFOMP in promoting the attendance at the ESMPE by students coming from European low income countries. In the 2013 edition EFOMP has provided five bursaries covering the entire admission fee. Successively EFOMP decided to provide a subsidized fee covering the 50% of the admission fee in order to allow a greater number of people to attend the school. The location of the school in Prague ensures optimal flight connection with low cost companies, affordable prices for accommodation and restaurants in one of the most enchanting cities of Europe.

## Didactic

Having started with Nuclear Medicine topics, the ESMPE expanded the field of interest to Diagnostic Radiology in 2015 with an edition illustrating the EFOMP protocol for Quality Controls in Digital Mammography and in 2016 with an edition devoted to the optimised use of Computed Tomography. In 2017 it is planned the first edition of ESMPE in Radiotherapy and in the near future we plan to extend the school also to non Ionizing Radiation topics (such as Magnetic Resonance Imaging).

In general from the beginning there has been a shift toward more practical, hand on courses. This is a general tendency in the domain of E&T and the ESMPE is willing to forward this tendency, which is also solicited in the questionnaires of satisfaction from attendees.

## Future Perspectives

A manual of operation of the ESMPE will be submitted to the next EFOMP Council for approval in order to create a Board of the school, with the cooperation of the NMOs. The ESMPE Board will consist of prominent Medical Physicists with expertise in the education and training of medical physicists. The Board will consist of the Chair of the School, the Vice Chair /Past Chair, the Chair and the Vice Chair/Past Chair of the Education and Training Committee of the EFOMP, the Chair and the Vice Chair/Past Chair of the Scientific Committee of the EFOMP and the Chairs of the Local Organizing Committee and 4 members of the scientific committee, who will be selected among the candidates indicated by the NMOs.

The term of office of the members of the Board are:

Board members	Normal term of Office (years)	First term of Office (years)
Chair	3	3
Vice-Chair/Past Chair	1 and 2 respectively	2 (there will be no Past Chair)
Chair of the EFOMP E&T Committee	2	As in the EFOMP
Vice-Chair/Past Chair of the EFOMP E&T Committee	1	As in the EFOMP
Chair of the EFOMP Scientific Committee	2	As in the EFOMP
Vice Chair/Past Chair of the EFOMP Scientific Committee	1	As in the EFOMP
Chair of the Local Organizing Committee	According to NMO rules	According to NMO rules
Members of the Scientific Committee	4	4 (three for 3 years)

# The European Board for Accreditation in Medical Physics

In recent years there has been a rapid development of medical techniques for treatment and diagnosis based on ionizing and non-ionizing radiation and on imaging techniques, many of which require the expertise of medical physicists. Consequently, there is a growing need to ensure that health professionals in medical physics have the required competence levels to meet the needs of health systems. To meet this challenge there is a demand for new education and training programmes for medical physicists to improve professional qualification within the scope of Lifelong Learning. This has been emphasized by the publication of the European Commission Guidelines on Medical Physics Expert report n. 174 and the European Union Basic Safety Standards Directive 2013/59/EURATOM.

An external assessment of quality is needed to ensure that the standard of education and training being provided is sufficiently high and to give a tool to training event providers to promote quality and continuous improvement. This requires that educational events be assessed by a recognized and independent body using widely accepted quality criteria. EFOMP has offered such an accreditation system for education and training events for many years. However, given that EFOMP is itself involved in providing educational courses, it has been decided to set up a completely independent body for educational events accreditation named the European Board for Accreditation in Medical Physics (EBAMP).

The main aim of EBAMP is to improve the education of health professionals involved in the practice of medical physics by accrediting medical physics education and training events, such as workshops, conferences, hand-on training and courses. Mainly, its work will be to accredit and assign continuous professional development points based on quality and quantity criteria in order to ensure the effectiveness and usefulness of the education provided. EBAMP will develop appropriate policies and protocols to



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Head of Medical Physics Department of  
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I firmly believe that an accurate well-designed Continuing Professional Development programme and training is essential for any professional and more specifically for health professionals such as medical physicists in order to improve knowledge, competence, skills and quality within the performance of their professional activities for healthcare and improvement of quality of life and safety for patients, staff and public.

accredit educational events by means of an assessment of planning, promotion, staff, teaching methods, facilities and design of the educational activity being provided.

It is not intended to replace any local accreditation scheme. EBAMP will work to set European standards for education and training event accreditation and offering an accreditation process to those EFOMP national members organizations (NMOs), consortia, entities and international education events provider 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.

The work of EBAMP will be carried out with transparency by its Board consisting of nine members. On 20th June 2016, EFOMP Council ratified by postal ballot the first Board among those candidates appointed by EFOMP Board of Directors. Each NMOs will be entitled to designate a member as the liaison persons with this Board. Peter F. Sharp and Stelios Christofides, as members of EBAMP steering group setting up by EFOMP, have drafted the EBAMP Quality Manual, Forms and Code of Ethical Conduct. Having done this EFOMP will now step back from the operation of EBAMP. The application forms and management of the accreditation process will be carried out entirely through the EBAMP website, outlined and developed for these objectives.

I firmly believe that an accurate well-designed Continuing Professional Development programme and training is essential for any professional and more specifically for health professionals such as medical physicists in order to improve knowledge, competence, skills and quality within the performance of their professional activities for healthcare and improvement of quality of life and safety for patients, staff and public.

I am grateful to Peter F. Sharp for his cooperation.

# Report of DICOM

As published into STRATEGIC DOCUMENT of DICOM:

"The DICOM Standards Committee exists to create and maintain international standards for communication of biomedical diagnostic and therapeutic information in disciplines that use digital images and associated data. The goals of DICOM are to achieve compatibility and to improve workflow efficiency between imaging systems and other information systems in healthcare environments worldwide. DICOM is a cooperative standard. Connectivity works because vendors cooperate in testing via either scheduled public demonstrations, over the Internet, or during private test sessions. DICOM is used or will soon be used by virtually every medical profession that utilizes images within the healthcare industry. These include cardiology, dentistry, endoscopy, mammography, ophthalmology, orthopedics, pathology, pediatrics, radiation therapy, radiology, surgery, etc. DICOM is even used in veterinary medical imaging applications.

The complete Procedures (bylaws) of the DICOM Standards Committee are available on the DICOM Web page at <http://dicom.nema.org>. Working groups of the DICOM Committee perform the majority of work on the extension of and corrections to the Standard. Working groups are formed by the DICOM Committee to work on a particular classification of tasks. "

The current activities and future directions of the DICOM Standard are largely based on information submitted by individual working group chairs.

The existing working Group are the following

- |   |   |
|---|---|
| WG-01: Cardiac and Vascular Information       | WG-17: 3D   |
| WG-02: Projection Radiography and Angiography | WG-18: Clinical Trials and Education                  |
| WG-03: Nuclear Medicine                       | WG-19: Dermatologic Standards                         |
| WG-04: Compression                            | WG-20: Integration of Imaging and Information Systems |
| WG-05: Exchange Media                         | WG-21: Computed Tomography                            |
| WG-06: Base Standard                          | WG-22: Dentistry                                      |
| WG-07: Radiotherapy                           | WG-23: Application Hosting                            |
| WG-08: Structured Reporting                   | WG-24: Surgery  |
| WG-09: Ophthalmology                          | WG-25: Veterinary Medicine                            |
| WG-10: Strategic Advisory                     | WG-26: Pathology                                      |
| WG-11: Display Function Standard              | WG-27: Web Technology for DICOM                       |
| WG-12: Ultrasound                             | WG-28: Physics  |
| WG-13: Visible Light                          | WG-29: Education, Communication and Outreach          |
| WG-14: Security                               | WG-30: Small Animal Imaging                           |
| WG-15: Digital Mammography and CAD            | WG-31: Conformance                                    |
| WG-16: Magnetic Resonance                     |   |

# The organization of WG-28

## Physics Strategy

- Secretariat-U.S. Meetings AAPM (American Association of Physicists in Medicine)
- Secretary Lynne Fairobent, AAPM (lynne@aapm.org)
- Secretariat-European Meetings EFOMP (Eropean Federation of Organizations for Medical Physics)
- Secretary Alberto Torresin, EFOMP (alberto.torresin@unimi.it)
- Co-Chair Annalisa Trianni, EFOMP (annalisa.trianni@asuiud.sanita.fvg.it)
- Co-Chair Donald Peck, AAPM (donaldp@rad.hfh.edu)

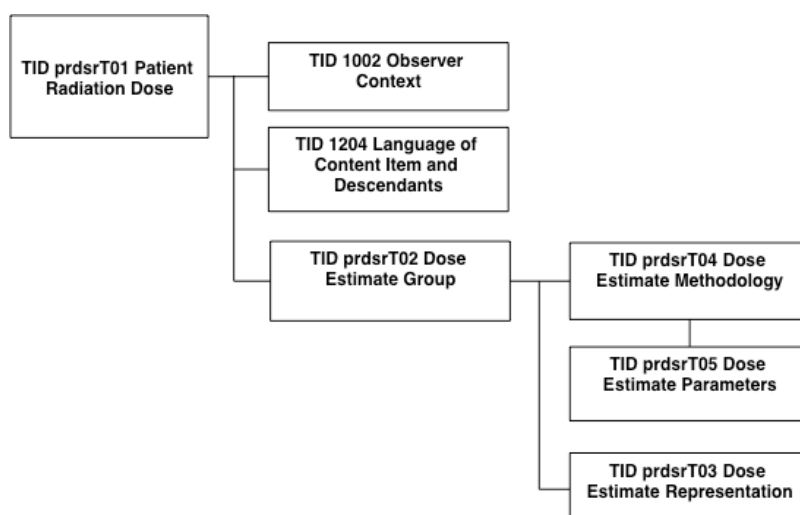
The scope of the DICOM WG28 is to develop or consult on CPs and Supplements requiring detailed expertise on physics and/or the needs and work of medical physicists. To serve as a liaison body to facilitate including data relevant to the physics community in DICOM objects.

The main topic on which WG-28 is currently working (jointly with WG-02 “Projection X-ray”) is the Supplement 191 of the DICOM standard, the so called “Patient Radiation Dose Structured Report”.

WG-28 started developing the “Patient Radiation Dose Structured Report” in 2012. The idea behind this supplement is that the current Information Object Definitions (IOD) and specifically the Radiation Dose Structured Report (SR) contains only information about the x-ray system or information the x-ray system can determine. Yet, these IODs do not include any information about the patient, which is required to adequately estimate the radiation absorbed dose. In addition, there are multiple methodologies and models that can be used to estimate patient dose and these methods are rapidly changing. Estimation of the radiation dose to a patient requires the knowledge of the x-ray system information, but the methods to do patient dose estimations are being developed and improved continuously and storage of these estimations in a Patient Radiation Dose SR would allow more versatile utilization of the data.

Goals of the P-RDSR then are:

- Store the results of Patient Organ Dose calculations:
  - of a SINGLE procedure or MULTIPLE procedures
  - including one or more modalities and procedure steps/phases
  - of one or more organs
  - by one or more calculation methods
- Exchange intermediate results with peers



WG-28 and WG-02 addressed the Public Comments on the supplement 191 “Patient Radiation Dose SR” creating a newer version of the Supplement to be reviewed by WG-06, expecting to be approved for Letter Ballot at that meeting”.

WG-28 and WG-02 have also evaluated the opportunity to develop a Radiation Dose Structured Reporting for Cone Beam CT. The final idea is to draft a new enhanced radiation dose structure report to include new modalities (e.g. CBCT) as well as information that the modality can provide, that are needed to estimate patient dose and that are not currently included in the present standard. AAPM and EFOMP are finalizing the report on CBCT systems. They will be reviewed by WG-28 to restart the discussion about RDSR and 3D objects.

Moreover MITA User QC standard (e.g. XR-27 for Interventional) requires the export of protocol technical information. There is an opportunity for interoperability by reusing in Angiography some concepts of the Sup 121 defined for CT.



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**Alberto Torresin**

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Committee of EFOMP, Medical  
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# Life on the stage

In his play, “As You Like It” Shakespeare writes:

“All the world’s a stage,  
And all the men and women merely players:  
They have their exits and their entrances;  
And one man in his time plays many parts,..”

The editor was passing through the usual phase of panicking about the lack of contributions so, in a moment of weakness, I suggested that, with my term of office finishing at the end of this year, I might contribute an article about my time with EFOMP - my exit. This was accepted with the alacrity of a drowning man grasping a lifebelt. Later I started to have second thoughts about the wisdom of what I had offered. Further on in the play Shakespeare describes the Seven Ages of Man and I began to feel like the man in the fifth age “

“And then the Justice,  
In fair round belly with good capon lined,  
With eyes severe, and beard of formal cut,  
Full of wise saws and modern instances,—  
And so he plays his part.”

While I’m not too keen on capons, I have to confess that my belly is somewhat rounder than it should be, although I am not saying that was the result of wining and dining at EFOMP’s expense. But do I have any “wise saws and modern instances” or rather “wise sayings” to share?

When I looked back through my EFOMP files I was rather surprised to find that I had first become involved in 2004, as Treasurer. Like many of my fellow countrymen, I hadn’t had much contact with other European societies before



joining EFOMP. So in some ways it was a culture shock. I have been sufficiently arrogant to claim that EFOMP Board meetings are carried out “in 12 different languages, all of them English” but that is only to cover the embarrassment that I can only speak one and I have great admiration for those who speak several.

Being Treasurer was an easy route into EFOMP affairs as I carried none of the responsibilities of chairing a committee and, with the professional support of the Company Secretary, I didn't even have to be particularly proficient in financial matters. So for the first few meetings I had the luxury of being able to watch how EFOMP officers worked – and that was an education! There were two main things I got from this. The first was that there were very significant differences between medical physics in the various countries; not so much in the science but in the professional standing. In some countries medical physics has a high professional status, seen to be comparable with the medical profession, while in others it struggled to gain any sort of recognition. The other was that my sense of humour was not always understood by my European colleagues (or sometimes even by my UK ones). But what was encouraging was that people had a genuine commitment to helping EFOMP achieve its aims of harmonizing and advancing medical physics both in its professional, clinical and scientific expression throughout Europe.

In 2011 I took up the position of vice-President and was fortunate in being able to “learn the trade” from the President at that time, Stelios Christofides. During meetings Stelios was always the first person down to breakfast, so I learnt that this was a good time to discuss

EFOMP affairs with him face-to-face and plan how the Board meeting would be run (this is known as democracy!). I once sat on a committee in the UK with an extremely efficient chairman of whom it was said that he always wrote the minutes of the meeting before the meeting was held (British humour!). But good planning is important as we have so little time at Board and Council meetings and it is essential that we don't spend that going over routine business but rather discuss matters of strategic interest to EFOMP.

As a Federation it is important that the Officers listen to the views of the national member organisations and that they in turn engage with EFOMP. Human nature being what it is, some people will put a lot of effort into EFOMP while other countries seem to take a more hands-off approach. Stelios reformed the way in which the committees of EFOMP worked but it is one of my regrets that, with some notable exceptions, we really don't have an effective committee structure.

But during the time I have been with EFOMP it has made some good progress, although I am not claiming that any of this was due to me. The creation of a limited liability company has allowed EFOMP to represent European Medical Physics in EU funded projects of which there have been a number in recent years. This has helped us move forward the concept of the Medical Physics Expert, for example. I would like, at this time, to single out the effort that Hilde Bosmans has put into the EUTEMPE-RX project. There have been many others who have given an enormous amount of their time on behalf of EFOMP but who I don't have time to list in this article. The creation of an accreditation system and setting up the Education

Board all demonstrate the important role that EFOMP plays in the development of our profession.

I have tried to encourage Council to recognise the responsibilities that it carries. The Board of EFOMP is just the executive; it carries out the programme of work as decided by the Council. It is Council who determines the strategy of EFOMP. Equally, members of Council represent their national societies and provide the main link between them and the Board; they do not attend Council as individuals but should be bringing the views of their national organisation. I don't think this is always happening and is something my successors are, I am sure, very aware that they will have to address. European Medical Physics News plays an important role in facilitating communication across the federation.

I would have liked to have stepped down from EFOMP at a time other than when my own country has seen fit to withdraw from the European Union. As you can see from the communication from IPEM elsewhere in this issue, many of us felt that this was a retrograde step. We appreciate working closely with our European colleagues. However the UK is still part of Europe and the role the EFOMP plays for our profession will be even more important in the future.

So I come to the end of my fifth age.

The sixth age shifts

Into the lean and slippered Pantaloon,

With spectacles on nose, and pouch on side;

His youthful hose, well saved, a world too wide

For his shrunk shank; and his big manly voice,

Turning again toward childish treble, pipes  
And whistles in his sound.

So I make my exit and, in my childish treble  
voice, wish EFOMP every success for the future.



**Peter F. Sharp**  
Former President of the EFOMP

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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 32 national organisations which together represent more than 7500 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".

For more news and information about upcoming events and courses please follow us in social networks or visit our website:



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