



**ESMPE European School for Medical Physics Experts**

## **Radiation Shielding in Medical Installations**

**10<sup>th</sup>-12<sup>th</sup> February 2022, Prague, Czech Republic**

EFOMP, 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 invite you to the next ESMPE on **10<sup>th</sup>-12<sup>th</sup> February 2022**.

The school will be aimed at advanced tasks connected to site planning and shielding design in medical installation. The school will cover the main radioprotection aspects of the shielding calculations for typical medical installations.

This two-and-a-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 the Radiation protection field as Radiation Protection Experts. As in past school editions, there will be an optional examination at the end for those seeking a higher level of certification beyond attendance. ESMPE have decided this event will be in a hybrid format. Participants and lecturers will be on-site in Prague where possible, but the school will also be live-streamed so participants can join live online if they cannot travel to the venue.

***Please note: All times shown are in CET***

### **Content**

- Radiation protection principles applied to radiation shielding design
- Methodology for Diagnostic and interventional X-ray Shielding (conventional, CT, IR)
- Methodology for Nuclear Medicine Shielding (conventional, PET, NM therapy)
- Methodology for Radiation Therapy Shielding (LINAC, special equipment, Proton)
- Radiation protection surveys
- Worked Examples

### **Final exam**

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

### **Organisers**

- Brendan McClean (Chair of the School)
- Paddy Gilligan, Marco Brambilla (Scientific Chairs)
- Jaroslav Ptáček, Tereza Hanušová (CAMP)





## Faculty

Brendan Mc Clean	Saint Lukes Radiation Oncology Network, Dublin/IE
Paddy Gilligan	Mater Misericordiae University Hospital, Dublin/IE
David Sutton	University of Dundee, Scotland/UK
Pat Horton	Royal Surrey County Hospital, Guildford, UK.
Colin Martin	University of Glasgow Glasgow/UK
Brenda Byrne	Mater Misericordiae University Hospital, Dublin/IE
Susan Maguire	Mater Private Hospital, Dublin/IE
Jörn Meissner	Meissner Consulting, München/DE
Ana Millan	Technicas Radiofísicas S.L., Zaragoza/ES



# ESMPE

Thursday 10<sup>th</sup> February 2022

Session	Title	Description	Lecturer	
8:00-9:00	Registration			
9:00-9:20	Introduction	Setting the scene	Presentation of the ESMPE and introduction to the course Overview of Shielding Design Goals in Europe	Brendan McClean
9.20-10.20	Diagnostic Shielding	Basic Principles	Dose limits & constraints. Dose quantities. Occupancy. Types of radiation to consider. Workload. Barrier Calculations. Transmission, materials & some practical considerations..	David Sutton
10:20-10.45	Coffee break			
10:45-11:15	Diagnostic Shielding	Dealing with scattered radiation	The scatter problem. Empirical approaches. Variation of scatter with angle and tube voltage. A simple solution. Heavily filtered radiation. Tertiary scatter.	David Sutton
11.15-12.00	Diagnostic Shielding	Methods - Radiography	Types of radiation to consider. Methodology for primary and scattered radiation. Workload. Example calculations.	Colin Martin
12:00-12:30			Question and Answer discussion on the morning lectures	All Faculty
12:30-14:00	Lunch break			
14.00-14.45	Diagnostic Shielding	Methods - Fluoroscopy	Types of radiation to consider. Example – Cardiac Cath lab including tertiary scatter. Workload & shielding. Example calculation in reverse –no additional shielding present.	David Sutton
14.45-15.30	Diagnostic Shielding	Methods – Computed Tomography	Planning and design. Scatter dose and workload. Methodology. Example calculation. Practical considerations. Tertiary scatter. Workload & shielding.	Colin Martin
15:30-15:50	Coffee break			
15:50-16:30	Diagnostic Shielding	Methods - Verification	Visual inspections. Transmission Measurements. Survey reports	Paddy Gilligan
16:30-17:00			Question and Answer discussion on the afternoon lectures	All Faculty
19:30-22:30	Social dinner - participants + lecturers			





# ESMPE

Friday 11<sup>th</sup> February 2022

	Session	Title	Description	Lecturer
09:00-09:45	Nuclear Medicine Shielding	Shielding requirements of a Nuclear Medicine Department (Diagnostic)	Classification of risk. Structural requirement for ventilation, plumbing, surfaces. Paths for workers and patients. Management of wastes	Brenda Byrne
09:45 – 10:30	Nuclear Medicine Shielding	Shielding requirements of a Nuclear Medicine Department (Therapy)	Therapy rooms shielding and site planning. Radioactive waste management. Decay tank systems.	Ana Millan
10:30-10:50	Coffee break			
10:50-11:40	PET/CT	Shielding requirements for a PET/CT facility	Facility design process and considerations, Factors affecting radiation protection and shielding, Imaging and uptake room calculations, Examples and Problems	Susan Maguire
11:40-12:00			Question and Answer discussion on the morning lectures	All Faculty
12:00-13:30	Lunch break			
13:30-14:30	Radiation therapy	Shielding of LINAC Vaults	Basic design principles, primary and secondary shielding, materials and safety issues	Pat Horton
14:30-15:30	Radiation therapy	Mazes, Doors and Practical Considerations	Maze and door calculations; Direct doors, Neutrons and structural issues	PH/BMcC Neutrons
15:30-16:00	Coffee break			
16:00-17:00	Radiation therapy	Proton therapy	Proton work load models; high energy neutron shielding; maze vs. door; ventilation ducts and other holes in the shield; line-of-sight models vs Monte Carlo; safety surveys vs. dose rate; activation topics; FLASH therapy effect on shielding	Joern Meissner
17:00-18:00	Radiation therapy	Brachytherapy and Non-conventional treatment units	HDR and PDR Brachytherapy, Gammaknife Tomotherapy, Halcyon, Cyberknife, MRI Linac,	Pat H/BMcC MRI Linac





# ESMPE

Saturday 12<sup>th</sup> February 2022

	Session	Title	Description	Lecturer
09:00-09:40	Radiation Therapy	Shielding surveys	Construction Inspection; Interlocks, Restrictive Devices, and Radiation Warning Lights and Signs; Survey Reports	Brendan McClean
09:40-10:00			Question and Answer discussion on the RT lectures	All Faculty
10:00-11:00		Case Studies 1 Examples to be provided	Where shielding design has had an impact on good and bad patient and staff experience	Paddy Gilligan
11:00-11:30	Coffee break			
11:30-12:30		Case studies 2 Examples to be provided	Where shielding design has had an impact on good and bad patient and staff experience	Paddy Gilligan
12:30-13:30	Final examination			



# ESMPE

Course language	English
Level	MPE
Registration fee* (2 main meals, 5 coffee breaks, 1 social dinner)	300 € 350 € (from 22 <sup>nd</sup> December 2021)
Reduced registration fee* <ul style="list-style-type: none"><li>• subsidized by EFOMP</li><li>• first-come, first-served policy</li></ul>	150 € - for the first 15 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, North Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine.
Maximum number of participants	80
Duration	10 <sup>th</sup> -12 <sup>th</sup> February 2022
Study load	17.5 hours of lectures and demonstrations
Venue	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
GPS coordinates	50°5'27.737"N, 14°24'58.713"E
Accommodation	Individual
Information, programme at:	<a href="http://www.efomp.org">www.efomp.org</a>
Registration	Electronic registration via <a href="http://www.efomp.org">EFOMP website</a>
Registration period	22 <sup>nd</sup> November 2021 – 26 <sup>nd</sup> January 2022

\* 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

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