



ESMPE

ESMPE European School for Medical Physics Experts



Artificial Intelligence in Medical Physics

5th-7th October 2023, Prague, Czech Republic

EFOMP, in collaboration with the Czech Association of Medical Physicists (CAMP) and COCIR invite you to the next ESMPE on **AI in Medical Physics**. The school will be organized as a 2.5 days hybrid (remote and in presence) meeting, which will be held in Prague **from 5th to 7th of October 2023**.

The school will focus on advanced Medical Physics aspects of Artificial Intelligence and aims at presenting practical methodology, state-of-the-art and future developments of AI. In order to be able to participate to the school, the remote self-training part, available at <https://e-learning.efomp.org/>, needs to be completed. Students who did not attend the on-line and propaedeutic module of the school will not be able to enrol to the face-to-face event.

This two-and-a-half day event will be accredited by EBAMP (European Board of Accreditation for Medical Physics) and is intended for Medical Physicists or associated professions who wish to expand their knowledge in Artificial intelligence. 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. All lecturers will give their talks on-site in Prague but participants can choose if they want to attend the school on-site (limited number of participants) or online, it will be live-streamed.

Content for the face to face event

- AI for dose and protocol optimization
- AI for workflow optimization and automation
- Advanced Quality Assurance for AI medical devices
- Regulatory aspects
- Session with industry (only for in presence)

Final exam

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

Organisers

Federica Zanca, Alberto Torresin (Scientific Chairs)

Brendan McClean (Chair of the ESMPE), Efi Koutsouveli (EFOMP Vice President)

Jaroslav Ptáček, Lucie Sůkupová (CAMP)





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On Site Faculty		
Michele	Avanzo	Centro di Riferimento Oncologico di Aviano IRCCS, Italy
Charlotte	Brouwer	University of Groningen, The Netherlands
Caterina	Brusasco	Louvain, Belgium
Gabriele	Guidi	Az.Ospedaliero-Universitaria di Modena, Italy
Matthew	Grech Sollars	University College London, United Kingdom
Irene	Hernandez Giron	North University College Dublin (UCD), Ireland
Smriti	Joshi	Universitat de Barcelona, Spain
Marc	Kachelriess	German Cancer Research Center (DKFZ), Germany
Mika	Kortesniemi	Hospital District of Helsinki and Uusimaa, Finland
Alberto	Torresin	Università degli Studi di Milano, Dip. Fisica, Italy
Charalampos	Tsoumpas	University Medical Center Groningen, The Netherlands
Federica	Zanca	PALINDROMO Consulting, Belgium





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5th October 2023

	Session	Title	Description	Lecturer
8:00-9:00	Registration and welcome			
9:00-10:00	Setting the scene	The role of the MPE in the AI era	This presentation will give an overview of the topics covered by the other speakers, which reflect the Advanced AI curriculum. Specifically, the role of the MPE in relation to the safety and performance valuation of AI medical software.	I.Hernandez A. Torresin
10:00-10:30	Coffee break			
10:30-11:30	AI for dose and/or protocol optimization in radiology	AI in CT and CBCT Image Formation	Main groups of clinical applications a. Rawdata processing b. Image reconstruction c. Noise reduction d. Contrast and dose optimization e. Motion management	M. Kachelrieß
11:30-12:30		In Radiology with focus MRI	Main groups of clinical applications a. Implementation/assessment/validation of AI techniques in a clinical setting within Neuroradiology b. Speeding up acquisitions / XAI / trustworthy AI c. Fingerprinting	M. Grech Sollars
12:30-14:00	Lunch break			
14.00-15.00	AI for dose and protocol optimization	In RT	Main groups of applications a. optimal treatment solution (e.g. protons vs photons) b. automated RT dose calculation and optimization c. AI-for image post processing: automated organ segmentation, image registration, fusion with images of other modalities d. Future research trend (not yet extended in clinical practice)	M. Avanzo
15.00-16.00	AI for workflow optimization and automation (radiology)	QA of AI applications in clinical practice : errors, performances and Post-Market surveillance	A practical example of quality assurance for AI applications in clinical settings will be presented. Focus will be on operational and clinical Key Performance Indicators: how to select them, how to do data rendering of KPIs. Examples of AI errors will be discussed for some use cases as well as clinical performance.	F. Zanca
16:00-16:30	Coffee break			
16.30-17.15	Advanced QA for AI medical devices	Quality of Data	The presentation will give an overview of practical approaches for data collection, curation, storage for AI applications	S. Joshi
17.15-18.00		Procurement, acceptance testing and commissioning	The presentation will give an overview of practical approaches for procurement, acceptance testing, commissioning of AI tool (sharing a practical experience)	C. Brouwer
19:30-23:00	Social dinner - participants + lecturers			





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6th October 2023

	Session	Title	Description	Lecturer
9:00-10:00	Impact and risk of AI in clinical settings	Risk management in AI: the role of the MPE	Risk management in AI: the role of the MPE. Clinical risk definition, distributional shift, insensitivity to impact, black box, automation bias.	M. Kortseniemi
10:00-10:30	Coffee break			
10.30-11.30	AI for dose and protocol optimization	In NM	Main groups of clinical applications a. image acquisition and generation b. image reconstruction for shorten the time of acquisition, dose reduction or improved image quality c. image post-processing d. future research trend (not yet extended in clinical practice)	C. Tsoumpas
11.30-12.30	AI for workflow optimization and automation (radiology)	AI report integration in radiology report	A practical example of AI workflow optimization will be given with respect to the AI report integration in structured radiology report. Focus will also be on interoperability (integration with RIS, PACS, external software etc..).	F. Zanca
12:30-14:00	Lunch time			
14.00-15.00	AI for workflow optimization and automation (RT)	AI Automated RT workflow	Practical examples of automated RT workflow (contouring and planning, adaptive RT, tumor motion management), automated QA	M. Avanzo
15.00-16.00	Impact and risk of AI in clinical settings	AI Policies and laws overview	Public and scientific policies and laws for promoting and regulating artificial intelligence (AI) at European and international level is presented,	G. Guidi
16:00-16:30	Coffee break			
16.30-17.30	Regulatory aspects of AI applications	Role of the MPs in the introduction of AI devices in clinical practice: a regulatory prospective	Provide MPs with practical guidelines on regulatory aspects of AI medical devices, in the European and in the US landscape. (Part I)	C. Brusasco
17.30-18.00		Role of the MPs in the introduction of AI devices in clinical practice: a regulator	Provide MPs with practical guidelines on regulatory aspects of AI medical devices, in the European and in the US landscape (Part II)	C. Brusasco





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7th October 2023: Companies session with focus on practical applications

	Session	Title	Description	Lecturer
9.00-10.30	<p>Case study on selected AI applications on one or more of the following topics:</p> <ul style="list-style-type: none">- Model evaluation for safety and performance- Software QA procedures: what does it mean for companies?		<p>Focus on 3 use cases: Mammography, MRI Prostate, CT stroke</p>	<p>Companies presentations</p>
10:30-11:00	Coffee break			
11:00-12:00	Panel discussion: how can MPE and industry work together to ensure safe and performing AI tools in clinical settings			
12:00-13:00	Final Examination			





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Course language	English
Level	Medical Physics Expert
<i>In order to be able to participate to the school, the remote self-training part, available at https://e-learning.efomp.org/, needs to be completed. Students who did not attend the on-line and propaedeutic module of the school will not be able to enrol to the face-to-face event. Registration for Part I is via the Individual Associate platform https://iam.efomp.org/index.php?r=db/login</i>	
Registration fee* (2 main meals, 5 coffee breaks, 1 social dinner)	300 € 350 € (from TBA)
Reduced registration fee* · subsidized by EFOMP · first-come, first-served policy	150 € - for the first 15 attendees (max. 2 from one country) coming from the following European countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Greece, Hungary, Latvia, Lithuania, Moldova, North Macedonia, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Ukraine.
Number of onsite participants	60
Number of online participants	100
Duration	5 th -7 th October 2023
Study load	25 hours of lectures and demonstrations
Venue	Institute for Clinical and Experimental Medicine, Videnska 1958/9, 140 21 Prague 4.
GPS coordinates	(50.0227343,14.4627919) https://goo.gl/maps/ZURP2VeS6PJpvho96
Accommodation	Individual
Information, programme at:	www.efomp.org
Registration	Electronic registration via EFOMP website
Registration period	10th March 2023 – 1st October 2023 (online only)

- payment must be done in 14 days following the pre-registration, otherwise pre-registration will be cancelled.
- payment must be done via EFOMP online payment system using a credit card; no bank transfers are accepted.

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