European Congress of Medical Physics 2018

Bridging knowledge across specialties

www.ecmp2018.org
### Refresher course: Risk management in Radiotherapy

**Venue:** Auditorium 1  
**Date:** Thursday 23 August 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
<th>Institution</th>
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</thead>
<tbody>
<tr>
<td>08:00 - 08:05</td>
<td><strong>Introduction</strong></td>
<td>Katia PARODI</td>
<td>Germany</td>
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<tr>
<td>08:05 - 08:27</td>
<td><strong>The role of the MPE in risk management</strong></td>
<td>Uwe WOLFF</td>
<td>Austria</td>
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<tr>
<td>08:28 - 08:50</td>
<td><strong>Practical examples of risk management in radiotherapy</strong></td>
<td>Markus BUCHGEISTER</td>
<td>Germany</td>
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### Scientific Session (RT - Motion) Invited talk, Oral Presentations

**Venue:** Auditorium 1  
**Date:** Thursday 23 August 2018

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<th>Time</th>
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<tbody>
<tr>
<td>09:00 - 09:20</td>
<td><strong>Systematic evaluation of lung-tumor motion using four-dimensional computed tomography</strong></td>
<td>Anna BÄCK</td>
<td>Sweden</td>
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<tr>
<td>-</td>
<td>Motion inclusive variations in bladder dose surface maps during the course of high-precision radiotherapy for prostate cancer</td>
<td>Oscar CASARES-MAGAZ</td>
<td>Denmark</td>
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<tr>
<td>-</td>
<td>A 4D Monte Carlo (MC) dose calculation framework with statistical breathing phase sampling to quantify interplay effects</td>
<td>Florian KAMP</td>
<td>Germany</td>
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<tr>
<td>-</td>
<td>DoseTracker: In-house developed software program for real-time reconstruction of motion-induced dose errors during radiotherapy</td>
<td>Simon SKOUBOE</td>
<td>Denmark</td>
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<tr>
<td>-</td>
<td>Differences between real and planned dose distributions as a result of uncorrected patient rotation in radiotherapy</td>
<td>Václav NOVÁK</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>-</td>
<td>Treatment accuracy in surface guided deep-inspiration breath-hold radiotherapy for left-sided breast cancer</td>
<td>Esben WORM</td>
<td>Denmark</td>
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<td>-</td>
<td>4D lung tumor motion modelling using dynamic MLC tracking and EPID feedback</td>
<td>Nima ROSTAMPOUR</td>
<td>Iran</td>
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<tr>
<td>-</td>
<td>Evaluation of optimized Slow-CT parameters with freebreathing marges based on spirometric system analysis</td>
<td>Maureen LAMARQUE</td>
<td>France</td>
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<tr>
<td>Time</td>
<td>Presentation Title</td>
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<td>Country</td>
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<tr>
<td>11:00 - 11:20</td>
<td>Automated inverse planning strategies for biological optimization: state of the art and future perspective</td>
<td>Lidia STRIGARI</td>
<td>Italy</td>
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<tr>
<td></td>
<td>Comparison of mean lung dose (MLD) obtained with multi-criteria optimization (MCO, RayStation), Progressive Optimizer (PRO, Eclipse) and predicted by homemade software DosePredictor for patients with stage III non-small cell lung cancer</td>
<td>Anna ZAWADZKA</td>
<td>Poland</td>
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<td>Error detection sensitivity of a commercially available system for 3D plan verifications</td>
<td>Zaira KATSILIERI</td>
<td>Germany</td>
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<td>Implementation of RapidPlan for head and neck cancer patients: the dosimetric advantages</td>
<td>Anne HOLM</td>
<td>Denmark</td>
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<td>Clinical implementation and evaluation of the Mobius3D system for independent dose calculation</td>
<td>Maria SJÖLIN</td>
<td>Denmark</td>
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<td>Advanced dose calculation algorithms in lung cancer radiotherapy: implications when treating in deep inspiration breath hold</td>
<td>Mirjana JOSIPOVIC</td>
<td>Denmark</td>
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<tr>
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<td>Does automation reduce the number of errors in quality control of treatment plans for external beam radiotherapy?</td>
<td>Nikolaj JENSEN</td>
<td>Denmark</td>
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<td></td>
<td>Contouring and dose reporting for lower urinary tract sub-structures in cervix cancer</td>
<td>Sofia SPAMPINATO</td>
<td>Denmark</td>
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<td></td>
<td>Quantifying the effect of increased tissue definition on inter-observer variation in contouring of organs at risk in lung cancer patients using motion-compensated imaging</td>
<td>Joseph LEE</td>
<td>United Kingdom</td>
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</tbody>
</table>

Thursday 23 August 2018

Joint session EFOMP-ESTRO Multi-disciplinary working in Radiotherapy

14:00 - 14:05  The balance between the need to specialise and the need to have a broader expertise with advancing techniques
Jens M. EDMUND, Denmark

14:05 - 14:20  Working in radiotherapy from the perspective of a nuclear medicine physicist
Ronald BOELLAARD, Netherlands

14:20 - 14:35  Working in radiotherapy from the perspective of an MRI physicist
Lars E OLSSON, Sweden

14:35 - 14:50  Can’t live without you - working with radiotherapy physicists from the perspective of a radiation oncologist
Esther TROOST, Germany

14:50 - 15:00  Panel discussion

Scientific Session (RT - Radiomics - Modelling) Oral Presentations

O-RAW: Ontology-guided Radiomics Analysis Workflow
Zhenwei SHI, Netherlands

Per-voxel Cox regression with interaction terms
Andrew GREEN, United Kingdom

A prospective study of dose-response relationship and NTCP of conductive hearing loss in patients undergoing head and neck radiotherapy
M Amin MOSLEH-SHIRAZI, Iran

Fano theory validation of the MCNP6.0 Monte Carlo code for medical applications
Pedro TELES, Portugal

Prediction of recurrences using diffusion driven growth modelling for glioblastoma
Jesper Folsted KALLEHAUGE, Denmark

Logistic regression modelling of radiation induced mucositis of H&N cancer patients
Christian Rønn HANSEN, Denmark

Modelling the risk of fatal acute toxicity following radiotherapy of lung cancer
Louise STERVIK, Sweden
ECMP welcomes **Germany - MR/US image guidance in radiation therapy**

**Auditorium 1**

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<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
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<tr>
<td>16:30 - 16:55</td>
<td><strong>Clinical Deployment of the MRIdian Linac</strong></td>
<td>Sebastian KLÜTER, Germany</td>
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<tr>
<td>16:55 - 17:20</td>
<td><strong>Initial experience with the Elekta Unity system</strong></td>
<td>Daniela THORWARTH, Germany</td>
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<tr>
<td>17:20 - 17:40</td>
<td><strong>MR-guided radiotherapy at the LMU in Munich: preliminary studies</strong></td>
<td>Florian KAMP, Germany</td>
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<tr>
<td>17:40 - 18:00</td>
<td><strong>Ultrasound guidance in radiotherapy - renaissance through innovation</strong></td>
<td>Svenja IPSEN, Germany</td>
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</table>

**Chairs:**
Katia PARODI, **Germany**  
Svenja IPSEN, **Germany**
Thursday 23 August 2018

**Refresher course: Diffusion-Weighted MRI: Techniques, applications and challenges in Oncology**

**Chairs:**
Lars G. HANSON, Denmark

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<td>08:00 - 08:05</td>
<td><strong>Introduction</strong></td>
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<td>08:05 - 08:27</td>
<td><strong>Diffusion MRI: sequence optimisation in oncology</strong></td>
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<tr>
<td>08:28 - 08:50</td>
<td><strong>Diffusion-Weighted MRI: Techniques, applications and challenges in Oncology</strong></td>
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Thursday 23 August 2018

**Scientific Session (DR-MRI) Invited talk, Oral Presentations**

**Chairs:**
Gunther HELMS, Sweden
Lars G. HANSON, Denmark

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<tr>
<th>Time</th>
<th>Session</th>
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| 09:00 - 09:20 | **Challenges in quantitative MRI**  
Gunther HELMS, Sweden  
- Fabrication of an anthropomorphic neonatal 3D printed head phantom, to be utilized as a quality assurance means for the optimization of the neonatal brain T1 and T2 weighted sequences on a 1.5T clinical MRI system  
Georgios KALAITZAKIS, Greece  
- Improved Absolute Metabolite Quantification by Localized Magnetic Resonance Spectroscopy Simulations  
Oscar JALNEFJORD, Sweden  
- Human in-vivo Magnetic Resonance Current Density Imaging (MRCDI) and MR Electrical Impedance Tomography (MREIT)  
Cihan GÖKSU, Denmark  
- Fast Field-Cycling MRI: novel contrast changes through switched magnetic fields  
James ROSS, United Kingdom  
- Spin coupling signal loss correlates with differentiation grade of lipomatous tumors: Preliminary results  
Katerina NIKIFORAKI, Greece  
- T2 and T* Relaxometry of Benign and Malignant Lipomatous Tumors  
Katerina NIKIFORAKI, Greece  
- Multiparametric MRI measurements of Renal Perfusion and Oxygenation  
Bryan HADDOCK, Denmark |
Thursday 23 August 2018

Scientific Session (DR-MRI) Invited talk, Oral Presentations

Chairs:
David LURIE, United Kingdom
Ioannis SEIMENIS, Greece

11:00 - 11:20
Spatial distortions in MRI
Ioannis SEIMENIS, Greece

- Correlation of magnetic resonance spectroscopy and histological findings in brain tumors
  Dimitrios VERGANELAKIS, Greece

- A new Signal-to-Noise ratio (SNR) measurement method based on low-pass filtering for Magnetic Resonance Imaging (MRI) Quality Control (QC) purposes
  Anou SEWONU, France

- Quantitative DW-MRI for treatment evaluation in particle therapy: role of ADC maps estimation
  Giulia BUIZZA, Italy

- Robustness of textural features in ADC Magnetic Resonance imaging maps among different contouring for prostate cancer patients
  Enrico MENGHI, Italy

- Visualizing sites of increased cellularity and high permeability in soft tissue sarcomas
  Katerina NIKIFORAKI, Greece

- Robust Radiomic Feature Selection in Magnetic Resonance Apparent Diffusion Coefficient Maps of Rectal Cancer
  Leonard WEE, Netherlands

- Analysis of diffusion and haemodynamic maps from multi-parametric mri of prostate cancer
  Kenni ENGSTRØM, Denmark

- Tumour segmentation in longitudinal diffusion weighted MRI of rectal cancer patients receiving radiotherapy
  Camilla SKINNERUP BYSKOV, Denmark

Thursday 23 August 2018

Lunch Break, Lunch Symposia, Exhibition and Posters

Auditorium 3
Thursday 23 August 2018

Joint session EFOMP-AAPM Pregnancy and radiation protection in imaging and Nuclear Medicine

Chairs:
Virginia TSAPAKI, Greece

14:00 - 14:05  Introduction
Virginia TSAPAKI, Greece

14:05 - 14:25  Radiation effects on the embryo and fetus
Cari BORRÁS, United States

14:25 - 14:45  Everything you need to know about dose management of pregnant patients in medical imaging
John DAMILAKIS, Greece

14:45 - 14:55  US Regulatory Requirements for Radiation Protection of Pregnant Patients and Medical Staff
Eugene LIEF, United States

14:55 - 15:00  Panel Discussion

Thursday 23 August 2018

Scientific Session (DR-CT) Oral Presentations

Chairs:
Mika KORTESNIEMI, Finland
Francis VERDUN, Switzerland

-  Toward 4D micro-CT and radiotherapy of small animals using all-optical, ultrashort X-ray sources: feasibility study and preliminary experimental results
   Paolo RUSSO, Italy

-  The acceptable quality doses (AQDs) in children undergoing CT examinations in Hamad Medical Corporation hospitals in Qatar
   Mohammad Hassan KHARITA, Qatar

-  Development of a national guideline for yearly constancy testing of image quality on CT scanners in Denmark
   Asbjørn SEEGERT, Denmark

-  Assessment of exposure and setting of local diagnostic reference levels for CT procedures
   Birute GRICIENE, Lithuania

-  Patient-specific dose and risk estimation for organ-based tube-current modulation in chest CT
   Caro FRANCK, Belgium

-  Towards Normalization of Contrast Enhancement of Pulmonary Parenchyma on Subtraction CT Imaging
   Dagmar GROB, Netherlands
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<tr>
<td>16:30 - 16:50</td>
<td><strong>Patient dosimetry in interventional radiology: concepts and tools</strong></td>
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<td>Annalisa TRIANNI, <em>Italy</em></td>
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<td>Low Contrast Detectability assessment of dynamic angiographic images:</td>
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<td>spatio-temporal generalisation of Model Observer and comparison with</td>
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<td>2AFC experiments</td>
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<td>Raffaele VILLA, <em>Italy</em></td>
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<td><strong>Comparison between skin dose values of a software tool and</strong></td>
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<td>GAFCHROMIC films using test fields and clinical cases</td>
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<td>Federica ROTTOLI, <em>Italy</em></td>
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<td><strong>Patient dose monitoring in interventional radiology</strong></td>
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<td>Paolo COLLEONI, <em>Italy</em></td>
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<td><strong>Patient dose evaluation and optimization during Hysterosalpingography</strong></td>
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<td>using digital X_Ray equipment</td>
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<td>Fabiola CRETTI, <em>Italy</em></td>
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<td><strong>Skin and Organ Doses in Pediatric Interventional Cardiology Procedures</strong></td>
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<td>Chadia RIZK, <em>Lebanon</em></td>
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<td><strong>Assessment of dose efficiency of a modern x-ray fluoroscopy system</strong></td>
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<td>using a model observer</td>
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<td>Michael SANDBORG, <em>Sweden</em></td>
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<td><strong>Correlation between Cumulative Dose and Peak Skin Dose using</strong></td>
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<td>GafChromatic films for patients undergoing interventional cardiology</td>
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<td>procedures</td>
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<td>Chiara VALERO, <em>Italy</em></td>
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### Refresher course: Proton radiotherapy planning  
**Auditorium 4**

**Chairs:**  
Jens M. EDMUND, Denmark

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<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 08:00  | **Introduction**  
Jens M. EDMUND, Denmark               |
| 08:05  | **Treatment planning in protontherapy**  
Marco SCHWARZ, Italy |
### Scientific Session (RT - Protontherapy) Invited talk, Oral Presentations

**Auditorium 4**

**Chairs:**
- Jens M. EDMUND, *Denmark*
- Oscar CASARES-MAGAZ, *Denmark*

11:00 - 11:20  **MRI-based synthetic CT applications for hadron dose planning**

  Jens M. EDMUND, *Denmark*

- **Toward a new treatment planning system accounting for in-vivo proton range verification in proton therapy**

  Liheng TIAN, *Germany*

- **Proton minibeam radiation therapy: a promising alternative for high-grade gliomas**

  Yolanda PREZADO, *France*

- **Short-lived positron emitters for in-beam Positron Emission Tomography (PET) verification of helium therapy**

  Ikechi OZOEMELAM, *Netherlands*

- **Preliminary test of innovative strip silicon detectors for therapeutic proton beam monitoring**

  Omar HAMMAD ALÌ, *Italy*

- **Range uncertainty reduction in proton beam therapy via prompt gamma-ray detection**

  Costanza PANAINO, *United Kingdom*

- **Comparative dose planning for Ru-106 brachytherapy and proton therapy for choroidal melanomas**

  Charlotte ESPENSEN, *Denmark*

- **INSPIRE: INfraStructure in Proton International REsearch - a new Horizon2020 network**

  Stine KORREMAN, *Denmark*

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**Thursday 23 August 2018**

**Lunch Break, Exhibition and Posters. 12.30 - 13.30 Lunch Symposium organised by VIEWRAY: MR-Guided SBRT - Clinical Experience with MR-Guided On-Table Adaptive Therapy**
Joint session EFOMP-COCIR Focus on BSS transposition in national legislation

Auditorium 4

Chairs: Klaus BACHER, Belgium

14:00 - 14:05 Harmonized transposition of the BSS in the national legislations. What can be done together by Medical Physicists and manufacturers
Klaus BACHER, Belgium

14:05 - 14:20 Information provided by manufacturers on equipment (BSS art 78)
Caterina BRUSASCO, Belgium

14:20 - 14:35 EFOMP Guidelines on the transposition of EU BSS art.60 in National Legislations
Alberto TORRESIN, Italy

14:35 - 14:50 COCIR perspective on BSS article 60: how can manufacturers and medical physicists best work together to optimize patient care
Sjirk BOON, Netherlands

14:50 - 15:00 Panel discussion

Scientific Session (RT-Brachytherapy) Oral Presentations

Auditorium 4

Chairs: Charlotte THORNBERG, Sweden
Kari TANDERUP, Denmark

- Source tracking with in vivo dosimetry for brachytherapy
  Jacob JOHANSEN, Denmark

- CT quantification of holmium distribution for absorbed dose calculation in a context of microbrachytherapy
  Jonathan TRANEL, France

- An innovative gynecological HDR brachytherapy applicator system for treatment delivery and real time verification
  Mauro CARRARA, Italy

- IVD methodology in APBI brachytherapy
  Sara PINTO, Portugal

- Prostate HDR brachytherapy: the experience of the team matters
  Mauro CARRARA, Italy

- Diffusing Alpha-emitters Radiation Therapy (DaRT): template based treatment planning technique for brachytherapy of squamous cell skin cancer
  Giacomo FELICIANI, Italy

- A study on the Consistency of Treatment Planning and Delivery for Endometrial Cancer treatments with Multi-Lumen Cylinders for High Dose Rate Brachytherapy
  Nicolae DUMITRU, United States
Thursday 23 August 2018

Scientific Session (NM-General) Invited talk, Oral Presentations

Chairs:
Adriaan LAMMERTSMA, Netherlands
Bernhard SATTLER, Germany

16:30 - 16:50
The Case for Quantitative Imaging in Nuclear Medicine
Adriaan LAMMERTSMA, Netherlands

- Creation of specific normal databases for perfusion quantification of low-dose myocardial SPECT studies
Michela LECCHI, Italy

- IS CZT-SPECT DEDICTED SYSTEM FOR MYOCARDIAL IMAGING RELIABLE IN ASSESSMENT OF LEFT VENTRICAL VOLUMES AS COMPARED TO ECHOCARDIOGRAPHY?
Jehangir KHAN, Sweden

- Validation of left ventricular ejection fraction with gated IQ-SPECT myocardial perfusion imaging
Roberta MATHEOU, Italy

- Quantitative analysis of ventilation SPECT applied to Krypton and Technegas
Robin DE NIJS, Denmark

- Validation of a Radio-Guided Surgery technique based on beta- radiation: test on ex-vivo specimens.
Elena SOLFAROLI CAMILLOCCI, Italy

- A 3D-printed phantom study for quantitative 99mTc-MAA SPECT/CT imaging and dosimetry in 90Y radioembolization
Sara UNGANIA, Italy
### Refresher course: Clinical alpha-particle dosimetry: What do we do and what should we do?

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<tr>
<td>08:00</td>
<td>Introduction</td>
<td>Manuel BARDIES, France</td>
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<tr>
<td>08:05</td>
<td>Clinical alpha-particle dosimetry</td>
<td>Stig PALM, Sweden</td>
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<tr>
<td>08:28</td>
<td>How to calibrate Gamma camera for 223Ra dosimetry</td>
<td>Marta CREMONESI, Italy</td>
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### Lunch Break, Lunch Symposia, Exhibition and Posters

### Joint session EFOMP-EFRS Teamwork of Medical Physicists and Radiographers

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<tr>
<td>14:00</td>
<td>In many countries Radiographers and Medical Physicists work together in teams, especially in areas concerning quality control and radiation protection. This session will highlight the roles of the two professions in this area in Europe</td>
<td>Efi KOUTSOVELI, Greece</td>
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<tr>
<td>14:05</td>
<td>The roles of radiographers in medical imaging and radiotherapy in Europe</td>
<td>Ainars BAJINSKIS, Latvia</td>
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<tr>
<td>14:20</td>
<td>Safety and Quality in the Medical Imaging Department</td>
<td>Ad MAAS, Netherlands</td>
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<tr>
<td>14:35</td>
<td>Teamwork in daily practice - The radiographer's perspective</td>
<td>Maeve DOYLE, Ireland</td>
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<td>14:50</td>
<td>Panel Discussion</td>
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<tr>
<td>16:30 - 16:50</td>
<td>Modern educational techniques in medical physics</td>
<td>Markus BUCHGEISTER, Germany</td>
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<td>16:50 - 17:10</td>
<td>e-Learning in Medical Physics</td>
<td>Slavik TABAKOV, United Kingdom</td>
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<td>17:10 - 17:30</td>
<td>Teaching of medical physics to radiology residents</td>
<td>Madan REHANI, United States</td>
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<td>TRAIN THE TRAINER WORKSHOP ON MEDICAL PHYSICS SUPPORT FOR NUCLEAR OR RADIOLOGICAL EMERGENCIES</td>
<td>Nur KODALOGLU, Turkey</td>
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<td>An International Master of Advanced Studies in Medical Physics: an appraisal after 5 cycles</td>
<td>Renata LONGO, Italy</td>
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<td>Education and training for leadership in Medical Physics: an EFOMP-EUTEMPE collaboration</td>
<td>Carmel J. CARUANA, Malta</td>
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<td>Improvements and Challenges in Postgraduate Radiation Protection Training for Dental Staff</td>
<td>Graham HART, United Kingdom</td>
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Refresher course: Motion management: from imaging to treatment and viceversa

Chairs:
Paweł Franciszek KUKOŁOWICZ, Poland

08:00 - 08:05 Introduction
Paweł Franciszek KUKOŁOWICZ, Poland

08:05 - 08:27 Active motion management strategies: breath hold, gating, tracking
Marianne AZNAR, United Kingdom

08:28 - 08:50 Motion management
Jan Jakob SONKE, Netherlands

Scientific Session (RT) Invited talk, Oral Presentations

Chairs:
Paweł Franciszek KUKOŁOWICZ, Poland
Gianfranco LOI, Italy

09:00 - 09:20 Modern radiotherapy of localized prostate cancer
Paweł Franciszek KUKOŁOWICZ, Poland

- Intrafractional imaging during volumetric modulated arc therapy (VMAT) prostate treatment in combination with Gold Anchor fiducials
  Ingun STÅHL, Sweden

- Cone-beam CT intensity correction for adaptive radiotherapy of the prostate using deep learning
  Christopher KURZ, Germany

- Influence of SBRT fractionation on the behavior of TCP and NTCP for prostatet cancer
  Evgeniia SUKHIKH, Russian Federation

- Calcifications in lung cancer patients: can they be used as surrogate for overall survival predictions?
  Frank BREWSTER, United Kingdom

- Adaptation of external beam radiotherapy through daily cone beam CT monitoring for cervical cancer patients
  Kari TANDERUP, Denmark

- Experimental study of dynamic dose interplay for flattening filter free beams in VMAT SBRT lung treatments
  Emmily SANDRINI, Brazil

- An investigation of possible radiophysical causes of recurrence for non-melanoma facial skin cancer treated with superficial X-rays
  Jens M. EDMUND, Denmark
Scientific Session RT-Dosimetry

11:00 - 11:20

New approaches in radiotherapy: spatial fractionation of the dose
Yolanda PREZADO, France

A multi-center dosimetry study to evaluate imaging dose from Elekta XVI and Varian OBI kV-Cone Beam CT systems to Cardiovascular Implantable Electronic Devices (CIEDs)
Hossein ASLIAN, Italy

Influence of treatment couch in the secondary MU calculation for VMAT prostate treatments
Eva Maria AMBROA REY, Spain

Influence of extrafocal dose in the out-of-field dose distribution in a paediatric anthropomorphic phantom, irradiated with a FFF beam and a 120 HD MLC - Monte Carlo simulations and Gafchromic EBT3 dose distribution
Firass GHAREEB, Portugal

Error sensitivity of forward- and back-projection EPID dosimetry for VMAT treatment of the prostate
James BEDFORD, United Kingdom

Output factor measurement in high-dose-per-pulse electron beams
Maria PIMPINELLA, Italy

EBT3 radiochromic film dosimetry in kV x-ray radiation therapy
Eleni PRENTOU, Greece

A comparison of dosimetry codes practice for FFF beams: IAEA TRS-398 and IPSM 1990
Francisco CUTANDA, United Kingdom

Big data in radiochromic film dosimetry
Ignasi MENDEZ, Slovenia
**Joint session EFOMP-IAEA - IAEA projects in Medical Physics**

**Auditorium 1**

**Chairs:**
Marco BRAMBILLA, Italy

**14:00 - 14:05**
To illustrate the progress and achievements of the IAEA projects in the field of Medical Physics, in which EFOMP has been involved
Marco BRAMBILLA, Italy

**14:05 - 14:20**
Patient radiation exposure monitoring in medical imaging
Jenia VASSILEVA, Austria

**14:20 - 14:35**
Dosimetry in radiopharmaceutical therapy
Manuel BARDIES, France

**14:35 - 14:50**
Guidelines for medical physics staffing requirements in diagnostic imaging and radionuclide therapy
Gian Luca POLI, Austria

**14:50 - 15:00**
Panel discussion

---

**Friday 24 August 2018**

**Scientific Session (RT-Technology) Oral Presentations**

**Auditorium 1**

**Chairs:**
Uulke VAN DER HEIDE, Netherlands
Iuliana TOMA-DASU, Sweden

- Transfer of minibeam radiation therapy into a cost-effective equipment: a proof of concept
  Yolanda PREZADO, France

- Passive ion beam modulation techniques for particle therapy raster scanning facilities
  Toke PRINTZ RINGBÆK, Germany

- 4D-CBCT streak reduction by simulated undersampling from 3D reconstruction
  Kasper Rørdam JENSEN, Denmark

- Novel inorganic scintillation detector system for real-time treatment verification during brachytherapy
  Gustavo KERTZSCHER, United States

- Influence of the degree of the geometric uncertainty on the quality of single isocenter VMAT multiple target treatments
  Georgia PRENTOU, Greece

- Kilovoltage rotational radiotherapy with the MariX/BriXs source for partial breast irradiation
  Giovanni METTIVIER, Italy
ECMP welcomes Germany - Ion beam therapy

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>16:30 - 17:00</td>
<td>Novel developments in ion beam dosimetry</td>
<td>Steffen GREILICH, Germany</td>
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<tr>
<td>17:00 - 17:30</td>
<td>Dual energy CT for improved range prediction in proton therapy: What can we gain?</td>
<td>Christian RICHTER, Germany</td>
</tr>
<tr>
<td>17:30 - 18:00</td>
<td>Ion-based imaging and in-vivo range verification in ion beam therapy: status and perspectives</td>
<td>Katia PARODI, Germany</td>
</tr>
</tbody>
</table>

Chairs:
Markus BUCHGEISTER, Germany
Daniela THORWARTH, Germany
Refresher course: Image quality in CT: From physical measurements to model observers

Chairs:
Sue EDYVEAN, United Kingdom

08:00 - 08:05
Introduction
Sue EDYVEAN, United Kingdom

08:05 - 08:27
Image quality in CT: from physical measurements to model observers
Francis VERDUN, Switzerland

08:28 - 08:50
Model observers applied to quality control in Computed Tomography
Irene HERNANDEZ GIRON, Netherlands

Scientific Session (DR-CT) Invited talk, Oral Presentations

Chairs:
Robert BUJILA, Sweden
Eleni Theano SAMARA, Switzerland

09:00 - 09:20
Impact of Scan Settings on Automatic Tube Current Modulation in CT
Robert BUJILA, Sweden

- Secondary Analysis of Canada’s National Computed Tomography (CT) Survey Data: Digging Deeper on DRLs
  Graeme WARDLAW, Canada

- Current Pediatric Radiation Doses from a Computed Tomography (CT) Dose Registry
  Philip W CHU, United States

- The LUMIC Challenge: How accurate are registration algorithms in registering lung CT images for subtraction?
  Dagmar GROB, Netherlands

- Adult Radiation Doses for Computed Tomography (CT) from an International Dose Registry
  Sophronia YU, United States

- Organ dose estimate in CT exams: inter-comparison of four commercial software and characterization of the main CT procedures used in ASST Niguarda (Milan, Italy)
  Alberto TORRESIN, Italy

- Evaluation of two model based iterative reconstruction algorithms in computed tomography
  Nadia OBERHOFER, Italy
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
<th>Country</th>
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<tbody>
<tr>
<td>11:00 - 11:20</td>
<td>Why is Dual Energy CT (DECT) still not used widely in clinics?</td>
<td>Mahadevappa MAHESH</td>
<td>United States</td>
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<td>Evaluation of bone and bone marrow doses in multi-slice CT thorax</td>
<td>John STRATAKIS</td>
<td>Greece</td>
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<td>examinations of children and young adolescents</td>
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<td>Noise Equivalent Number of Quanta (NEQ): a tool for choosing the optimal</td>
<td>Vittorio DI TRAPANI</td>
<td>Italy</td>
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<td>reconstruction algorithm in Computed Tomography (CT)</td>
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<td>Cluster analysis methods applied to an archive of CT patient dose data</td>
<td>Osvaldo RAMPADO</td>
<td>Italy</td>
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<td>A simple method for low contrast detectability, image quality and dose</td>
<td>Luca BELLESI</td>
<td>Switzerland</td>
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<td>optimization with CT iterative reconstruction algorithms and model</td>
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<td>observers</td>
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<td>Quantification of low contrast resolution and noise of dual energy CT</td>
<td>Bartosz PAWALOWSKI</td>
<td>Poland</td>
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<td>using software for automated quality control</td>
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<td>Impact of scanner type and acquisition parameters on the accuracy of</td>
<td>Luca Leandro VIGNA</td>
<td>Italy</td>
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<td>displayed computed tomography dose index</td>
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Friday 24 August 2018

Lunch Break, Lunch Symposia, Exhibition and Posters. 12.30 - 13.30
Lunch symposium organised by Sun Nuclear: Integrated and Innovative RT QA
### Joint session EFOMP-EANM - Quantitative Nuclear Medicine

**Auditorium 3**

**Chairs:**
Søren HOLM, *Denmark*

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>14:00 - 14:05</td>
<td>The role of quantitative nuclear medicine as a diagnostic or prognostic tool and in therapy monitoring</td>
<td>Søren HOLM, <em>Denmark</em></td>
</tr>
<tr>
<td>14:05 - 14:20</td>
<td>EANM/EARL harmonization strategies in PET quantification: from daily practice to multicentre oncological studies</td>
<td>Bernhard SATTLER, <em>Germany</em></td>
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<tr>
<td>14:20 - 14:35</td>
<td>SPECT/CT quantitative reconstruction techniques</td>
<td>Klaus BACHER, <em>Belgium</em></td>
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<tr>
<td>14:35 - 14:50</td>
<td>Recent developments in time-of-flight PET</td>
<td>Stefaan VANDENBERGHE, <em>Belgium</em></td>
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<tr>
<td>14:50 - 15:00</td>
<td>Panel discussion</td>
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### Scientific Session (DR-General) Oral Presentations

**Auditorium 3**

**Chairs:**
Irene HERNANDEZ GIRON, *Netherlands*
Magnus BÅTH, *Sweden*

- **Patient dosimetry during cone beam CT in dental implant planning**
  Sofia KOTTOU, *Greece*

- **Calculation of the patient size for abdominal radiography in terms of Water Equivalent Diameter**
  An DEDULLE, *Belgium*

- **Dosimetric evaluation of the O-arm® imaging system**
  Marta SANS MERCE, *Switzerland*

- **First experimental validation of phase-attenuation hybrid X-ray imaging**
  Adriano CONTILLO, *Italy*

- **Normal Ranges of Cardiac Imaging Radiomic Metrics in Healthy Volunteers 24 hours post Ultra-small Particles of Iron Oxide (USPIO) Administration**
  Polly DARBY, *United Kingdom*

- **Evaluation of the needs for PPV measurement from the legal point of view**
  Agnieszka KUCHCINSKA, *Poland*
<table>
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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>16:30-16:50</td>
<td><strong>Annual Quality Assurance testing of radiological equipment: why is this an important task of the MPE?</strong></td>
<td>Hilde BOSMANS, Belgium</td>
<td><strong>Belgium</strong></td>
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<td><strong>A single phantom, a single statistical method, a single figure of merit for all x-ray equipment</strong></td>
<td>Nicoletta PARUCCINI, Italy</td>
<td><strong>Italy</strong></td>
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<td><strong>A Monte Carlo investigation of dose width product (DWP) as a dose index for CBCT dosimetry</strong></td>
<td>Abdullah ABUHAIMED, Saudi Arabia</td>
<td><strong>Saudi Arabia</strong></td>
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<td><strong>Implementation and in-phantom testing of a free Monte Carlo software for CT dose calculation</strong></td>
<td>Alessio BOSCHINI, Italy</td>
<td><strong>Italy</strong></td>
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<td><strong>An Experience with Open Source Machine Learning Software DeepMedic</strong></td>
<td>Teemu MÄKELÄ, Finland</td>
<td><strong>Finland</strong></td>
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<td><strong>Impact of tube potential and beam width of CBCT scans on size-specific dose estimate (SSDE) factors</strong></td>
<td>Abdullah ABUHAIMED, Saudi Arabia</td>
<td><strong>Saudi Arabia</strong></td>
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<td></td>
<td><strong>Development of Breast Tumours models database</strong></td>
<td>Kristina BLIZNAKOVA, Bulgaria</td>
<td><strong>Bulgaria</strong></td>
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</table>
Refresher course: The future of personalised radiotherapy from a radiobiological perspective

Auditorium 4 08:00 - 08:27

Radiobiological parameters that influence treatment outcome in radiotherapy
Loredana MARCU, Romania

Radiobiological model-based treatment individualisation in radiotherapy
Iuliana TOMA-DASU, Sweden

Scientific Session (NM-PET) Invited talk, Oral Presentation

Auditorium 4 09:00 - 09:20

Future trends of PET/CT technology
Søren HOLM, Denmark

Preparing data for multiparametric PET/MRI: Influence of PET point spread function modelling and EPI distortion correction on the spatial correlation of 18F-FDG-PET uptake and diffusion weighted MRI in head/neck cancer
Adam Espe HANSEN, Denmark

Validation framework for automated determination of the optimal number of clusters in [F-18]FET-PET brain images
Elham YOUSEFZADEH, Germany

Application of new algorithms in PET image reconstruction: preliminary results
Roberta MATHEOUD, Italy

Measuring, monitoring and reporting effective dose on hybrid equipment: results and challanges to integrate with MDCT in a large population study
giovanni TOSI, Italy

Impact of tracer activity reduction on PET radiomic features in pediatric 18F-FDG-PET/MRI examinations
Marco BRANCHINI, Italy

Underestimation of 68Ga PET/CT Quantification caused by Activity Overestimation using Default Calibrator Settings
Tom SANDERSON, United Kingdom
11:00 - 11:20  
**Dosimetric planning of liver radioembolization with 90Y microspheres: methodological problems and clinical achievements**  
Carlo CHIESA, *Italy*

- **Vandetanib may act as a radiosensitiser for 177Lu-octreotate treatment of medullary thyroid cancer**  
Viktor SANDBLOM, *Sweden*

- **Optimization of quantitative 99mTc-MAA SPECT/CT imaging for 90Y radioembolization: a 3D-printed phantom study**  
Sara UNGANIA, *Italy*

- **A1M is a potential kidney protector in 177Lu-octreotate treatment of neuroendocrine tumours**  
Charlotte ANDERSSON, *Sweden*

- **Development of a realistic geometry model for cellular dosimetry of different therapeutic isotopes used in internal radiotherapy**  
Nora HOCINE, *France*

- **Biological effects evaluation in peripheral blood lymphocytes from patients undergoing Radium-223 chloride (223RaCl2) therapy**  
Lidia STRIGARI, *Italy*

- **Advanced personalised 3D dosimetry for Peptide Receptor Radionuclide Therapy based on Monte Carlo method**  
Salvatore BERENATO, *United Kingdom*

- **Myelosuppression in Non-Hodgkin Lymphoma Patients Treated with 177Lu-Iliotomab satexetan Can Be Predicted by a Model with Red Marrow Absorbed Dose as the Only Parameter**  
Johan BLAKKISRUD, *Norway*

- **PET-TC post therapy dosimetry in radioembolization with resin 90Y microspheres: comparison with pre treatment SPECT-TC 99mTc-MAA results**  
Elisa RICHETTA, *Italy*
Friday 24 August 2018

Joint session EFOMP-ESMRMB The expanding role of MR in radiation therapy

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>14:00 - 14:05</td>
<td>Introduction</td>
<td>David LURIE, United Kingdom</td>
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<tr>
<td>14:05 - 14:20</td>
<td>Benefits of MRI for Radiation Therapy</td>
<td>Heinz-Peter SCHLEMMER, Germany</td>
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<td>14:20 - 14:35</td>
<td>MRI for radiotherapy treatment planning</td>
<td>Uulke VAN DER HEIDE, Netherlands</td>
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<td>14:35 - 14:50</td>
<td>New Technologies for MR guided Radiotherapy</td>
<td>Cornelius van den BERG, Netherlands</td>
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<tr>
<td>14:50 - 15:00</td>
<td>Panel discussion</td>
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Friday 24 August 2018

Scientific Session Radioprotection, Oral Presentations

<table>
<thead>
<tr>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>Internal contamination monitoring of workers in a nuclear medicine</td>
<td>Roberta MATHEOUD, Italy</td>
<td>Italy</td>
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<td>Age and gender specific radiation risk models as an alternative to</td>
<td>Martin ANDERSSON, Sweden</td>
<td>Sweden</td>
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<td>effective dose</td>
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<td>DosReg - a national web-based tool to support the optimization of</td>
<td>Henrik BÅVENÅS, Sweden</td>
<td>Sweden</td>
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<td>radiological protocols and examinations</td>
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<td>Recent update of typical effective doses received by patients at</td>
<td>Asen DIMOV, Bulgaria</td>
<td>Bulgaria</td>
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<td>diagnostic and interventional radiology procedures and its impact on</td>
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<td>assessment of collective effective dose to population in Bulgaria</td>
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<td>Assessment of Radiation Exposure in a Newly Formed Nuclear Medicine</td>
<td>Panayiotis HADJITHEODOROU, Cyprus</td>
<td>Cyprus</td>
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<tr>
<td>An Excel-based tool for improving patient dose data reporting and</td>
<td>Jenia VASSILEVA, Austria</td>
<td>Austria</td>
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<td>analysis</td>
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</table>
Scientific Session Radioprotection Invited talk, Oral Presentations

Chairs:
Colin MARTIN, United Kingdom
Jenia VASSILEVA, Austria

16:30 - 16:50
Implementation and practical experience with the new EURATOM Directive occupational dose limit to the lens of the eye: from 150 mSv to 50 mSv per year
Colin MARTIN, United Kingdom

- Dose monitoring for physicians’ lens in Catheterization Lab: intercenter survey
Luca BERNARDI, Italy

- Eye lens dose monitoring in Interventional Radiology
Paolo SCALCHI, Italy

- Evaluation of a new personal radiation protection device for the operator’s head during X-ray diagnostics and interventions
Maria LARSSON, Sweden

- The dose to the lens of the eye for the heart team performing transcatheter aortic valve implementation (TAVI): Is there any concern for cataract?
Angeliki KARAMBATSAKIDOU, Sweden

- Analysis of Radiation Protection of breastfed babies when mother is undergoing diagnostic nuclear medicine examination (F18-FDG PET, Tc-99m MIBI).
Agnieszka KUCHCINSKA, Poland

- Establishing a unified system for logging radiation incidents in an international healthcare services organisation
Katia KATSARI, Netherlands

- Occupational radiation doses during interventional radiology residents training
William JARAMILLO GARZÓN, Colombia
Refresher course: Quantitative molecular imaging : can we trust the SUV?

Chairs: Marco BRAMBILLA, Italy

08:00 - 08:05 Introduction
Marco BRAMBILLA, Italy

08:05 - 08:50 Quantitative molecular imaging: can we trust the SUV?
Ronald BOELLAARD, Netherlands

Special Focus Professional Matters

Chairs: Ad MAAS, Netherlands
Carmel J. CARUANA, Malta

11:00 - 11:20 IOMP project 'History of Medical Physics' - Objectives and First Results
Slavik TABAKOV, United Kingdom

11:20 - 11:40 National Registration Schemes for Medical Physicists in Europe. An Overview
Ad MAAS, Netherlands

11:40 - 12:00 Strategic leadership in medical physics - a to-do list
Carmel J. CARUANA, Malta

- The European Federation of Medical Physics algorithm for the evaluation of minimum staffing level of Medical Physics Experts: results of the Italian experience.
  Roberta MATHEOUD, Italy

- The CBCT protocol of EFOMP-ESTRO-IAEA is alive: update by EURADOS and DIN
  Annalisa TRIANNI, Italy

- Contribution of the medical physicist to the Italian consensus document on management of patients with cardiac implantable devices (CIED) undergoing radiotherapy and future development from AIFM working group.
  Mara SEVERGNINI, Italy

Lunch Break, Lunch Symposia, Exhibition and Posters
Refresher course: Dose painting: Why and how

Auditorium 1 Saturday 25 August 2018

**Chairs:**
Brendan MCCLEAN, Ireland

08:00 - 08:05  **Introduction**
Brendan MCCLEAN, Ireland

08:05 - 08:27  **The rationale behind dose painting strategies currently tested in clinical trials**
Ivan VOGELIUS, Denmark

08:28 - 08:50  **Quality assurance issues pertaining to non-uniform dose prescription situations**
Daniela THORWARTH, Germany

Scientific Session (RT - QA - QC) Invited talk, Oral Presentations

Auditorium 1 Saturday 25 August 2018

**Chairs:**
Crister CEBERG, Sweden
Michele STASI, Italy

09:00 - 09:20  **Automated treatment planning and quality assurance**
Crister CEBERG, Sweden

- **Establishing acceptance criteria for VMAT quality assurance (QA) in a new radiotherapy centre**
Inés FLORES-CACHO, Spain

- **QUALITY ASSURANCE AND RISK MANAGEMENT FOR INTRAOPERATIVE ELECTRON RADIOTHERAPY ACCELERATORS - RECOMMENDATIONS BY THE POLISH ASSOCIATION OF MEDICAL PHYSICS**
Marta KRUSZYNA-MOCHALSKA, Poland

- **Patient-specific quality assurance based on electronic portal imaging devices via artificial neural networks**
Frédéric CHATRIE, France

- **The Output Factor Measurements of CyberKnife System using Various Detectors**
Canan KOKSAL, Turkey

- **Verification of Field Junctions in Craniospinal Proton Radiotherapy**
Bartłomiej SADOWSKI, Poland

- **Monte Carlo as quality control tool of machine performance and treatment planning system, is it a luxury or a necessity?**
Husein ALHAMADA, Belgium

- **Comparison between four routine control devices detecting photon beam energy changes**
Miguel JIMÉNEZ MELGUIZO, Spain
Joint session EFOMP-ESR Teaming up for medical radiation protection

Auditorium 1

Chairs:
John DAMILAKIS, Greece

11:00 - 11:05 A paradigm shift is occurring in the establishment of Diagnostic Reference Levels: from anatomy to clinical indication in adults and from age to weight in children. The impact of these change will be illustrated in the context of a multidisciplinary teamwork between Radiologists and Medical Physicists
John DAMILAKIS, Greece

11:05 - 11:20 Implementing Clinical Imaging Guidelines
Guy FRIJA, France

11:20 - 11:35 Introduction and preliminary results of the EUCLID European Project
Virginia TSAPAKI, Greece

11:35 - 11:50 Perspective on paediatric imaging diagnostic reference levels (DRLs)
Claudio GRANATA, Italy

11:50 - 12:00 Panel discussion

Plenary Session

Auditorium 1

Chairs:
Peter SHARP, United Kingdom

12:00 - 12:30 Deep Learning in Computed Tomography
Marc KACHELRIEß, Germany

Award of the best Oral Presentation and Poster

Auditorium 1

Closing sessions and Ceremony

Auditorium 1
### Refresher course: Breast Tomosynthesis. Technology, quality controls and dosimetry

**Auditorium 3**

**Chairs:**
- Magnus BÅTH, *Sweden*

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 08:00 - 08:05 | **Introduction**
  Magnus BÅTH, *Sweden* |
| 08:05 - 08:27 | **Physics, technology and QC of breast tomosynthesis**
  Anders TINGBERG, *Sweden* |
| 08:28 - 08:50 | **Breast Tomosynthesis: Technology, quality control, and dosimetry**
  Ioannis SECHOPOULOS, *Netherlands* |

### Scientific Session (DR-Mammo) Invited talk, Oral Presentations

**Auditorium 3**

**Chairs:**
- Ioannis SECHOPOULOS, *Netherlands*
- Paolo RUSSO, *Italy*

<table>
<thead>
<tr>
<th>Time</th>
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| 09:00 - 09:20 | **Dosimetry in breast computed tomography**
  Paolo RUSSO, *Italy* |
  - **Digital breast tomosynthesis: flat panel and photon counting detectors comparison**
    Alessandro LORIA, *Italy* |
  - **3D dose distribution in two clinical digital breast tomosynthesis units: a phantom study**
    Antonio SARNO, *Italy* |
  - **Monochromatic phase-contrast breast CT: a phantom-based image comparison with a clinical system**
    Christian FEDON, *Netherlands* |
  - **Channelized Hotelling Observer performance in acquired mammographic images of an anthropomorphic breast phantom**
    Christiana BALTA, *Netherlands* |
  - **A virtual study to determine the potential of dual-energy imaging for detectability of microcalcifications in breast screening**
    Galya GOSPODINOVA, *Bulgaria* |
  - **Calculation of Breast Dose with The Regression Model**
    Ayşegül YURT, *Turkey* |
  - **Computer-based Platform for Phase Contrast Breast Imaging**
    Kristina BLIZNAKOVA, *Bulgaria* |
  - **Experimental validation of a Monte Carlo code for internal breast dosimetry in mammography**
    Christian FEDON, *Netherlands* |
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<tr>
<td>11:00 - 11:05</td>
<td>Introduction - Artificial Intelligence in Medical Imaging: why should a medical physicist care?</td>
<td>Annalisa TRIANNI, Italy</td>
<td>Italy</td>
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<tr>
<td>11:05 - 11:20</td>
<td>Basics of deep learning</td>
<td>Jonas TEUWEN, Netherlands</td>
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<td>11:20 - 11:35</td>
<td>From Image Quality to Care Outcome</td>
<td>Mika KORTESNIEMI, Finland</td>
<td>Finland</td>
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<td>11:35 - 11:50</td>
<td>Imaging Biobanks</td>
<td>Emanuele NERI, Italy</td>
<td>Italy</td>
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<tr>
<td>11:50 - 12:00</td>
<td>Panel Discussion</td>
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Saturday 25 August 2018

Refresher course: Fundamental on radiomics

Chairs:
Kari TANDERUP, Denmark

08:00 - 08:05
Introduction
Kari TANDERUP, Denmark

08:05 - 08:27
Statistical methods for analysis of multidimensional imaging data
Koen VAN LEEMPUT, Denmark

08:28 - 08:50
Radiomics: transforming standard imaging into mineable data related to biology
Janita VAN TIMMEREN, Netherlands

Saturday 25 August 2018

Scientific Session (NIR) Invited talk, Oral Presentations

Chairs:
Ayakkanu MANIVANNAN, United Kingdom
Alex REM, Netherlands

11:00 - 11:20
Ayakkanu MANIVANNAN, United Kingdom

- Influence of Nonionizing Millimeter Electromagnetic Radiation on Tumor and Healthy DNA
  Vitali KALANTARYAN, Armenia

- Handheld MED testers: An inter-comparison to inform requirements for acceptance testing and calibration
  Michael MANLEY, Ireland

- Development of a quality assurance program for B-mode ultrasound equipment: one-year experience
  Sotiria TRIANTOPOULOU, Greece

- DEVELOPMENT OF A FLOWCHARTS TOOL FOR THE RISK ASSESSMENT OF OCCUPATIONAL EXPOSURE TO ELECTROMAGNETIC FIELDS
  George GOURZOLIDIS, Greece

- Validation of probabilistic tracking method in the reconstruction of thalamocortical and optical radiation tracts: comparison between reconstructed tracts and evoked potential recorded in epileptic patients.
  Stefania NICI, Italy
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<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>08:00 - 08:05</td>
<td><strong>Introduction</strong>&lt;br&gt;Maurice JANSSEN, Netherlands</td>
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<tr>
<td>08:05 - 08:27</td>
<td><strong>Quality and Safety Management of Medical Lasers</strong>&lt;br&gt;Alex REM, Netherlands</td>
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<tr>
<td>08:28 - 08:50</td>
<td><strong>Safe use of electrosurgery in healthcare</strong>&lt;br&gt;Christiaan VAN SWOL, Netherlands</td>
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