



**ESMPE European School for Medical Physics Experts**

# Computed Tomography. Technology, Dosimetry, Optimization.

**January 25 – January 27, 2018, Prague, Czech Republic**

The EFOMP and COCIR (The European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry) in collaboration with the Czech Association of Medical Physicists and the Department of Dosimetry and Application of Ionizing Radiation of Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague would like to invite you to the next ESMPE CT 2018.

The school will be aimed at advanced tasks connected with Computed Tomography. The school will cover the main physics aspects of the CT technology, Dosimetry and Optimization.

This edition is jointly organized by EFOMP and COCIR. Lecturers identified by COCIR will give insides on the technical solution adopted by manufacturers in the relevant fields of CT dose reduction and optimization.

This two-and-half day event will be accredited by EBAMP (European Board of Accreditation for Medical Physics) and is intended for practicing clinical Medical Physicists who are involved in Computed Tomography. As in last year's school, there will be an optional examination at the end for those seeking a higher level of certification beyond attendance.

## Organizers

Jaroslav Ptáček, Tereza Hanušová (Czech Republic)  
Mika Kortnesniemi (Scientific Chair),  
Marco Brambilla (Chair of the School)

## Content

**State of the Art of CT Imaging** - Image quality parameters in modern CT imaging - Image reconstruction in CT - from traditional FBP to iterative methods

**Tube Current Modulation - Automatic kV Selection - Iterative Reconstructions** - How it is implemented in different makes and model of state of the art scanners. How to configure the relevant parameters during acquisition. Future perspectives

**CT Dosimetry** - Patient Specific Dosimetry - Managing patient dose with CT dose tracking systems - CT DRLs, notification values, alert values

**Advances in CT Technology Future X-ray Sources and Detectors**

**CT Optimization** - Setting CT protocols per specific clinical indications

## Final exam

The final exam is voluntary. Participants can gain additional credits when successfully pass the test.



**EFOMP**



**FAKULTA  
JADERNÁ  
A FYZIKÁLNĚ  
INŽENÝRSKÁ  
ČVUT V PRAZE**

## Faculty

25 <sup>th</sup> January 2018 Thursday	Session	Title	Description	Lecturer
<b>8:00-9:00</b>			<b>Registration</b>	
<b>9:00-10:00</b>	<b>Setting the Scene</b>	<b>Risk Assessment in CT Imaging</b>	Stochastic risk assessment. Usefulness of CTDI, DLP, effective dose, organ dose to predict this risk. Overview of the risks associated with CT imaging.	<b>K. Bacher</b>
<b>10:00-10:30</b>			<b>Coffee break</b>	
<b>10:30-11:30</b>	<b>State of the Art of CT Imaging</b>	<b>Image Quality Parameters in Modern CT Imaging</b>	The lecture will go through basics of image quality and continues to more developed quantitative parameters which are needed to consider the effects of iterative reconstruction techniques to the clinically relevant contrast and resolution ranges.	<b>S. Edyvean</b>
<b>11:30-12:30</b>		<b>Image Reconstruction in CT - from Traditional FBP to Iterative Methods</b>	Principles of image reconstruction in CT including the traditional filtered back-projection (FBP) and evolving into iterative reconstruction in the image space or in the sinogram space. Modeling the physics in the iterative reconstruction for transmission computed tomography.	<b>O. Rampado</b>
<b>12:30-14:00</b>			<b>Lunch break</b>	
<b>14:00-14:40</b>	<b>Technology - General Electric</b>	<b>Tube Current Modulation - Automatic kV Selection - Iterative Reconstructions</b>	How it is implemented in different makes and models of state of the art scanners. How to configure the relevant parameters during acquisition. Future perspectives.	<b>D.Crotty H Grundin</b>
<b>14.40-15.20</b>	<b>Technology - Toshiba</b>			<b>K.Boedeker, R. Irwan</b>
<b>15.20-16.00</b>	<b>Technology - Philips</b>			<b>P. Coulon</b>
<b>16:00-16:30</b>			<b>Coffee break</b>	
<b>16:30-17:10</b>	<b>Technology - Siemens</b>	<b>Tube Current Modulation - Automatic kV Selection - Iterative Reconstructions</b>	How it is implemented in different makes and models of state of the art scanners. How to configure the relevant parameters during acquisition. Future perspectives.	<b>T.Flohr, B. Schmidt</b>
<b>17:10-18:00</b>	<b>Discussion</b>			
<b>20:00-23:00</b>			<b>Social dinner - participants + lecturers</b>	

26 <sup>th</sup> January 2018 Friday		Title	Description	Lecturer
9:00-10:00	CT Dosimetry	Patient Specific Dosimetry in CT	The lecture will present the proposed developments of the emerging EFOMP-AAPM TG246 methods including prerequisites for experimental and calculational patient dose determination, and related uncertainties. Talk will also cover the major source codes and anthropomorphic models for dosimetry use.	<i>M. Kortensniemi</i>
10:00-10.30		<b>Coffee break</b>		
10:30-11:15	CT dosimetry	Managing Patient Dose with CT Dose Tracking Systems	An overview of CT dose tracking systems developed by different vendors. This lecture will also provide information on how these systems can help in radiation protection of patients, optimization and organ dose evaluation.	<i>V. Tsapaki</i>
11:15-12.00		CT DRLs, Notification Values, Alert Values	How to establish CT DRLs. Clinical DRLs vs. anatomical DRLs. How to use DRLs, notification values and alert values effectively.	<i>J. Damilakis</i>
12:00-12.30		EFOMP Guidelines on the Transposition of EU BSS Art. 60 in CT	Relevant parameters for assessing the patient dose to be transferred in the record of the examination.	<i>A. Torresin</i>
12:30-14:00		<b>Lunch time</b>		
14:00-14:40	Technology - General Electric	Advances in CT Technology Future X-ray Sources and Detectors	Physics and technology - Single tube multi energy or double tube? Spectral multienergy acquisition - CT photon counting - Organ dedicated CT procedures/scanners.	<i>D.Crotty</i> <i>H. Grundin</i>
14:40-15:20	Technology - Toshiba			<i>K.Boedeker,</i> <i>R. Irwan</i>
15:20-16:00	Technology - Philips			<i>P. Coulon</i>
16:00-16:30		<b>Coffee break</b>		
16:30-17:10	Technology - Siemens	Advances in CT Technology Future X-ray Sources and Detectors	Physics and technology - Single tube multi energy or double tube? Spectral multienergy acquisition - CT photon counting - Organ dedicated CT procedures/scanners.	<i>T.Flohr, B. Schmidt</i>
17:10-17:30	Discussion			
17:30-18:00	CT Dosimetry	What the MPE Must Know from Manufacturers	Methods of manufactured implementation for the displayed CT dose metrics, uncertainties and suspension levels.	<i>R. Irwan</i>

27 <sup>th</sup> January 2018 Saturday		Title	Description	Lecturer
9.00-10.00	CT Optimization	Setting CT Protocols According to Specific Clinical Indications	How to create good scanning protocols. From anatomy to clinical indication driven protocols.	<i>M. Brambilla</i>
10.00-11.00			The manufacturers' point of view and strategies.	<i>R. Irwan</i>
11:00-11:30		<b>Coffee break</b>		
11.30-13.00	CT Optimization	Round Table	Few basic protocols vs as specific as possible protocols, the way of assigning protocols, the role of the Medical Physicist in Protocol Optimization, the interaction between MPs, Radiologists, Radiographers and Manufacturers' specialist in the protocol settings.	<i>EFOMP</i> <i>(J. Damilakis</i> <i>M. Kortensniemi</i> <i>A. Torresin)</i> <i>ESR</i> <i>(P.Parizel)</i> <i>COCIR</i> <i>(R. Irwan)</i>
13:30-15:00		<b>Final examination</b>		

## Faculty

<b>Klaus Bacher</b>	Head of Division of Medical Physics, Ghent University, Ghent, Belgium.
<b>Kirsten Boedeker</b>	COCIR - Research and Image Quality Scientist, Toshiba
<b>Marco Brambilla</b>	Head of Department of Medical Physics - University Hospital - Novara - Italy
<b>Dominic Crotty</b>	COCIR- Premium CT Product Dose Lead, GE Healthcare
<b>John Damilakis</b>	Head of Department of Medical Physics, Faculty of Medicine, University of Crete - Greece
<b>Philippe Coulon</b>	COCIR - Director CT Clinical Science Radiology, Philips
<b>Sue Edyvean</b>	Head of Medical (Radiation) Dosimetry Group - Centre for Radiation, Chemical and Environmental Hazards (CRCE) – Chilton - UK
<b>Thomas Flohr</b>	COCIR - Head of CT Concepts, Siemens Healthineers
<b>Håkan Grundin</b>	COCIR – CT Manager Nordic Region - GE Healthcare
<b>Roy Irwan</b>	COCIR - Chief Physicist, Toshiba
<b>Mika Kortesiemi</b>	Adjunct Professor, Chief Physicist, HUS Medical Imaging Center, University of Helsinki-Finland
<b>Paul Parizel</b>	Head of Department of Radiology, Faculty of Medicine University of Antwerp – Belgium - Chair of the ESR Board of Directors
<b>Osvaldo Rampado</b>	Department of Medical Physics - University Hospital of Torino, Italy
<b>Bernhard Schmidt</b>	COCIR - Head of CT Scanner Applications, Siemens Healthineers
<b>Alberto Torresin</b>	Head of Department of Medical Physics - Hospital Niguarda - Milan - Italy
<b>Virginia Tsapaki</b>	Head of Department of Medical Physics - Konstantopoulio General Hospital - Athens - Greece

## Further information

<b>Course language</b>	English
<b>Level</b>	MPE
<b>Registration fee</b> * (2 main meals, 5 coffee breaks, 1 social dinner)	<b>300 €</b> <b>350 €</b> (from 11.12.2017)
<b>Reduced registration fee</b> * - subsidized by EFOMP - first-come, first-served policy - deadline for application (31.12.2017)	<b>150 €</b> - for the first 10 attendees (max. 2 from one country) coming from the following European countries: Albania, Belarus, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Estonia, Greece, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine.
<b>Maximum number of participants</b>	<b>80</b>
<b>Duration</b>	<b>25<sup>th</sup> January 2018 – 27<sup>th</sup> January 2018</b>
<b>Study load</b>	17 hours of lectures and demonstrations
<b>Venue</b>	Department of Dosimetry and Application of Ionizing Radiation, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Břehová 7, 115 19 Prague 1, CZECH REPUBLIC
<b>GPS coordinates</b>	<b>50°5'27.737"N, 14°24'58.713"E</b>
<b>Accommodation</b>	Individual
<b>Information, program, etc.</b> <b>Practical information at:</b>	<a href="http://www.csfm.cz/winter2018.html">www.csfm.cz/winter2018.html</a> winter2018@csfm.cz
<b>Registration</b>	Electronic registration via <a href="http://www.csfm.cz/winter2018.html">www.csfm.cz/winter2018.html</a>
<b>Registration period</b>	<b>10 July 2017 – 25 December 2017</b>

\* payment must be done in 14 days following the pre-registration, otherwise pre-registration will be cancelled and neither free place nor subsidized or ordinary fee can be granted for repeated registration

