ESMPE European School for Medical Physics Experts – Prague

Magnetic resonance Imaging: Advanced clinical applications - Safety aspects - Quality controls

July 6 – July 8, 2017
Prague, Czech Republic

The 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 would like to invite you to the next **ESMPE_MRI 2017**.

The school will be aimed at advanced tasks connected with **Magnetic Resonance Imaging.** The school will cover the main physics aspects of the MRI technology and will focus on Safety aspects involved in the use of MRI and Quality controls of MRI equipments. 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 Magnetic Resonance. 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.

Content

Fundamentals of MRI - Fundamentals of MRI: Physics of NMR, MRI hardware, Image formation in MRI.

Clinically used pulse sequences - Standard MRI pulse sequences - Diffusion MRI.

Quantitation Functional MRI and artefacts - Quantitative T1 and T2 mapping - the BOLD effect and fMRI of the brain imaging Artefacts in MRI - sources and mitigation strategies.

Safety in MRI - Legislation and Regulatory Requirements - MRI Site planning - Safety standards for workers and patients - Incidents in MRI - The role of the MP in MRI safety

Safety in MRI – Hands on Course - Measures of Magnetic field - Measures of Radiofrequency Shielding - Oxygen concentration and ventilation.

Quality Controls - Acceptance testing and QC of MRI systems - QA of RF coils - Test objects and filling solutions for QC - QC in fMRI and diffusion imaging

Final exam

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

Organizers

Jaroslav Ptáček, Tereza Hanušová (Czech Republic)
David Lurie (Scientific Chair**), Alberto Torresin (**Chair of the School**)**
Marco Brambilla (EFOMP Secretary General**), John Damilakis** (EFOMP President)

Faculty

Marcello Alecci	Dipartimento di Medicina Clinica, Sanità Pubblica, University of L'Aquila, Italy
Andrew J Fagan	National Centre for Advanced Medical Imaging (CAMI), St. James's Hospital Dublin - School of Medicine, Trinity College University of Dublin -School of Physics, Dublin Institute of Technology, Ireland
Gisela Hagberg	Scheffler Group, MPI for Byological Cybernetics and University hospital Tübingen, Germany
David Lurie	Bio-Medical Physics, School of Medicine, Medical Sciences & Nutrition, University of Aberdeen, United Kingdom
Thomas Maris	Department of Medical Physics, University Hospital of Iraklion, Greece
Ioannis Seimenis	Medical Physics Laboratory, School of Medicine, Democritus University of Thrace, Greece
Alberto Torresin	Hospital of Niguarda, Department of Medical Physics – Milano, Italy
Michela Tosetti	Laboratorio di Fisica Medica e Biotecnologie di Risonanza Magnetica, IRCCS Fondazione Stella Maris, Italy

Time-table

6th July 2017 Thursday	Session	Title	Description	Lecturer
8:00-9:00		Registration		
9:00-10:00	Fundamentals of MRI	Physics of NMR	Spins, magnetic fields, precession, rotating frame, RF pulses, inversion recovery and spin echo	Marcello Alecci
10:00-10:30		Coffee break		
10:30-11:30	Fundamentals of MRI	Image formation in MRI	Gradients, frequency encoding, selective excitation, phase encoding, gradient echo, k-space	David Lurie
11:30-12:30		MRI hardware	Magnets, gradient coils, RF coils including surface coils and array coils	Marcello Alecci
12:30-14:00		Lunch break		
14:00-15:00	Clinically used pulse sequences	Standard MRI pulse sequences	Overview of pulse sequences used in clinical MRI, including fast spin-echo, echo-planar, parallel imaging	Michela Tosetti
15:00-16:00		Diffusion MRI	Diffusion MRI, MR tractography and potential applications in neurosurgical planning.	Andrew J Fagan
16:00-16:30		Coffee break		
16:30-17:15	Quantitation	Quantitative T1 and T2 mapping	Methods and applications of quantitative relaxation time measurement in the brain and the heart	Michela Tosetti
17:15-18:00	Functional MRI	Functional MRI	The BOLD effect and fMRI of the brain	Gisela Hagberg
18:00-18:30	Artefacts	MRI Artefacts	Artefacts in MRI - sources and mitigation strategies	David Lurie
20:00-23:00		Social dinner - participants + lecturers		

7th July 2017 Friday		Title	Description	Lecturer
8:00-9:00	Safety in MRI	Legislation and Regulatory Requirements	Overview of Legislation and Regulatory Requirements for MRI in Europe	Andrew J Fagan
9:00-10:00		MRI Site planning	Installation and Room design for MRI scanners	Thomas Maris
10:00-10.30		Coffee break		
10:30-11:30	Safety in MRI	Safety standards for workers	Active and passive implanted medical devices; How to use technical data sheets for implanted medical devices; exposure to RF fields	Andrew J Fagan
11:30-12.30		Safety standards for patients	Active and passive implanted medical devices; How to use technical data sheets for implanted medical devices; exposure to RF fields	Alberto Torresin
12:30-14:00		Lunch time		
14:00-16:00	Safety in MRI Hands on Course	Measures of Magnetic field	Measures of Static Magnetic field inside and outside the Examination room; Instrumentation and techniques.	Ioannis Seimenis
		Measures of Radiofrequency Shielding	How to check the RF shielding: instrumentation and Techniques	
		Oxygen concentration and ventilation evaluation	Normal and emergency ventilation; Oxygen Monitor and helium safety procedures	
16:00-16:30		Coffee break		
16:30-17:30	Safety in MRI	Incidents in MRI	Incident analysis in MRI, How to prevent incidents	David Lurie
17:30-18:00		The role of the MP in MRI safety	MR Safety Working Group - document on Safety Responsibilities	Alberto Torresin

8th July 2017 Saturday		Title	Description	Lecturer
8.00-9.00	Quality Controls Hands on Course	Acceptance testing and QC of MRI systems	Acceptance/commissioning testing; : purpose, types, examples, Protocols	Thomas Maris
9.00-10.00		QA of RF coils	Quality controls of Radiofrequency coils	Marcello Alecci
10.00-10.30		Test objects and filling solutions for QC	Phantoms available, filling solutions	Thomas Maris
10:30-11:00		Coffee break		
11.00-12.00	Quality Controls Hands on Course	QC in fMRI and diffusion imaging	Quality controls in advanced applications: fMRI and diffusion imaging	Gisela Hagberg
12:30-14:00		Final examination		

Further information

Course language	English
Level	MP
Registration fee	**300 €** 2 main meals, 5 coffee breaks included, 1 social dinner
Reduced registration fee **- subsidized by EFOMP** **- first-come, first-served policy**	**150 €** - 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.
Maximum number of participants	**40**
Duration	**6th Jul 2017 – 8th Jul 2017**
Study load	17 hours of lectures and demonstrations
Venue	Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Trojanova 13, 120 00 Praha 2, CZECH REPUBLIC
GPS coordinates	**50°04'27.7"N 14°25'00.6"E**
Accommodation	Individual
Information, program, etc.	www.csfm.cz/summer2017.html
Registration	Electronic registration via www.csfm.cz/summer2017.html
Registration period	**1 February 2017 – 30 Jun 2017**

For all practical information, including accommodation and public transport in Prague, please contact Czech part of organizing committee: summer2017@csfm.cz.

Electronic registration and e-mail address will be functional from 1 February 2017.