

Summer School on Imaging Modalities in Medical Physics

Images in medicine such as computed tomography (CT) and magnetic resonance imaging (MRI) play a key role in the today's diagnosis and treatment of patients worldwide. Further, these major imaging modalities have recently been introduced as 3D-based tools in image guided radiation therapy of cancer patients. This summer school will cover the basic physical mechanisms behind the CT and MRI modalities and the techniques that transfer the physics into decision making images. The summer school is intended for professionals and students who work or intends to work in the field of medical physics such as master and PhD students, medical physicists in training, and, persons in health care who need to upgrade their knowledge in this area.

Program schedule

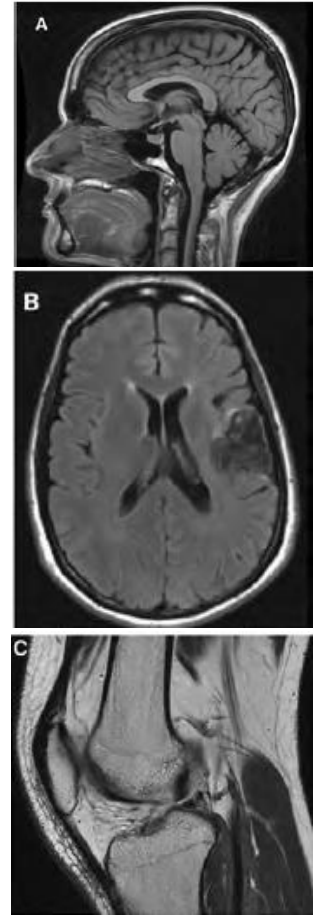
Monday August 20, 2018

Time	Session	Title	Content
08:00-08:30	-	Registration	Registration and coffee
08:30-10:00	1	CT basics and geometry	Introduction to the clinical use of imaging modalities. Description of CT scanner geometry including fan/cone angle, slice thickness, intensity and noise considerations and attenuation.
10:00-10:20	-	break	pause and coffee
10:20-11:40	2	Exercises	Hand calculations and computer exercises on the topics covered in session 1
11:40-12:30	-	Lunch	
12:30-14:00	3	CT reconstruction	The physics behind CT image contrast, sinograms, forward and simple backward projection, filtered backprojection.
14:00-14:20	-	break	pause and coffee
14:20-16:00	4	Exercises	Hand calculations and computer exercises on the topics covered in session 3
16:00-16:40	5	Quiz on CT	Smartphone/tablet based multiple choice quiz and course evaluation day 1
17:00-17:30	-	Guided tour	Guided tour at the original Niels Bohr Institute



Tuesday August 21, 2018

Time	Session	Title	Content
08:00-08:30	-	Coffee	Coffee and possible post registration
08:30-10:00	6	MR basics and tissue contrast	Nuclear magnetic resonance, spin and precession, magnetic field interaction, T1 and T2 weighted tissue relaxation, Bloch equation.
10:00-10:20	-	break	pause and coffee
10:20-11:40	7	Exercises	Hand calculations and computer exercises on the topics covered in session 6
11:40-12:30	-	Lunch	
12:30-14:00	8	MR pulse sequences and imaging	Spin echo pulse sequence, contrast weighting, inversion recovery, gradient-phase-frequency encoding, k- and image space transformation
14:00-14:20	-	break	pause and coffee
14:20-16:00	9	Exercises	Hand calculations and computer exercises on the topics covered in session 8
16:00-16:40	10	Quiz on MRI	Smartphone/tablet based multiple choice quiz and course evaluation day 2



The lectures will be covered by medical physicist and associated professor at the Niels Bohr Institute, Jens Edmund (PhD, MPE, DABR). The exercises will be run by Jens and PhD students scaled with the number of participants. The summer school venue will be at the H.C. Ørsted Institute where the 2nd European Congress of Medical Physics will also take place. Reading material and instructions for the summer school will be communicated electronically in advance for preparation.

More information on registration can be found at www.ecmp2018.org

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