Czech Association of Medical Physicists

EFOMP School for Medical Physics Experts – Prague, July 2014

Advanced Kinetic Modeling and Parametric Methods
Advanced SPECT and PET Applications in Cardiology, Neurology and Oncology

July 10 – July 12, 2014
Prague, Czech Republic

The Czech Association of Medical Physicists in collaboration with EFOMP and Department of Dosimetry and Application of Ionizing Radiation of the Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague would like to invite you to the **EFOMP School for Medical Physics Experts (Nuclear Medicine) - Prague Summer 2014**. The school will be aimed at advanced tasks connected to Kinetic Modeling and Parametric Methods and SPECT and PET Applications in Cardiology, Neurology and Oncology. This two-and-half day event will be an EFOMP accredited one and is intended for practising clinical Medical Physicists who are at the level of a Medical Physics Expert (MPE) in Nuclear Medicine or working towards becoming an MPE. 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

PET and SPECT tracer modeling - Kinetic modeling of a new tracer (overview of steps involved in evaluation of new tracer), An overview update of plasma input models (compartmental, tissue reference and non-compartmental models), Input function processing and image derived input functions (input function corrections (calibration, plasma/blood ratio, metabolite corrections, extraction of image derived input functions), Demonstration: image derived input functions processing (illustration of the steps involved in input function corrections), Reference tissue modeling (principle of reference tissue modeling), Parametric methods (overview of most commonly used parametric analysis methods), Curve fitting and weighting factors (principles of curve fitting, optimization and use of weighting factors).

Advances in Cardiac Imaging - Cardiac dedicated ultrafast SPECT cameras (hardware updates: new detectors and designs and implications on acquisition and reconstruction protocols), Comparative analysis of iterative reconstruction algorithms with resolution recovery for cardiac SPECT studies (software updates: Point spread functions, Noise suppression algorithms, Attenuation correction, Scatter correction. Principal effects and their interaction). Advances in PET cardiac imaging.

Advances in Neurology Imaging - Perfusion brain imaging with nuclear medicine techniques (New PET tracers compounds; dedicated brain scanners; methods of quantification in brain perfusion techniques using SPECT/PET imaging).

Advances in Oncological PET Imaging - Acquisition protocols for ^{18}F-FDG whole body PET/CT: optimizing scan duration versus administered dose (optimize the administered activity as a function of patient-dependent parameter), Time of Flight and Resolution modeling in PET imaging: theory, practice, benefits, and pitfalls (theoretical analysis of the resolution modeling framework, overview of various approaches, potential advantages, edge artifacts, limitations in quantitative imaging). Quantification Issues in oncological PET imaging: volume delineation, partial volume correction, SUV and beyond (methods for volume delineation in heterogeneous tumors, methods for partial volume correction in oncological PET).

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Advances in Perfusion Imaging - Fractal analysis in nuclear medicine perfusion imaging (theory, mathematical framework, overview of recent research in fractal analysis of tissue perfusion imaging, using PET and SPECT and to discuss implications for different fields of application; software tools).

Organizers

Jaroslav Ptacek, Martin Steiner (Czech Republic)
Carmel Caruana, Marco Brambilla, Günter Hartmann, Peter Sharp (EFOMP)

Teachers

Ronald Boellaard	Department of Nuclear Medicine and PET Research, VU University Medical Centre, Amsterdam, Netherlands
Marco Brambilla	Department of Medical Physics, University Hospital, Novara, Italy
Vincent Cunningham	School of Medical Sciences, University of Aberdeen, Aberdeen, United Kingdom
Marco Dominietto	Institut für Biomedizinische Technik- University of Zurich, Switzerland
Joerg van den Hoff	PET Center, Institute of Radiopharmaceutical Cancer Research, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany
Adriaan Lammertsma	Department of Nuclear Medicine and PET Research, VU University Medical Centre, Amsterdam, Netherlands
Johan Nuyts	Department of Nuclear Medicine and Medical Imaging Research Center, KU Leuven, Leuven, Belgium
Bernhard Sattler	Department of Nuclear Medicine, University Hospital, Leipzig, Germany

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Time-table

9th July Wednesday	Session	Title	Description	Lecturer
18:00-19:00		**Registration**		
19:00-21:00		**Welcome party**		
10th July Thursday	**Session**	**Title**	**Description**	**Lecturer**
8:00-9:00		**Registration**		
9:00-10:00	PET and SPECT tracer modeling	***Kinetic modeling of a new tracer***	Overview of steps involved in evaluation of new tracer	***Sattler***
10:00-10:30		coffee break		
10:30-11:30		***An overview update of plasma input models***	Compartmental, tissue reference and non-compartmental models	***Lammertsma***
11:30-12:30		***Input function processing and image derived input functions***	Input function corrections (calibration, plasma/blood ratio, metabolite corrections), extraction of image derived input functions	***van den Hoff***
12:30-14:00		lunch time		
14:00-14:30		***Demonstration: image derived input functions processing***	Illustration of the steps involved in input function corrections	***Boellaard***
14:30-16:00		***Reference tissue modeling***	Principle of reference tissue modeling	***Lammertsma***
16:00-16:30		coffee break		
16:30-18:00		***Parametric methods***	Overview of most commonly parametric analysis methods	***Boellaard***
18:00-18:30		***Curve fitting and weighting factors***	Principles of curve fitting, optimization and use of weighting factors	***Boellaard***

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11th July Friday	Session	Title	Description	Lecturer
8:00-9:00	Advances in Cardiac Imaging	***Cardiac dedicated ultrafast SPECT cameras***	Hardware updates: new detectors and designs and implications on acquisition and reconstruction protocols	***Brambilla***
9:00-10:00		***Comparative analysis of iterative reconstruction algorithms with resolution recovery for cardiac SPECT studies***	Software updates: point spread functions, noise suppression algorithms, attenuation correction, scatter correction; principal effects and their interaction	***Brambilla***
10:00-10:30	coffee break			
10:30-12:30	Advances in Neurology Imaging	***Perfusion brain imaging with Nuclear Medicine techniques***	Methods of quantification in brain perfusion techniques using SPECT/PET imaging	***Cunningham***
12:30-14:00	lunch time			
14:00-14.30	Advances in Oncological PET Imaging	***Acquisition protocols for ^{18}F-FDG whole body PET/CT: optimizing scan duration versus administered dose.***	Optimize the administered activity as a function of patient-dependent parameter	***Boellaard***
14:30-16:00		***Time of flight and resolution modeling in PET imaging: theory, practice, benefits, and pitfalls***	Theoretical analysis of the resolution modeling framework; overview of various approaches; potential advantages; edge artifacts; limitations in quantitative imaging	***Nuyts***
16:00-16:30	coffee break			
16:30-18:30		***Quantification Issues in oncological PET imaging: volume delineation, partial volume correction, SUV and beyond***	Methods for volume delineation in heterogeneous tumors, methods for partial volume correction in oncological PET	***van den Hoff***

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12th July Saturday	Session	Title	Description	Lecturer
8:00-10:00	Advances in Perfusion Imaging	***Fractal analysis in nuclear medicine perfusion imaging***	Theory; mathematical framework; overview of recent research in fractal analysis of tissue perfusion imaging, using PET and SPECT and to discuss implications for different fields of application; software tools	***Dominietto***
10:00-11:00	coffee break			
13:00-15:00	Examination	***Exam (optional)***		***Caruana***

Further information

Course language	English
Level	MP to MPE
Registration fee	**300 €** welcome party, 2 main meals, 5 coffee breaks included
Reduced registration fee **- subsidized by EFOMP and CAMP** **- first-come, first-served policy**	**200 €** - for the first 20 attendees (max. 4 from one country) coming from the following EFOMP NMO countries: Albania, Bulgaria, Croatia, Cyprus, Estonia, Greece, Hungary, Latvia, Lithuania, Macedonia, Moldova, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine
Late registration fee **- registration after 13 Jun 2014**	**350 €**
Maximum number of participants	**50**
Duration	**10 Jul 2014 – 12 Jul 2014** 9 Jul 2014 evening - welcome party
Study load	17 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 (possible via accommodation agency)
Information, program, etc.	www.csfm.cz/summer2014.html
Registration	Electronic registration via www.csfm.cz/summer2014.html
Registration period	**1 Feb 2014 – 13 June 2014**

For all practical information, including accommodation and public transport in Prague, please contact Czech part of organizing committee: summer2014@csfm.cz. You will be informed about accommodation possibilities, transportation etc. in registration confirmation e-mail.

Electronic registration and e-mail address will be functional from 1 Feb 2014.

Lecture room