

ESMRMB

European Society for Magnetic Resonance in Medicine and Biology

School of MRI 2018



EDUCATIONAL COURSES FOR PHYSICIANS AND MR RADIOGRAPHERS/TECHNOLOGISTS

Advanced MR Imaging of the Musculoskeletal System

May 17–19, Budapest/HU

Advanced Head and Neck MR Imaging

May 24–26, Oslo/NO

Clinical fMRI & dMRI – Theory and Practice

June 28–30, Cardiff/UK

Advanced MR Imaging of the Abdomen

September 6–8, Coimbra/PT

Advanced Pelvic MR Imaging

September 6–8, Madrid/ES

Advanced Cardiac MR Imaging

September 13–15, Rome/IT

Advanced Neuro Imaging: Diffusion, Perfusion, Spectroscopy

September 27–29, Leuven/BE

MR Safety

October 18–20, Vienna/AT

Curso Avanzado de Imagen por RM Músculo-Esquelético presented in Spanish

November 8–10, Barcelona/ES

eLearning: Basic Course on Applied MR Techniques

September 10 – October 22

eLearning: Advanced Course on Applied MR Techniques

November 5 – December 17



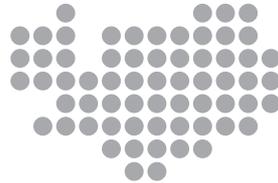
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ESOR EUROPEAN SCHOOL OF RADIOLOGY

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**EUROPEAN SOCIETY FOR MAGNETIC RESONANCE
IN MEDICINE AND BIOLOGY (ESMRMB)**
Scientific images kindly provided by the members of the
Organisation Committee 2018.

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Vienna, January 2018
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ESMRMB Office, Vienna/AT

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ESMRMB Society Journal MAGMA

Starting January 1st, 2018, Prof David Norris has succeeded to Prof P.J. Cozzone as MAGMA Editor-in-Chief. MAGMA is a multidisciplinary international journal devoted to the publication of articles on all aspects of magnetic resonance techniques and their applications in medicine and biology. In addition to Regular Issues, the journal also publishes Special Issues:

NEW Special Issue in 2018 !

"Cardiovascular Magnetic Resonance"
with Tim Leiner and Gustav Strijkers as Guest-Editors

RECENT SPECIAL ISSUES (published in 2016)

2016 "Tissue segmentation in MRI"

with Fritz Schick as Guest-Editor

2016 "Ultrahigh Field MR: Cutting Edge Technologies Meet Clinical Practice"

with Thoralf Niendorf, Markus Barth, Frank Kober, Siegfried Trattnig as Guest-Editors

MAGMA's impact and dissemination is rapidly increasing

2014 Impact Factor: 2.869 (rank 30 / 125)

2015 Impact Factor: 2.638 (rank 35 / 124)

(category "Radiology, Nuclear Medicine & Medical Imaging")

MAGMA offers a very short publication timeline:

- MAGMA has the shortest publication cycle among all MR journals! Only 5 weeks for the reviewing process and 3 weeks for time to publication online after final acceptance.
- MAGMA is currently read by thousands of institutions worldwide through the Springer library consortia.
- More than 200 full-text articles were downloaded daily in 2016.
- As a bonus to authors, MAGMA keeps with its policy of NOT applying page charges or supplement for color illustrations.

An ESMRMB
Membership is already
available from € 25!

Welcome from the Director of the School of MRI Programme



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Dear Colleagues,

It is a great pleasure for me to inform you that after another successful year 2017 we are delighted to offer nine courses again in 2018.

I regret to inform you that we will not continue our Body Diffusion-weighted MRI course. Many thanks to Dr. Koh and his faculty for their long-standing commitment. They have offered a new field in MR education, which was very important for the wide spectrum of our educational programme.

We are proud of our long-standing collaboration with the course organisers who again did a lot of work and compiled another great programme for 2018.

We are planning nine courses in Europe this year and are especially excited to announce an additional MSK course, which will be presented in Spanish. The course will be held in Barcelona/ES, the exciting Catalan city with cosmopolitan flair. The MSK course in English will be held, in Budapest. Hungary's capital beckons with stunning vistas over the Danube and lots of history to discover.

We are also very happy to organise our newly revised course on fMRI & dMRI, for the very first time in Cardiff/UK. Come for the high-quality education, stay for the Doctor Who Experience! If you are craving the sun, attend one of our courses in the South – you can choose between historic Coimbra, where the course on Abdominal Imaging is headed this year, epic Rome, where we are planning our Cardiac course, and temperamental Madrid, where our newly updated course focused solely on pelvic MRI will be held.

In the mood for a trip to a more moderate climate? Hear the best speakers of their expertise in Oslo,/NO, Leuven/BE and Vienna/AT.

Moreover, after the great success in previous years, we are happy to offer two eLearning courses in 2018, one basic and one advanced course on Applied MR Techniques. Over the course of seven weeks, the courses will cover one topic per lesson (1.5 h). Enjoy state-of-the-art education from the comfort of your home!

Let me end by expressing many thanks to everybody for making the School of MRI Courses 2018 possible. My gratitude goes to our course organisers, who compile fantastic programmes with brilliant speakers. Special thanks also go to the local organisers who play a critical role for the local preparation and the promotion of the courses, as well as to our local sponsors without whom it would not be possible to offer such a wide range of courses. Last but not least, not to forget the ESMRMB office for their excellent support. The success of the ESMRMB School of MRI courses depends on the active engagement of everyone involved!

After a period of four years as the director of the School of MRI, due to a lot of different commitments, I have decided to step down from my position and pass on all obligations to my successor during the ESMRMB/ISMRM Joint Meeting in Paris. It was an honour and a true pleasure for me to serve the ESMRMB Society in this function, which was an exciting and wonderful task, working together with excellent and highly cooperative course organizers and to maintain a successful educational programme. I am proud to say that the School of MRI is still the most important educational program in MRI worldwide.

Since MRI is one of the most dynamic fields in medical imaging, you should expand your knowledge in the field of MRI to keep up with the most recent developments. I sincerely hope to be welcoming you in 2018 as either a participant, teacher, or future organiser.

With my best greetings and best wishes for a healthy and successful 2018,

Prof. Siegfried Trattnig
Director of the ESMRMB School of MRI
Medical University, Vienna/AT

Organisation Committee

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Siegfried Trattnig

Director of the School of MRI
Medical Director of the Centre of Excellence for High-field MR
Department of Radiology
Medical University Vienna/AT

Jens Bremerich

Radiologist, Department of Radiology
University Hospital of Basel/CH

Davide Farina

Radiologist, Department of Radiology
University of Brescia/IT

Nicholas Gourtsoyiannis

Radiologist, Department of Radiology
University Hospital of Iraklion
Crete/GR

Sven Haller

Neuroradiologist, Department of Radiology
University Hospital Geneva/CH

Alexander Leemans

Physicist, University Medical Center Utrecht
Image Sciences Institute (ISI)
Utrecht/NL

Riccardo Manfredi

Radiologist, Radiology Department
"A. Gemelli" Hospital
Università Cattolica del Sacro Cuore of Rome/IT

Eva Scheurer

Director, Health Department Basel
Institute of Forensic Medicine
University of Basel/CH

Prudencia Tyrrell

Radiologist, Department of Radiology
Robert Jones and Agnes Hunt Orthopaedic Hospital
Oswestry/UK

Joan Carles Vilanova Busquets

Radiologist, Department of Radiology
University of Girona/ES

General Information

Do you really know what k-space means? How to optimise contrast in MR images using a FLASH sequence? What a RARE sequence can be used for and how to interpret artefacts in MR images? Do you know what the so-called BOLD effect is and how to apply diffusion imaging? Do you know the best imaging strategies to analyse congenital heart defects and the optimal sequence to visualize cartilage? If you can easily answer all these questions, there is perhaps no need for you to sign up for one of the MR teaching courses of the ESMRMB. If not, however, the ESMRMB educational courses offer you the opportunity to enhance your knowledge and to prepare for applying MR techniques in daily business and clinical research.

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There are two types of courses available:

The ESMRMB School of MRI offers Advanced Clinical Courses, which will enable you to:

- ensure optimum use of MRI in the relevant field of MR application
- know the indications and limitations of MRI compared to other imaging modalities
- acquire an in-depth understanding of measurement strategies in the relevant area
- optimise imaging strategies for the best visualisation of underlying structures and diseases
- interpret morphological data correctly back to tissue components and pathologic alterations of tissues
- interpret functional data back to physiological or pathological activities
- All courses are held in the English language except the course "Curso Avanzado de Imagen por RM Músculo-Esquelético" which will be held in Spanish.
- The duration of each course is 2,5 days. The courses start either on Thursday between 8 and 9 a.m. or between 1 and 2 p.m. and last until Saturday between 1 and 2 p.m. or between 5 or 6 p.m.
- The detailed programme of each course as well as the exact time schedule is available on the ESMRMB website.
- 50% of the total teaching time is used for repetitions in small groups to intensify the learning experience and offers high interactive teaching with the experts in the respective field.
- A maximum of 65 places per course is available. If less than 40 participants register, the ESMRMB reserves the right to cancel a course at the latest 4 weeks prior to its beginning. The course on 'MR Safety' is limited to 35 participants.
- The ESMRMB ensures the evaluation of all courses and guarantees professional and didactically experienced teachers.
- A voluntary examination will be held at the end of each course.

The ESMRMB School of MRI offers two eLearning courses on Applied MR Techniques, which will enable you to:

- profoundly understand signal and contrast generation in MR images at different conditions (morphological, biophysical and technical);
- use the right measurement sequence for your clinical questions;
- optimise your MR examination (measurement protocol, sequence timing, etc.);
- verify image contrast by modifying measurement sequence or by applying contrast agents;
- interpret MR images back to tissue components and functional activities;
- understand advanced MRI techniques such as MR angiography, diffusion imaging, perfusion sequences etc.
- ensure safe application of MRI by knowing the involved hardware components and the safety risks
- Two eLearning courses (basic and advance) are scheduled for this year.
- The duration of each course is 6 or 7 modules (one 90 minute module/week) on Monday evenings.
- The detailed programme will be available on the ESMRMB website.
- The ESMRMB ensures the evaluation of all courses and guarantees didactically experienced teachers.

Filming and Recording Policy

Filming and recording during the courses is generally not permitted. Exceptions may be granted by the course organiser on-site. If you wish to record any lecture (for your personal use only), please contact the respective lecturer and course organiser for permission.

Accreditation

An application will be made to the UEMS-EACCME for CME accreditation of these events. A certificate of attendance will be available online.

An application for the ESSR Diploma will be made for the MSK course.

Registration Information

For information regarding registration and registration fees, please refer to page 26.

Please note that registration is possible online at www.esmrm.org

Advanced MR Imaging of the Musculoskeletal System

6 May 17–19, 2018
Budapest/HU

Course organiser:
Prudencia Tyrrell
Oswestry/UK

Local organiser:
Victor Berczi, Budapest/HU
Co-host:
Szabolcs Hetényi, Budapest/HU

Course venue:
Semmelweis University
Tűzoltó utca 37-47
1049 Budapest
Hungary

Preliminary faculty:
A. Baur-Melnyk, J-L. Drapé, C. Glaser, S. Hetenyi,
A. Karantanas, V. Pullicino, J. Teh, F. Vanhoenacker,
K. Woertler, M. Zanetti

Course duration:
Thursday noon – Saturday noon

The aim of this course:
MR imaging of the Musculo-Skeletal System including the spine, is one of the most common requests in routine clinical work. MRI is more sensitive than x-rays and CT in a wide variety of pathologies including tumour detection, degeneration, inflammation and trauma. However specificity is often low and requires knowledge of specific sequence protocols, morphologic signs and pattern recognition.

In this course in Budapest, ten topics are addressed. These topics include bone marrow, spine, the shoulder, elbow, wrist and hand, the hip, knee, ankle and foot, bone tumours and sports injuries of the lower limb.

Within each area 3-4 common or complex subjects are addressed, reviewing the anatomy, typical and atypical imaging presentations and differential diagnoses. The Course is a combination of lectures and case based repetitions in small groups.

We look forward to welcoming you at this International Course which is delivered by renowned Speakers.

Participation requirements:
Physicians and technician/radiographers who have a good knowledge of MR techniques; minimum of 6 months experience in applied MRI of the musculoskeletal system.



Learning Objectives

Bone and Soft-Tissue Tumours

- How to perform an MRI for bone tumours
- How to perform MRI for soft-tissue tumours
- Differential diagnosis of soft-tissue lesions
- Differential diagnosis of bone lesions
- Joint tumours and pseudotumoural lesions

Hip/Pelvis

- How I perform, read and report a hip exam
- Labral anatomy and pathology
- Types of femoro-acetabular impingement (FAI)
- BME in the hip: Transient osteoporosis, osteoarthritis or osteonecrosis?

Bone Marrow

- Normal distribution of bone marrow and bone marrow variations
- Principles of focal and diffuse bone marrow replacement
- Benign versus malignant vertebral compression fractures
- Multiple myeloma/whole body Imaging

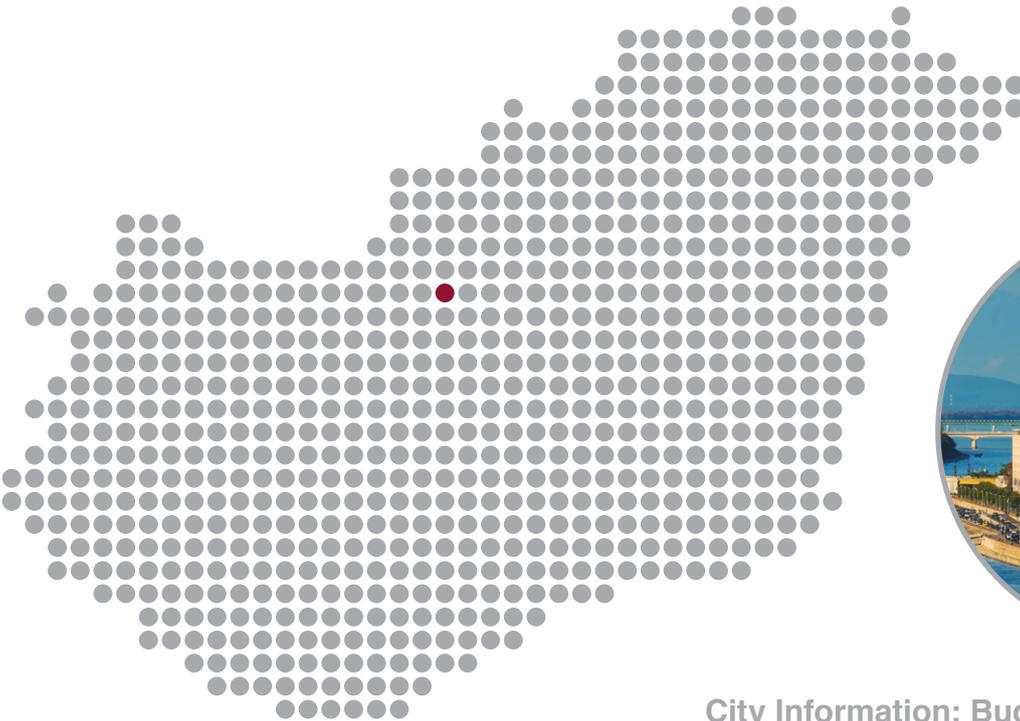
Knee

- Imaging strategies and sequence protocols
- Cruciate and collateral ligaments and menisci
- Osteochondral defects and osteonecrosis
- Bone marrow oedema

Sports Injuries

- Anatomy and pathology of the muscle tendon unit
- Athletic groin injuries
- Avulsion injuries
- Sports injuries of the toes





City Information: Budapest/Hungary

Population:	approx. 1.735.711
Time zone:	CET
Currency:	Forint (HUF)
Country dialling code:	+36
Closest airport:	Budapest Ferenc Liszt Int. Airport (BUD / LHBP)

Budapest is famous not only for the monuments reflecting its own 1,000-year-old culture, but also for the relics of others who settled here. Remains from both Roman occupation and the later Turkish rule can still be seen in the city. After the Ottoman Empire, the union with Austria has had a particular influence on the city's form and style. The capital has two sides, Buda and Pest, stretching along the banks of the Danube, representing two different characters of the city. Suburban Buda and its historic castle district offer medieval streets and houses, museums, caves and Roman ruins. The dynamic Pest side boasts the largest parliament building in Europe, riverside promenades, flea markets, bookstores, antique stores and café houses.

Transportation:

One can easily get to the city by taxi, train, or bus. A taxi ride to the city centre takes around 30 minutes, the price starts with a standard fare of 450 Forints and 280 Forints per additional km of driving. If you are heading into the city center, an ideal option is to take line #100E (runs from 4 am to 11.30 pm), a bus line which connects the airport directly with the city center (you need a special ticket, costs: HUF 900). Another option of public transit involves bus #200E from the terminal to get to the metro terminal at Kobanya/Kispest (Blue Metro, which is the #3 line). Then you take a metro into town. The Blue Metro starts there, so you can take any train. Tickets for public transportation priced 350 HUF (need to buy a new ticket on all lines, e.g. metro 1 ticket, bus another ticket) are available at the airport from BKK at its customer service points.

Hotel Information: www.esmrb.org

Shoulder

- How I perform, read and report a shoulder exam
- Classification of impingement
- Rotator cuff lesions
- Shoulder instability

Elbow

- How I perform, read and report an exam of the elbow
- Anatomic variants simulating disease
- Lesions in lateral/medial/anterior/posterior pain

Hand and Wrist

- How I perform, read and report an exam of the wrist
- TFCC lesions
- Carpal instability
- Sports injuries of the hand and wrist

Spine

- Disc degeneration and disc prolapse
- Spondylodiscitis
- Sero-negative spondylarthropathies
- Sacrum and sacroiliitis

Foot/Ankle

- How I perform, read and report a foot exam (including ligaments and tendons)
- Normal variants and variants sometimes associated with disease
- Bone marrow oedema - transient osteoporosis – osteonecrosis – mechanical stress reaction
- Nerve entrapments including Morton's neuroma and its differential

Advanced Head & Neck MR Imaging

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May 24–26, 2018
Oslo/NO

Course organiser:
Davide Farina
Brescia/IT

Local organiser:
Heidi Eggesbo, Oslo/NO

Course venue:

Oslo University Hospital, Ullevål,
Søsterhjemmet
Kirkeveien 166
0450 Oslo
Norway

Preliminary faculty:

T. Beale, C. Czerny, F. de Keyzer, M. de Win D. Farina,
T. Ferreira, R. Maroldi, S. Qureshi, B. Schuknecht, B. Verbist

Course duration:

Thursday morning – Saturday noon

The aim of this course:

The aim of this course is to offer an in-depth knowledge of current MR imaging techniques for the diagnosis of head and neck lesions. The course will provide the participant with an update on fundamental and advanced sequence protocols to image the different head and neck regions. A comprehensive coverage of the MR signal of the normal tissues will give the preliminary basis for head and neck anatomy. We will focus on imaging strategies, recent developments and specific MR findings to characterise head and neck congenital, inflammatory, benign and malignant diseases. Special emphasis will be placed on differential diagnosis and on grading tumour extent. The course will provide a combination of lectures and case based interactive teaching in small groups.

Participation requirements:

Physicians who have good knowledge in MR techniques; minimum of 6 months experience in applied Head and Neck MRI.



Learning Objectives

Basic and Advanced MR Imaging Techniques

- DW Imaging: Low b, high b, ADC map: low ADC vs high ADC
- IVIM DW derived perfusion-fraction Imaging (D*)
- Which sequences on head and neck on 3T?
- 3T Isotropic and non-isotropic high-res imaging
- DCE-MR: Which use in the head and neck?
- Isotropic T1w and T2w imaging at 1.5T

MR Imaging of the Sinonasal Tract

- Functional anatomy of the sinonasal tract
- Aggressive inflammatory diseases
- Benign and malignant neoplastic lesions; feasibility of endonasal surgery. Grading of skull base and orbital invasion.

MR Imaging of the the Skull Base

- Anatomy of the anterior, middle and posterior skull base.
- Anatomy of the cavernous sinus and Meckel's cave
- Benign and malignant neoplastic lesions: MRI signal and growth pattern

MR Imaging of the Orbit

- Anatomy and imaging techniques
- Extra-ocular vascular lesions: cavernous hemangioma, lymphatic malformations, varices, AV malformations
- Inflammatory pseudotumour, lymphoma and orbital metastasis
- Thyroid ophthalmopathy: MR Imaging

MR Imaging of the Nasopharynx and Parapharyngeal Space

- Anatomy of the nasopharyngeal walls and parapharyngeal space
- Staging nasopharyngeal neoplasms
- Differential diagnosis of submucosal masses
- MR patterns of pre- and post-styloid masses

MR Imaging of the Oral Cavity and Oropharynx

- Anatomy of the oral cavity and oropharynx
- MR examination of the cooperative & uncooperative patient
- The submucosal mass
- Patterns of growth of malignant neoplasms
- Key information and MR most frequent pitfalls

Surface Coil MR Imaging of the Larynx and Hypopharynx

- How to image the larynx and hypopharynx: tips and tricks
- Which sequences? Which study planes?
- New insights on muscles and fat spaces: high-res anatomy
- How to recognise edema of fat, muscles and cartilage

MR Imaging of Temporal Bone:

- middle ear, mastoid and petrous apex**
- MRI of cholesteatoma: DWI imaging
- Petrous apex lesions (and leave-me alone lesions)
- Infections, benign and malignant masses

MR Imaging of Temporal Bone: inner ear and CPA Lesions

- MR anatomy of VII and VIII cranial nerves. The normal membranous labyrinth. Landmarks for the jugular foramen
- Imaging temporal bone and CPA lesions. 3D T2 sequences
- Inner ear malformations: is cochlear implant feasible?
- Neuro-vascular conflict. Detecting the recurrent cholesteatoma

MR Imaging of Lymph Nodes and Lumps in the Neck

- Imaging techniques to detect and characterise neck nodes. Which role for DWI?
- Retrolatero-pharyngeal and parotid nodes
- MR of cystic, vascular and solid masses in the neck
- The unknown primary. Is MR imaging useful?

MR Imaging of Major and Minor Salivary Glands

- MR anatomy of key landmarks
- Fat sat sequences, DCE-MR and DWI imaging. MR Sialography
- Distinguishing parapharyngeal from parotid gland 'deep lobe' tumours



City Information: Oslo/Norway

Population:	approx. 669.060
Time zone:	CET
Currency:	NOK
Country dialling code:	+47
Closest airports:	Oslo Airport Gardermoen (OSL)

Oslo, being the third largest Scandinavian city after Copenhagen and Stockholm, is located at the head of a 110km long Fjord and is surrounded by an abundance of greenery and wooded hills. It has 40 islands and 343 lakes within its city limits. Despite the rather small population of just over half a million, it is a cosmopolitan city with late- night shopping, crowded little bars and restaurants and a lively nightlife. Visitors can enjoy a myriad of outdoor activities, varying from cross-country skiing, hiking, trekking to relaxing on the fjords. Oslo is a great place to learn more about the Vikings and great explorers such as Leiv Eriksson. Some of the magnificent ships can be seen in the Viking Ship Museum in the city. Oslo is also home to great artists such as Edvard Munch and writers like Henrik Ibsen, Knut Hamsun and Sigrid Undset. Visit the great monumental buildings such as the medieval fortress of Akershus, the National Theatre, the Parliament and the Royal Palace. Don't miss one of the main tourist attractions: the Vigeland Park, a public park with 212 sculptures.



Transportation:

Oslo Airport Gardermoen is Norway's largest international airport located approx. 50km north of the city. Flytoget is the express train from the airport to Oslo railway station. The journey time is 19 minutes and departures are every 10 minutes throughout the day. SAS Transport operates a bus service from the airport to Oslo centre (journey time: 45 minutes). Special fixed price airport taxis can be ordered in advance from Oslo Taxi Central and Norges Taxi. There are also regular taxi ranks outside the arrivals entrance.

Hotel Information: www.esmrmrb.org

Clinical fMRI & dMRI – Theory and Practice

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**June 28–30, 2018
Cardiff/UK**

**Course organiser:
Alexander Leemans
Utrecht/NL**

**Local organiser:
Derek K. Jones, Cardiff/UK**

Course venue:
Cardiff University
Hadyn Ellis Building
Maindy Road 50
CF24 4HQ Cardiff
UK

Preliminary faculty:
V. Giampietro, D. K. Jones, A. Leemans, S. Lehéricy,
R. Peeters, S. Rombouts, M. Smits, C. Tax, S. Wastling,
S. Williams

Course duration:
Thursday morning – Saturday noon

The aim of this course:
The aim of this course is to convey in-depth knowledge about functional MR imaging (fMRI) and diffusion (tensor & beyond) MR imaging (dMRI), with a focus on clinical practice. These advanced MR neuroimaging techniques are increasingly applied to the study of the healthy and diseased human brain and provide information about the brain's activity and its connections. The course will offer an overview of present methodologies, an update about functional anatomy and an overview of clinical as well as some research applications. These topics are taught using a mixture of lectures and small group exercises. In addition, a practical session on a 3T MR system performing fMRI studies in healthy volunteers complements the taught elements of the course. Finally, special attention is given to the (clinical) interpretation of specific cases, including results from both routine presurgical fMRI examinations and more advanced fMRI (group) studies. We are happy to welcome you to this course in Cardiff!

Participation requirements:
Physicians and technicians/radiographers with good knowledge of MR techniques; minimum of 3 months' experience in applied MR imaging and/or fMRI or dMRI.



Learning Objectives

Basics of fMRI

- Physiological principles of fMRI
- Blood oxygen level dependent contrast (BOLD) MR technique and imaging sequences
- Resting state fMRI

Basics of dMRI

- Physical principles of anisotropic diffusion
- dMRI technique and imaging sequences
- Concepts of quantification of white matter microstructure
- Concepts of fibre tractography

Experimental and Paradigm Design

- Technical set-up for fMRI
- Categorical, factorial, parametric designs
- Blocked versus event-related paradigms
- Paradigms: development, implementation and pitfalls

Data Analysis

- Spatial preprocessing
- Statistical analysis
- Fibre tractography

Functional Anatomy

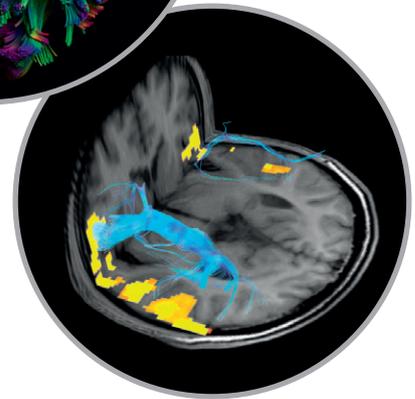
- Motor system
- Language system
- Visual system
- Auditory system
- Applications and (clinical) interpretation

Presurgical fMRI/dMRI

- Risk estimation in brain tumour patients
- Combining fMRI and dMRI in brain tumour patients
- Challenges and pitfalls

fMRI/dMRI in Psychiatry

- Applications in psychiatric disease
- Pharmacological fMRI
- Pitfalls



City Information: Cardiff/UK

Population:	approx. 346.000
Time zone:	UTC
Currency:	British Pounds (GBP)
Country dialling code:	+44
Closest airport:	Cardiff International Airport (CWL / EGFF)

Cardiff is the capital of Wales and the eleventh-largest city in the United Kingdom. Cardiff offers a range of different attractions from sports to culture and entertainment. One of the major tourist sights is the Cardiff Castle which is located in the centre of the city. Other important sights are the Millennium Stadium and the National History Museum at St. Fagans, a large open air museum which houses dozens of buildings from throughout Welsh history. Cardiff also offers a wide range of cultural programmes. You can enjoy the opera, ballet, musicals and live music from top acts. Across the city, there are a range of theatres, galleries and arts and live music venues. You can explore French Impressionist paintings at the national museum, find out about Cardiff's local history at the Cardiff Story Museum and Cardiff Bay's maritime heritage at Y Pierhead.

Transportation:

The nearest Airport is the Cardiff International Airport which is located in Rhoose and has a direct link to the centre of Cardiff. The Cardiff Airport Express Bus service brings passengers directly to the city centre of Cardiff. A one way ticket costs around £5 and can also be paid in EUR. You should expect to pay around £30 for a private transfer between the city centre and the airport.

Hotel Information: www.esmrmrb.org

Advanced MR Imaging of the Abdomen

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**September 6–8, 2018
Coimbra/PT**

**Course organiser:
Nicholas Gourtsoyiannis
Athens/GR**

**Local organiser:
Filipe Caseiro Alves, Coimbra/PT**

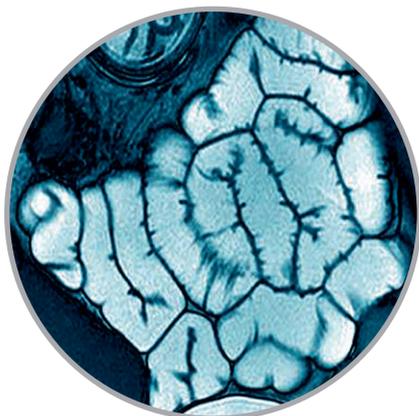
Course venue:
Hotel Vila Galé Coimbra
Rua Abel Dias Urbano, 20
3000-001 Coimbra
Portugal

Preliminary faculty:
L. Curvo-Semedo, M. França, N. Gourtsoyiannis,
L. Marti-Bonmati, C. Matos, L.-A. Mouloupoulos,
N. Papanikolaou, J. C. Vilanova, G. Zamboni

Course duration:
Thursday morning – Saturday noon

The aim of this course:
The course aims to convey an in-depth knowledge about MR imaging of the abdomen. The topics covered include modern MRI techniques and updated MR applications for diagnosing focal and diffuse liver disease as well as recent developments in MR imaging of the pancreatic disorders and gynaecological disorders. The course also focuses on MR imaging of the GI tract, the kidneys, adrenal glands and prostate. A team of renowned teachers with expert knowledge in abdominal imaging ensures a high quality teaching programme and looks forward to welcoming you in Palermo.

Participation requirements:
Physicians who have good knowledge in MR techniques; minimum of 6 months experience in applied MRI of the Abdomen.



Learning Objectives

From Imaging Biomarkers to Radiomics: Technical Aspects and Clinical Applications in the Abdomen

- To be familiar with the principles of quantitative MRI
- To understand the basic concepts of Imaging Biomarkers and Radiomics
- To review established and potential clinical applications of Radiomics

MR Imaging of diffuse liver lesions

- The role of MR imaging biomarkers of hepatic steatosis, iron overload, inflammation and fibrosis, in different diffuse liver diseases
- To review the different MR imaging techniques to evaluate and to quantify liver steatosis, iron overload and fibrosis
- Vascular diseases of the liver: pre-sinusoidal and postsinusoidal disorders

MR Imaging of HCC

- To comment on the different guidelines used today in screening cirrhotic patients
- To understand the role of MR imaging in the diagnosis and staging of HCC
- To discuss the role of imaging in HCC grading and phenotyping using imaging biomarkers
- To learn about the value of imaging and radiomics to assess HCC response in clinical trials

MR Imaging of Pancreatic Lesions

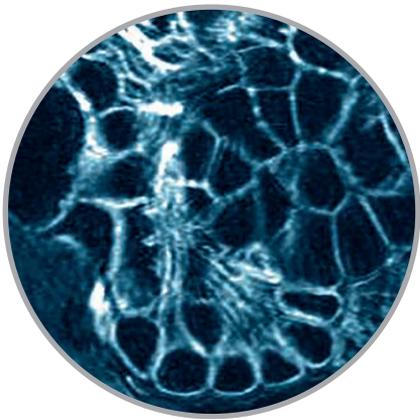
- Appearance of the normal pancreas and tumours on T1-weighted sequences
- Appearance of the normal pancreas and tumours on T2-weighted sequences with short TE
- Enhancement patterns of focal pancreatitis versus pancreatic tumours
- Staging of pancreatic tumours
- Contribution of diffusion-weighted imaging

MR Enteroclysis of the Small Bowel

- To discuss the advantages of volume challenge
- To describe the examination protocol in detail
- To explain the comparative merits of the multiple contrast mechanisms
- To present normal appearances
- To familiarise with MRE imaging findings
- To review Crohn disease activity

MR Imaging of Kidneys and Adrenal Glands

- MRI appearance of the normal kidneys and adrenals
- The enhancement patterns of the renal and adrenal masses
- Characteristics of the renal tumours, including RCC, oncocytomas, angiomyolipomas etc.
- Staging of the RCC, including the diameter of the lesions, and extra-renal and vascular extension
- In- and opposed-phase imaging
- Benign and malignant adrenal tumours



MRI of the Prostate

- To learn about the multiparametric MRI of the prostate
- To understand the role of MRI in the detection of significant prostate cancer
- To know about image-guided biopsies of the prostate (MR- and MR/US-guided biopsies)
- To learn about MRI in the staging of prostate cancer
- To learn about MRI on tumor recurrence and follow-up

MR Imaging in Diagnosing and Staging of Ovarian Cancer

- Chose the appropriate imaging modality for characterising an ovarian mass - what is bad?
- Learn MRI protocols for imaging ovarian masses.
- Learn how to stage ovarian cancer - where to look, what to look for.
- Learn when neoadjuvant chemotherapy is indicated for newly diagnosed ovarian cancer patients.

MR Imaging of Anorectal Cancer

- To understand the role of MRI for primary staging and restaging of rectal cancer
- To know the imaging risk factors that influence treatment approach in patients with rectal cancer
- To learn how to interpret MR for primary staging and to be aware of potential pitfalls in interpretation
- To know how to interpret MR imaging features that arise following preoperative chemo-radiotherapy, including the main pitfalls

City Information: Coimbra/Portugal

Population:	approx. 143.000
Time zone:	CET -1
Currency:	EUR
Country dialling code:	+351
Closest airport:	Porto International Airport (OPO / LPPR)

Coimbra, the former medieval capital of Portugal, is a major cultural and intellectual centre of the country. The oldest academic institution in the Portuguese-speaking world, the University of Coimbra, is located here and all over the city, you will discover landmarks left by those who built the nation. Its historical buildings are classified as World Heritage site by the UNESCO. The city of Coimbra is home of approximately 23,300 students. The Biblioteca Joanna holds over 300,000 books, some of which date back to the 12th century. The most famous park in the city is the fifth oldest Botanical Garden in the world, also belonging to the University of Coimbra. Due to its long history, Coimbra offers a lot of historical sites like the Medieval Downtown or the Old Cathedral.

Transportation:

The city of Coimbra does not have its own airport. The nearest airport is the Porto International Airport (120km). From there Coimbra can be reached by train, taxi or by car. To get to Coimbra by train, passengers first have to travel to Gare da Campanhã (the main train station in Porto), which takes approximately 30 minutes. From there several trains depart to Coimbra. The journey will take about 1,5 hours and a one-way ticket costs around 12 EUR.

Hotel Information: www.esmrb.org

Advanced Pelvic MR Imaging

14 **September 6–8, 2018**
Madrid/ES

Course organiser:
Riccardo Manfredi
Rome/IT



Local organisers:
Vicente Martinez de Vega, Madrid/ES

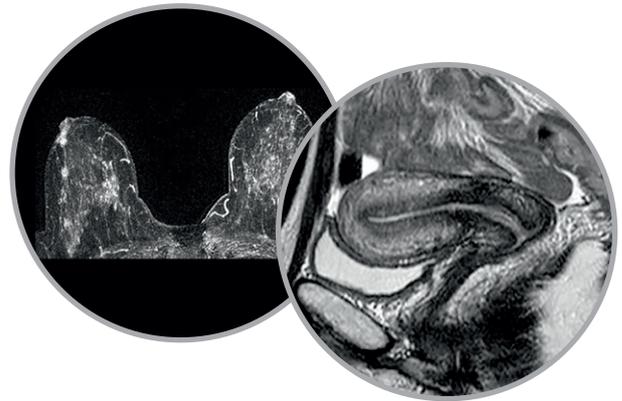
Course venue:
Hospital Quironsalud Madrid
c/ Diego de Velázquez, 1
28223 Pozuelo de Alarcón, Madrid
Spain

Preliminary faculty:
R. Beets-Tan, R Forster, J. Futterer, B. Hamm, K. Kinkel,
R. Kubik, F. Maccioni, R. Manfredi, V. Martinez de Vega,
T. Metens, A. Rockall, E Sala

Course duration:
Thursday morning – Saturday noon

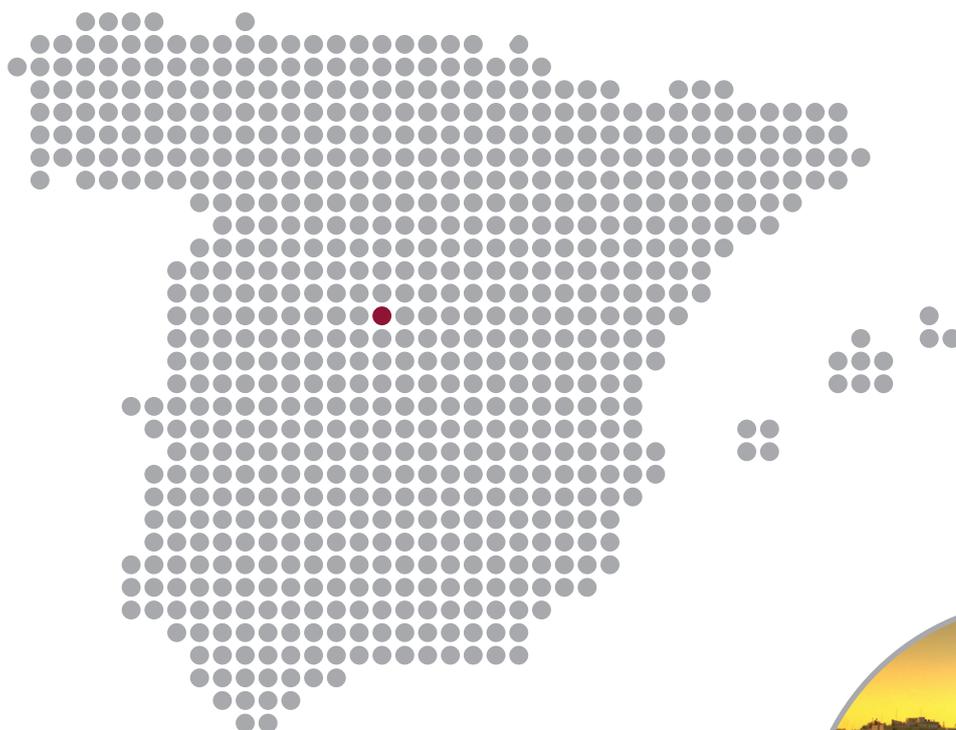
The aim of this course:
Technical advances have opened up new diagnostic applications in MR imaging with MRI gaining an increasing role in this patient population also in a clinical routine setting. This course will offer an overview of current MR imaging strategies for the diagnosis of pelvic diseases including foetal imaging and pelvic floor MRI. Established as well as potential future indications will be reviewed compared to other imaging examinations. We will discuss hard- and software requirements of MR systems for optimal clinical use as well as the optimisation of imaging strategies and diagnostic advantages arising from the application of contrast agents. The aim of the course is furthermore to convey in depth knowledge of morphological changes of the pelvic organs under pathological conditions. We would like to welcome you to this course in, where European experts in the field of MR imaging will be given the opportunity to share their knowledge with you in plenary lectures and reinforce the information in small group discussion.

Participation requirements:
Physicians who have good knowledge in MR techniques and some experience in applied MRI of the breast and female pelvis.



Learning Objectives

- Physics
- Benign diseases of the uterus
- Malignant diseases of the uterus
- Benign diseases of the Ovaries
- Malignant diseases of the ovary
- Obstetric and fetal MRI
- Prostate neoplasm detection and PI-RADS classification
- Prostate neoplasms staging and recurrent disease
- Rectal cancer staging and restaging after neoadjuvant treatment
- Diffusion of gynecologic cancer
- Pelvic floor
- Perianal fistula
- Neoplasia of the Vulva and vagina



City Information: Madrid/Spain

Population:	approx. 3.165.541
Time zone:	CET
Currency:	EUR
Country dialling code:	+34
Closest airports:	Adolfo Suárez Madrid– Barajas Airport (MAD)

Madrid, the capital of Spain, is a cosmopolitan city that combines the most modern infrastructures and the status as an economic, financial, administrative and service centre, with a large cultural and artistic heritage, a legacy of centuries of exciting history.

Strategically located in the geographic centre of the Iberian Peninsula at an altitude of 646 m above sea level, Madrid has one of the most important historic centres of all the great European cities. This heritage merges seamlessly with the city's modern and convenient infrastructures, a wide-ranging offer of accommodation and services, and all the latest state-of-the-art technologies in audio-visual and communications media. These conditions, together with all the drive of a dynamic and open society –as well as high-spirited and friendly– have made this metropolis one of the great capitals of the Western world. Furthermore, art and culture play a key role in Madrid's cultural life. The capital has over 60 museums which cover every field of human knowledge.

Transportation:

The airport of Madrid is connected to the city by an airport bus, the Expres Aeropuerto (Airport Express), a 24-hour service which has only 3 stops after the airport: O'Donell, Plaza de Cibeles and Atocha. The buses run every 15 minutes during the day and every 35 at night, and the journey takes approximately 40 minutes. Tickets cost 5 euros and may be bought on board. There are stops at terminals T1, T2 and T4. Madrid's Barajas Airport has also Metro stations in Terminal T2 and the newer Terminal T4. Trains leave every 5 minutes from 6.00am to 2.00am. Line 8 goes straight to the Nuevos Ministerios Metro station in the centre of Madrid, with a journey time of just 12 minutes. The price of a single journey to or from the airport is currently 5 euros. If you prefer to go by taxi, there is now a fixed rate of 30 euros to any central location (within the M-30 ring-road).

Hotel Information: www.esmrmb.org

Advanced Cardiac MR Imaging

16

September 13–15, 2018
Rome/IT

Course organiser:
Jens Bremerich
Basel/CH



Local organisers:
Luigi Natale, Rome/IT

Course venue:
Policlinico Agostino Gemelli
Complesso Integrato Columbus (C.I.C)
Largo Agostino Gemelli
800168
Italy

Preliminary faculty:
J. Bremerich, P. Buser, M. Carlsson, M. Gutberlet,
M. Hrabak-Paar, A. Jacquier, N. Kawel-Böhm,
L. Natale, A. Redheuil, F. Santini

Course duration:
Thursday morning – Saturday noon

The aim of this course:
MRI has evolved to a valid and robust clinical tool in everyday practice. The unique feature of tissue characterisation by means of T1-/T2-/T2*-/ECV-mapping together with cardiac morphology, function and flow with excellent spatial, temporal and contrast resolution explain its outstanding role in imaging cardiac disease. Multiple sequence options require stringent tailoring of imaging protocols and knowledge of both, pathology and modality. Beginners and advanced course participants learn basic principles of cardiac MR and discuss dedicated protocols based on real cases. Clinical topics provide deep insight into congenital, valvular, ischemic, inflammatory, and pericardial disease as well as storage disorders, masses and cardiomyopathy. Participants discuss these disorders with respect to relevant clinical questions. Strengths and limitations of MR and CT are highlighted. The focus of this course is MR, but CT and its role for coronary imaging and cardiovascular risk assessment are also addressed.

Participation requirements:
Physicians who have a good knowledge in MR techniques and a minimum of 6 months experience in applied Cardiac MRI.



Learning Objectives

Tissue characterisation, Fibrosis, Amyloidosis

- T1-/T2-/T2*-/ECV-mapping, Late Gadolinium Enhancement
- Sarcoidosis
- Amyloidosis
- Hemosiderosis, Thalassemia
- Myocarditis

Heart Failure

- Definition
- Pathophysiology
- Clinical presentation
- Treatment options

Protocols Step-by-Step: Safety, Set-up for Stress

- Set-up for stress test
- Safety considerations
- Dedicated protocols
- Cooperation Radiology/Cardiology/Physics

Basic Principles of Cardiac MRI

- Spin-echo, Gradient-echo
- Triggering, gating
- Resolution of time, space, contrast
- Coronaries
- Contrast modulation by preparation pulses

Cardiac CT

- Basic principles
- Coronaries
- Calcium Score
- Valves
- Postprocessing





Congenital Heart Disease

- Segmental analysis
- Grown up congenital heart disease
- MR or CT
- Regurgitation, Insufficiency

Valvular Heart Disease

- Regurgitation
- Insufficiency
- Flow

Cardiomyopathy

- Pathophysiology
- ARVC
- Dilated cardiomyopathy and Non compaction
- Hypertrophic cardiomyopathy

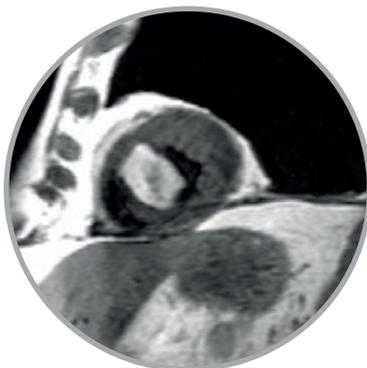
Ischemic Heart Disease:

Infarct, Viability, Perfusion, Stress

- Function
- Perfusion
- Infarct, Viability, Late enhancement

Cardiac Masses, Pericardial Disease

- Systematic approach
- Benign and malignant tumours, metastasis, thrombus
- Acute vs. chronic pericarditis



City Information: Rome/Italy

Population:	approx. 1 800.000
Time zone:	CET
Currency:	EUR
Country dialling code:	+39
Closest airport:	Rome Fiumicino – Leonardo da Vinci Airport (FCO/ LIRF), Rome Ciampino Airport (CIA/ LIRA)

If you were to sum up the city of **Rome** in two words, they would be 'busy' and 'historic'. This beautiful city is over 2,700 years old and has become one of the most popular cities in the world. Rome is simply full of history, with an enormous number of spectacular ancient Roman monuments, including the Vatican City, The Forum, from where Julius Caesar once governed ancient Rome, the Colosseum and the ruins of the Circus Maximus. There are also a large number of museums displaying ancient artefacts and world-famous paintings and sculptures by artists such as Raphael, Botticelli, Pinturicchio and Bellini, to name just a few.

Transportation:

The airport Rome Fiumicino is located around 35km away from Rome city centre and is connected by the Leonardo Express, with trains to Rome Termini Station running every 15 minutes. A one-way ticket to the centre costs 14 EUR. A Taxi ride from Fiumicino airport to Rome city centre is 48 EUR. From Rome Ciampino, there are direct bus connections both to Rome Termini Station and to nearby local stations (either metro or regular train). From the local stations, there are train services to Termini and other destinations.

Hotel Information: www.esmrb.org

Advanced Neuro Imaging: Diffusion, Perfusion, Spectroscopy

18 **September 27–29, 2018**
Leuven/BE

Course organiser:
Sven Haller
Commugny/CH

Local organiser:
Stefan Sunaert, Leuven/BE

Course venue:
UZ Leuven, Campus Gasthuisberg
Medical Imaging Center, Radiology
Herestraat 49
3000 Leuven
Belgium

Preliminary faculty:
J. Alvarez-Linera, A. Björnerud, S. Brockstedt, E.R. Danielsen,
S.Haller, M. Koch, R. Kreis, E.M. Larsson, J. Linera, J. Wikström

Course duration:
Thursday morning – Saturday noon

The aim of this course:
The aim of this course is to convey in-depth knowledge about advanced functional MR techniques for imaging of the central nervous system. The combination of MR physics (at a level for radiologists) and clinical applications in this course provides an excellent opportunity to improve the understanding as well as the clinical interpretation of diffusion- and perfusion-MRI and MR spectroscopy. During the last decade, these techniques have matured and are now frequently incorporated into daily clinical work. Furthermore, significant progress in the development of refined techniques, such as diffusion tensor imaging, has been made during the last few years. The course will offer an overview of present methodology with clinical applications in neuroradiology, as well as promising new methods, using a mixture of lectures and small group exercises. We are happy to welcome you to this course in Geneva where European experts in the field will share their knowledge with you.

Participation requirements:
Radiologists, neuroradiologists, physicians, physicists, radiographers, MRI nurses and others who have good knowledge in MR techniques; minimum of 6 months experience in applied MRI and/or Neuro Imaging.

Learning Objectives

Diffusion (dMRI: DWI and DTI)

- Basic mechanisms
- Isotropic diffusion
- Anisotropic diffusion
- The ADC concept
- Pulse sequences and acquisition techniques
- Diffusion tensor imaging
- Diffusion kurtosis imaging
- Introduction to axonal fibre tracking and q-space imaging
- Pitfalls, practical issues, implementation

Perfusion (pMRI or PWI)

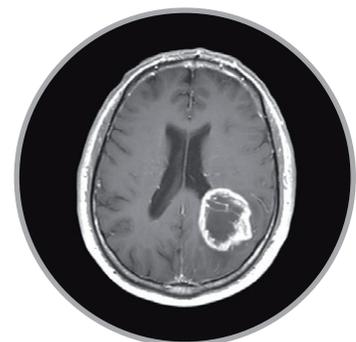
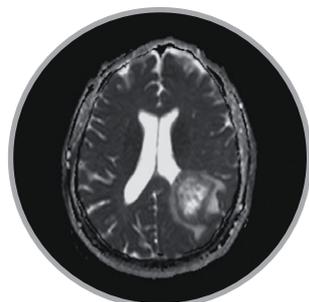
- Basic Physiology
- Dynamic Susceptibility Contrast (DSC) methods
- Pulse sequences
- Modelling, implementation and pitfalls
- Convolution and deconvolution
- Advanced modelling, heterogeneity, leakage correction
- Arterial spin labelling (ASL)

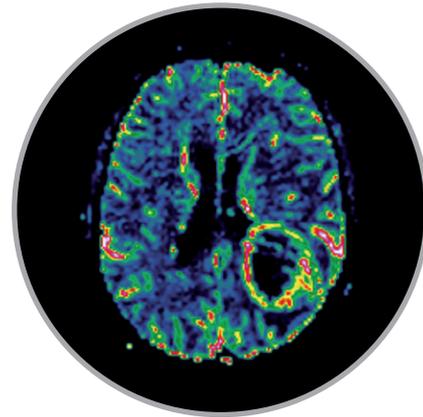
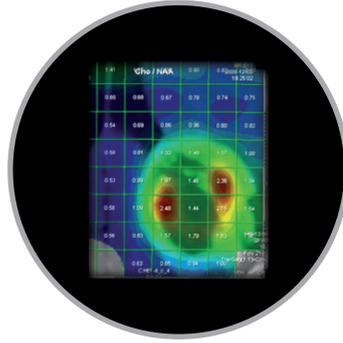
Clinical Applications of dMRI and pMRI

- Stroke
- Epilepsy
- Brain tumours
- Infection/inflammation
- Dementia
- Trauma
- Metabolic diseases

MR Spectroscopy (MRS)

- Basic principles
- Sequences for proton spectroscopy
- Postprocessing
- Metabolite quantification
- Quality Control and artefacts
- Clinical aspects
- Interpretation
- Pitfalls
- Applications





City Information: Leuven/Belgium

Population:	approx. 99.288
Time zone:	CET
Currency:	EUR
Country dialling code:	+32
Closest airport:	Brussels Airport (BRU / EBBR)

Leuven (Louvain in French) is an ancient capital, a prominent brewing centre and Flanders' oldest university town. In term time, and even during holidays, some 25,000 students give the city an upbeat, creative air. The picturesque core is small enough that you could easily see the sights in one day. The city has a long and interesting history, being founded probably in the 9th century. It was particularly interesting because of the location, at the river Dijle and close to Brussels. Most of the city was destroyed by the German invasion in World War I, and was again damaged during World War II. The historic centre itself however has been preserved and historic buildings like the University Library have been restored.

Transportation:

The closest airport to Leuven is Brussels Airport, located 26km from the center of Leuven. The easiest way to get to Leuven from the airport is by train. The train station is located in the basement of the airport terminal building itself. There is a direct train from the airport to Leuven each hour. The train takes about 15 minutes to Leuven. A single journey will cost about 6 EUR. Taxis are available outside the Arrivals Hall. Licensed taxis can be identified by the yellow and blue licence emblem. The price is approximately 60 EUR.

Hotel Information: www.esmrmrb.org

MR Safety

20

**October 18–20, 2018
Vienna/AT**

**Course organiser:
Siegfried Trattnig
Vienna/AT**



**Local organiser:
Martin Krššák, Vienna/AT**

Course venue:
MR Centre of Excellence for High Field MR
Lazarettgasse 14
1090 Vienna
Austria

Preliminary faculty:
D. Beitzke, K. Bräuner, J. Felblinger, L. Hanson, A. Jones,
M. Krššák, A. Melzer, N. Oberhofer, G. Schaefer, F. Schick,
H. Thomsen, S. Trattnig

Course duration:
Thursday morning – Saturday noon

This course is limited to 35 participants!

The aim of this course:
The aim of the course is to provide a systematic overview of the risks connected to superconductive clinical MR systems. It will cover both patient safety and personnel safety. The potential hazards related to the 3 different electromagnetic fields used in MR (the static magnetic field, the switched gradient field and RF field) will be presented and experienced in practical sessions. Another important aspect are the standards of MR Safety and compatibility testing in active as well as non-active implants, with a focus on a training in clinical strategies how to handle implant safety issues in the MR environment, enhance patients safety and improve the MR workflow in daily routine. Special aspects such as cardio-vascular implants and MR Safety issues in interventional MR will be presented, too. The most recent developments and risks of Gadolinium-based MR contrast agents will be covered. Additionally an introduction to risk management in clinical and experimental MR systems (3 and 7T) will be given. The course will provide a combination of lectures and practical training sessions in smaller groups.

Participation requirements:
The target group can be subdivided into the following two categories:
Health care personnel: radiologist, radiological technologist, physician, ongoing MR safety expert and Safety Officer, occupational physician
Other personnel: medical physicists, MR researcher, hospital safety manager, maintenance manager

Learning Objectives

Introduction to construction and function of MRI scanner

- Update on MR scanner components
- Update on MR basics

A systematic overview on MR interactions with magnetic and electrically conductive materials

- Characteristics of the static magnetic field inside and around a clinical MR system
- Forces and torques acting on magnetic materials in static magnetic fields
- Characteristics of the radiofrequency electromagnetic transmitter field and of the gradient field
- Induction of electrical currents by time varying electrical and magnetic RF fields in conductive structures and tissue

Risks in MRI I:

Static Bo field, dangers due to superconductors

- Value and effects of the static magnetic field around the magnet
- Exposure limits for static magnetic fields
- Potential risks for human exposure to static magnetic fields
- Dependence of physiologic effects on relevant parameters of the static magnetic field
- Potential risks of superconducting magnets and helium leakage

Risks in MRI II:

MR gradients and RF

- Exposure limits for low frequency gradient fields
- Potential risks for humans with gradient fields
- Exposure limits for high frequency RF fields
- Potential risks of high frequency RF fields
- Dependency of SAR from the static magnetic field

Implant Testing and Safety Considerations

- Active definitions of MR Safety and terms
- Standards of MR Safety and compatibility testing
- Presentation of standard test methods
- Simulation of RF heating using human models
- MR Labelling of active and non-active implants with respect to static magnetic and switched gradient magnetic fields and RF fields

MR-safety considerations in a clinical environment

- How to prepare the patient for the MR examination
- To learn about the impact of different implants on clinical MRI
- To understand the patient related MR safety issues without implants (burning incidents)
- To be aware of emergency situations in the scanner room

Implant problems and optimisation. Researching implants

- Impact of implants on clinical MRI and financial consequences
- Strategies of improvement, workflow
- Effective research of MRI-conditions of implants
- Fixed Parameter mode

Cardiovascular implants and cardiac pacemakers in MRI

- Risks and subsequent limitations of MR imaging after stents and stent graft implantation
- The risks of conventional, 'old' cardiac pacemaker implantation
- Newest guidelines of MR safety after stent and pacemaker implantation

MR Safety issue in Interventional MR

- Principles of Interventional MRI and intraoperative MRI
- Potential risks for clinicians and patients
- Technical requirements for safe Interventional MRI and intraoperative MRI
- Limitations of visualisation and tracking of interventional devices
- How to avoid reaching exposure limits during interventions
- Examples from clinical and pre-clinical studies

Contrast agents

- Chemical characteristics of Gd chelates
- Risks of Nephrogenic Systemic Fibrosis
- Evaluation of renal function
- Allergic reactions with Gd chelates
- tissue specific Gd deposition

EU Directive and MR worker training

- MRI in the context of European health and safety legislation
- Existing national and international EMF exposure guidelines and standards
- EC standard 60601-2-33
- The Physical Agents (EMF) Directive: state of play and possible future developments

Risk management in MR

- Risk assessment
- Instruments for risk management (reporting, root cause analysis,...)
- Strategies for risk reduction in MR
- Considerations regarding ferromagnetic detectors and the commitment to a ferrous-free MR environment

Practical Session I

System-related MR Safety (7 Tesla)

The goal is to give the participants a hands-on experience of the potentially dangerous interactions of metallic objects with the intense static magnetic field: inspection of the safety precautions of the MR site and MR-related alarms, the controlled access zone, experience with attraction forces and torque (ferromagnetic objects) and effect of Lenz law (all metallic objects) due to the static magnetic fringe field, movement of "MR compatible" ear prosthesis; practical issues with ferromagnetic detectors, practical aspects related to maintenance and cleaning staff.

Practical Session II

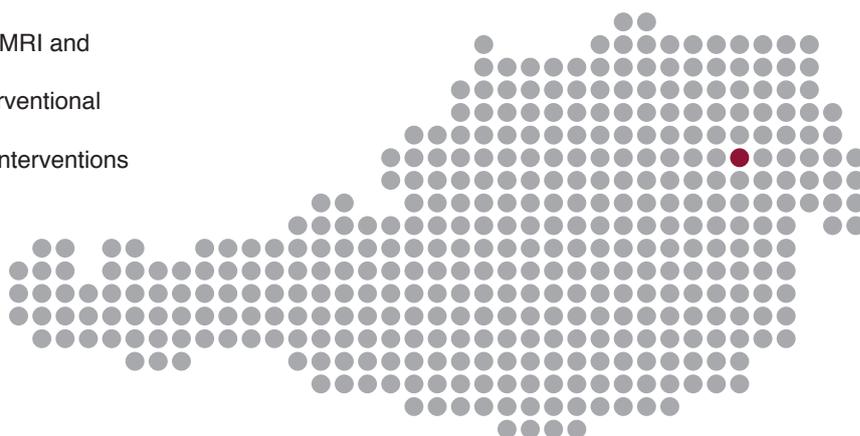
Patient-related MR Safety (3 Tesla)

This session is focused on safe patient handling in MR: patient interview and correct MR clothing; patient screening for metal objects and implants; examination of anaesthetized patients; handling metal objects and appropriate labelling of necessary equipment in the MR environment; patient positioning: how to avoid RF-burns, hearing protection, patient communication and alarm system; ambient emergency situations including fire and quench; management of accompanying person/parents; patient form and informed consent, patient emergency; issues related to RF stimulation, PNS and 1st controlled operation mode.

Practical session III

RF heating

Participants will experience the RF heating issue with an experiment. The goal is to understand the parameter complexity related to SAR and to know the necessities for interpretation of the RF part of the MR labelling of devices/items.



City Information: Vienna/Austria

Population:	approx. 1,793.667
Time zone:	CET
Currency:	EUR
Country dialling code:	+43
Closest airports:	Vienna International Airport (VIE)

Vienna – the capital as well as the largest city in Austria - serves as an economic and politic hub, hosting many international organisations like the United Nations and OPEC. There is a lot to see in Vienna, from the gothic Saint Stephen's Cathedral to the Hofburg Imperial Palace, from the Art Nouveau splendour of the Secession to the magnificent late baroque palace of Schönbrunn and the well-known Riesenrad (Ferris Wheel) in the Vienna Prater. In Vienna, music is in the air; more famous composers have lived here than in any other city, and it is known as the home of the waltz and operetta. Enjoy the fantastic music of the Vienna Staatsoper, the Volksoper, the Musikverein and the Konzerthaus. Visit unique art collections at the Albertina, the Kunsthistorisches Museum (Museum of Art History), the Belvedere, the Leopold Museum, the Museum of Modern Art, and many more. Visiting Vienna doesn't just mean sightseeing it also means enjoying a 'G'spritzter' (a white wine spritzer), chocolate cake (the unique 'Sacher Torte'), coffee (like the Viennese 'Melange') and the famous 'Wiener Schnitzel'.

Transportation:

Vienna is served by the airport near Schwechat, located 18km southeast of the city centre and is well connected to all major European cities. The CAT (City-Airport-Train) runs from the airport directly to the city centre twice an hour. A round trip ticket costs 21 EUR and it takes 16 minutes to arrive at the city center. Taxis are readily available and cost around 35-40 EUR for a ride to the center of Vienna. Moreover Vienna can be easily reached by train. Vienna Central Railway Station is the major hub. From there the center can be reached in a few minutes by using the underground line U1, a one-way ticket costs 2,20 EUR.

Hotel Information: www.esmrmrb.org

Curso Avanzado de Imagen por RM Músculo-Esquelético

22

**08-10 de Noviembre de 2018
Barcelona, ES**

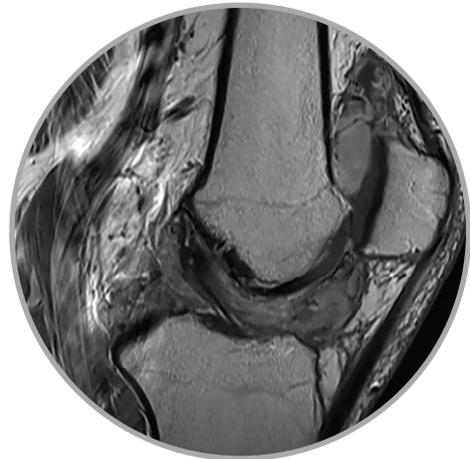
**Organizador del curso:
Joan C. Vilanova
Girona/ES**



**Organizador local:
Fernando Fernández, Barcelona/ES**

Sede:
Hospital del Mar
Passeig Marítim, 25-29
08003 Barcelona

Duración del curso:
Jueves mañana - Sábado mediodía



Learning Objectives

Médula Osea

- Distribución normal, conversión de la médula ósea y variantes
- Patología de la médula ósea: diagnóstico diferencial
- Diferenciación entre fractura benigna/neoplásica
- RM de cuerpo entero

Rodilla

- Secuencias y estrategias en el protocolo de estudio
- Edema óseo. Patrones en las lesiones de rodilla
- Imagen del cartílago
- Ligamentos cruzados y meniscos
- Osteonecrosis y defectos subcondrales

Cadera/Pelvis

- Estrategia de imagen, protocolos, secuencias, informe
- Diagnóstico diferencial del edema óseo: coxitis, artrosis, edema transitorio, necrosis
- Patología articular y lesiones del lábrum
- Atrapamiento femoroacetabular

Codo

- Estrategia de imagen, protocolos, secuencias, informe en el estudio del codo
- Variantes anatómicas que simulan patología
- Patología en el dolor anterior/posterior/medial/lateral

Lesiones del Deporte

- Lesiones musculares, unión miotendinosa
- Lesiones del deporte, atletas en general
- Lesiones tendinosas, entesopatías

Raquis

- Discopatía, degeneración, protrusión, hernia
- Espondilodiscitis
- Espondiloartropatía inflamatoria seronegativa
- Sacro y sacroileitis

Mano/Muñeca

- Estrategia de imagen, protocolos, secuencias
- Lesiones del fibrocartílago
- Inestabilidad
- Tumores de muñeca y mano

Tobillo/Pie

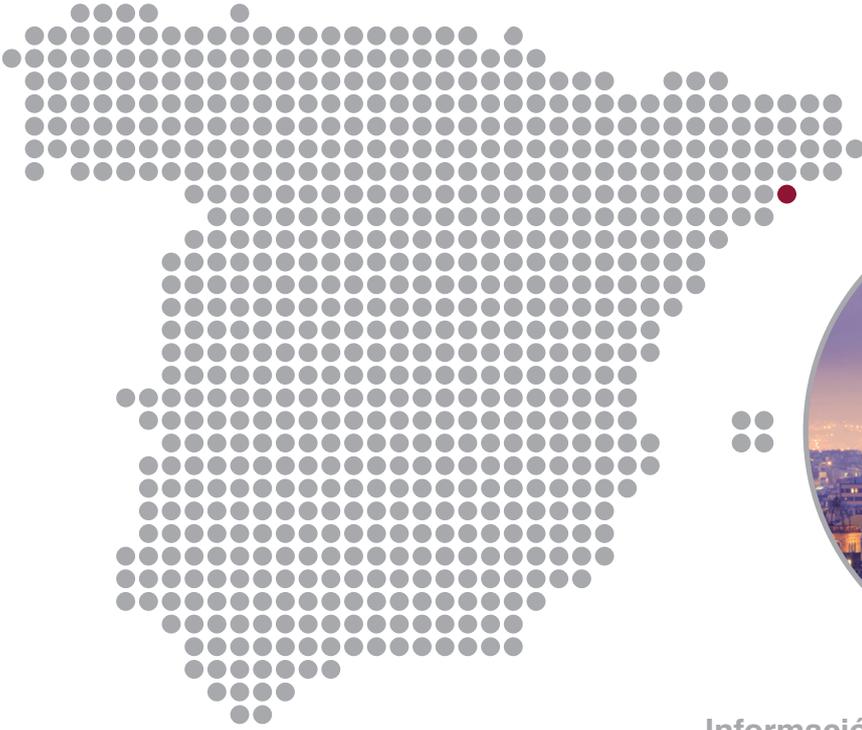
- Estrategia de imagen, protocolos, secuencias
- Variantes de la normalidad que simulan patología
- Ligamentos y tendones.
- Diagnóstico diferencial del edema óseo y de partes blandas. Lesiones de estrés
- Atrapamientos neurogénicos incluyendo neuroma de Morton y diagnóstico diferencial

Hombro

- Estrategia de imagen, protocolos, secuencias, informe
- Clasificación de pinzamiento.
- Lesiones del manguito de los rotadores
- Lesiones traumáticas e inestabilidad del hombro

Tumores Oseos y de Partes Blandas

- Estrategia de imagen en RM, protocolos, secuencias para explorar lesiones tumorales óseas y de partes blandas
- Diagnóstico diferencial de lesiones óseas y de partes blandas
- Tumores articulares y lesiones pseudotumorales



Información de la ciudad: Barcelona/España

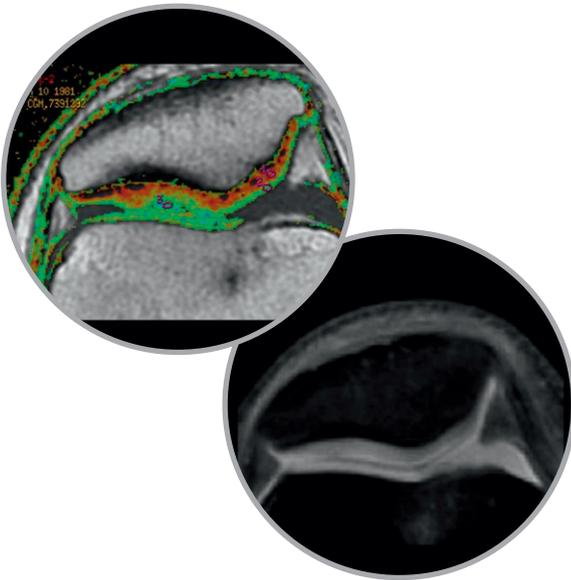
Población:	aprox. 1.608.746
Huso horario:	CET
Moneda:	EUR
Código de marcación nacional:	+34
Aeropuerto más cercano:	Aeropuerto de Barcelona (BCN)

Barcelona es la segunda ciudad española en número de habitantes y es la capital de Cataluña. Fundada como ciudad romana, Barcelona se convirtió en la capital del condado de Barcelona. Asediada varias veces durante su historia, Barcelona tiene un rico patrimonio cultural y es hoy un importante centro cultural y un importante destino turístico. Particularmente conocidas son las obras arquitectónicas de Antoni Gaudí y Lluís Domènech i Montaner, que han sido designadas como Patrimonio de la Humanidad por la UNESCO. La obra maestra de Gaudí, La Sagrada Familia, que aún está en construcción, es el símbolo internacional de Barcelona. Barcelona como destino turístico de renombre internacional, con numerosas áreas recreativas, una de las mejores playas del mundo, clima templado y cálido, monumentos históricos, incluidos ocho lugares del Patrimonio Mundial de la UNESCO, numerosos hoteles de buena calidad e infraestructura turística desarrollada.

Transporte:

Barcelona dispone del aeropuerto de Barcelona-El Prat, con dos terminales (T1 y T2) a 17 km del centro de la ciudad. El aeropuerto está conectado a la ciudad con un autobús del aeropuerto, Aerobús, que conecta el aeropuerto (T1 y T2) con el centro de la ciudad y las principales estaciones de metro en solo 35 minutos. El precio del billete de ida es de 5,90 EUR y para un viaje de ida y vuelta de 10,20 EUR. Además, el aeropuerto está conectado al metro, un billete sencillo al centro cuesta 4,50 euros, pero también existe la posibilidad de comprar un pase de un día que incluye no solo el traslado desde y hacia el aeropuerto, sino todo el sistema de transporte público de Barcelona. El billete puede utilizarse de 2 a 5 días y los precios son desde 14,50 por 2 días. Los taxis están disponibles en las Terminales 1 y 2 y cuestan aprox. 30-60 EUR.

Hotel Information: www.esmrmb.org



eLearning: Basic Course on Applied MR Techniques

September 10 – October 22

Course organiser:
Eva Scheurer
Basel/CH



The aim of this course:

The course is aimed at those of you who have no or little physical and mathematical background, but would like to understand the process of image formation and the sequences of usual clinical MR imaging. The course consists of 7 modules of 60 minutes which take place once a week and a self-assessment test. Thus, the course extends over a period of 8 weeks. Each module consists of a presentation in form of a live lecture given by experienced teachers, and additionally offers direct interaction with the speaker with question/answer time at the end of each module. The presentations can be followed on any computer with internet access.

The course is particularly aimed at medical doctors (e.g. residents in radiology), biologists or technicians who work with MRI or have an interest in using MRI for research. Participants do not need previous experience in MR techniques and MR physics.

Goals of the course:

Attendance at the Basic Course on Applied MR Techniques will enable you to

- profoundly understand signal and contrast generation in MR images at different conditions (morphological, biophysical and technical);
- understand basic principles of image contrast and image formation;
- use basic clinical sequence for your questions and enhance tissue contrast by modifying parameters and using contrast agents;
- interpret MR images back to tissue components and functional activities;
- ensure safe application of MRI by knowing the involved hardware components and basic safety risks



Learning Objectives

The physical basis of Nuclear Magnetic Resonance

- Magnetic field
- Spin and magnetic moment
- Spin precession and Larmor frequency
- Magnetic properties of nuclei
- Resonance
- FID
- Fourier transform
- Relaxation, T1 and T2

Magnetic Resonance Imaging: formation of the imaging

- Gradients
- Localization principles
- Slice selection and slice parameters
- Frequency encoding
- Notion of phase encoding

Basic clinical sequences, tissue contrast and image quality

- Image quality: contrast, spatial resolution and Signal-to-Noise Ratio
- Main artifacts
- Tissue parameters and pathological variations
- Spin echo sequence and parameters: TR, TE
- Proton density, T1- and T2-weighting
- Slice thickness, FOV, Matrix size
- Gradient echo techniques and steady state free precession (SSFP)
- Spoiling techniques and T1 contrast
- Contrast-enhanced-SSFP and T2* contrast
- Saturation pulses

Basic methods of contrast enhancement

- Presaturation
- Water and Fat imaging and artifact
- Basic principles, classification and biodistribution of contrast agents
- Basic principles of MR angiography using contrast agents

MR Hardware and basic safety aspects

- Magnets and cryogeny
- Gradient coils
- Radiofrequency coils
- Computers
- Metal in a magnetic field
- Gradient intensity and slew rate
- Specific Absorption Rate (SAR)
- Safety limits

**Education
made easy**

eLearning: Advanced Course on Applied MR Techniques

November 5 – December 17

Course organiser:
Eva Scheurer
Basel/CH



The aim of this course:

You are not a physicist or a biomedical engineer, but of course you already heard about spins and k-space, and you know the basics about relaxation times. However, the more you know the more aspects come up which would be useful for your daily MRI practice. ESMRMB therefore newly offers you an Advanced Course on Applied MR Techniques that helps you deepening your basic knowledge and prepares you to facing problems, questions and pitfalls in your daily MRI routine and research.

The eLearning course consists of 6 modules of 60 minutes which take place once a week and a self-assessment test. Thus, the course extends over a period of 7 weeks. Each module consists of a presentation in form of a live lecture given by experienced teachers, and additionally offers direct interaction with the speaker with question/answer time at the end of each module. The presentations can be followed on any computer with internet access.

The Advanced Course on Applied MR Techniques is particularly aimed at medical doctors (e.g. residents in radiology), radiographers, biologists and technicians who work with MRI or have an interest in using MRI for research. Participants do not necessarily need extensive experience in MR techniques and MR physics, however, the previous attendance of the Basic Course on Applied MR Techniques is highly recommended.

Goals of the course:

Attendance at the Advanced Course on Applied MR Techniques will enable you to

- enhance the understanding of signal and contrast generation in MR images;
- use basic and advanced MR sequences for your clinical questions and avoid pitfalls;
- assess and enhance image quality by optimizing sequence and imaging parameters;
- understand advanced MRI techniques such as diffusion imaging, perfusion sequences, functional MRI and spectroscopy;
- ensure safe application of MRI by knowing and assessing advanced safety risks

Learning Objectives

Objective 1:

Repetition: The physical basis of nuclear magnetic resonance

- Magnetic field
- Spin and magnetic moment
- Spin precession and Larmor frequency
- Magnetic properties of nuclei
- Resonance
- FID
- Fourier transform
- Relaxation, T1 and T2

Objective 2:

Repetition: Formation of the imaging

- Gradients
- Localization principles
- Slice selection and slice parameters
- Frequency encoding
- Notion of phase encoding

Data sampling, image reconstruction & practical examples

- Sampling techniques (Cartesian, radial, spiral)
- Oversampling, undersampling
- 2D / 3D Fourier reconstruction
- Artifacts

Objective 3:

Repetition: Basic clinical sequences, tissue contrast and image quality

- Image quality: contrast, spatial resolution and Signal-to-Noise Ratio
- Main artifacts
- Tissue parameters and pathological variations
- Spin echo sequence and parameters: TR, TE
- Proton density, T1- and T2-weighting
- Slice thickness, FOV, Matrix size
- Gradient echo techniques and steady state free precession (SSFP)
- Spoiling techniques and T1 contrast
- Contrast-enhanced-SSFP and T2* contrast
- Saturation pulses

Practical image optimization

- SNR, CNR
- Resolution, scan time
- FOV, matrix size
- 2D vs. 3D
- Adjusting bandwidth
- Avoiding artifacts

Objective 4:

More clinical sequences & applications

- Inversion recovery sequences (STIR, FLAIR)
- Fat suppression techniques
- Susceptibility weighted imaging
- Flow sensitive sequences

Objective 5:

Advanced sequences & applications

- Diffusion
- Perfusion
- Functional MRI
- Spectroscopy

Objective 6:

Advanced safety issues

- Repetition basic principles
- Potential hazards and risks
- Implants
- Nerve stimulation
- Heating
- Acoustic noise
- Claustrophobia
- Pregnancy

Registration

Registration is possible online at www.esmrmmb.org

26 In order to register for your desired course(s), please visit our website at www.esmrmmb.org.

Please note that your registration becomes valid only after payment is received and confirmed by the ESMRMB Office. The confirmation of payment will be available for download in the online 'MyUser Area'.

Registration

ESMRMB educational activities are exclusively offered to ESMRMB members. To attend the School of MRI 2018 courses, your ESMRMB membership fee for the year 2018 must be settled.

Membership fees

Regular Membership € 175
Reduced Membership (junior, radiographer, senior) € 25

Please find out more about ESMRMB membership types on the ESMRMB website, at www.esmrmmb.org.

Rates refer to one course. If more than one course is booked at once, a 10% reduction will be granted.

Registration fees

Early registration fees

(until 8 weeks prior to the course)

Regular Members*
€ 525

Junior/Radiographer/Senior Members*
€ 375

Late registration fees

(after 8 weeks prior to the course)

Regular Members*
€ 700

Junior/Radiographer/Senior Members*
€ 500

The registration fee includes:

- Attendance of the course
- Teaching material for the course (digital syllabus)
- Coffee & Lunch
- Welcome Reception

Participants are responsible for their own travel and hotel arrangements. When booking your flights, please make sure that you will be able to stay for the entire course.

Terms of cancellation

In case of cancellation of the registration by the participant:

- > 4 weeks before the course date: the registration fee less 20% for administrative costs will be refunded.
- < 4 weeks before the course date: no refund will be granted.

If less than 40 participants register, ESMRMB reserves the right to cancel a course at the latest 4 weeks prior to its beginning. Please keep this in mind for your travel arrangements.

Information regarding the confirmation/cancellation of a course will be announced on our website.

eLearning Courses

Regular Members*
€ 100

Junior/Radiographer/Senior Members*
€ 50

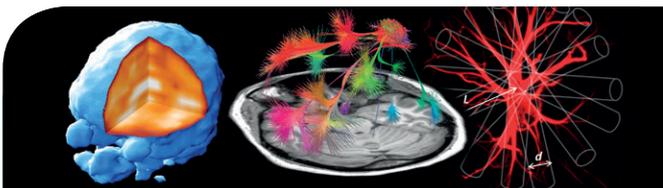
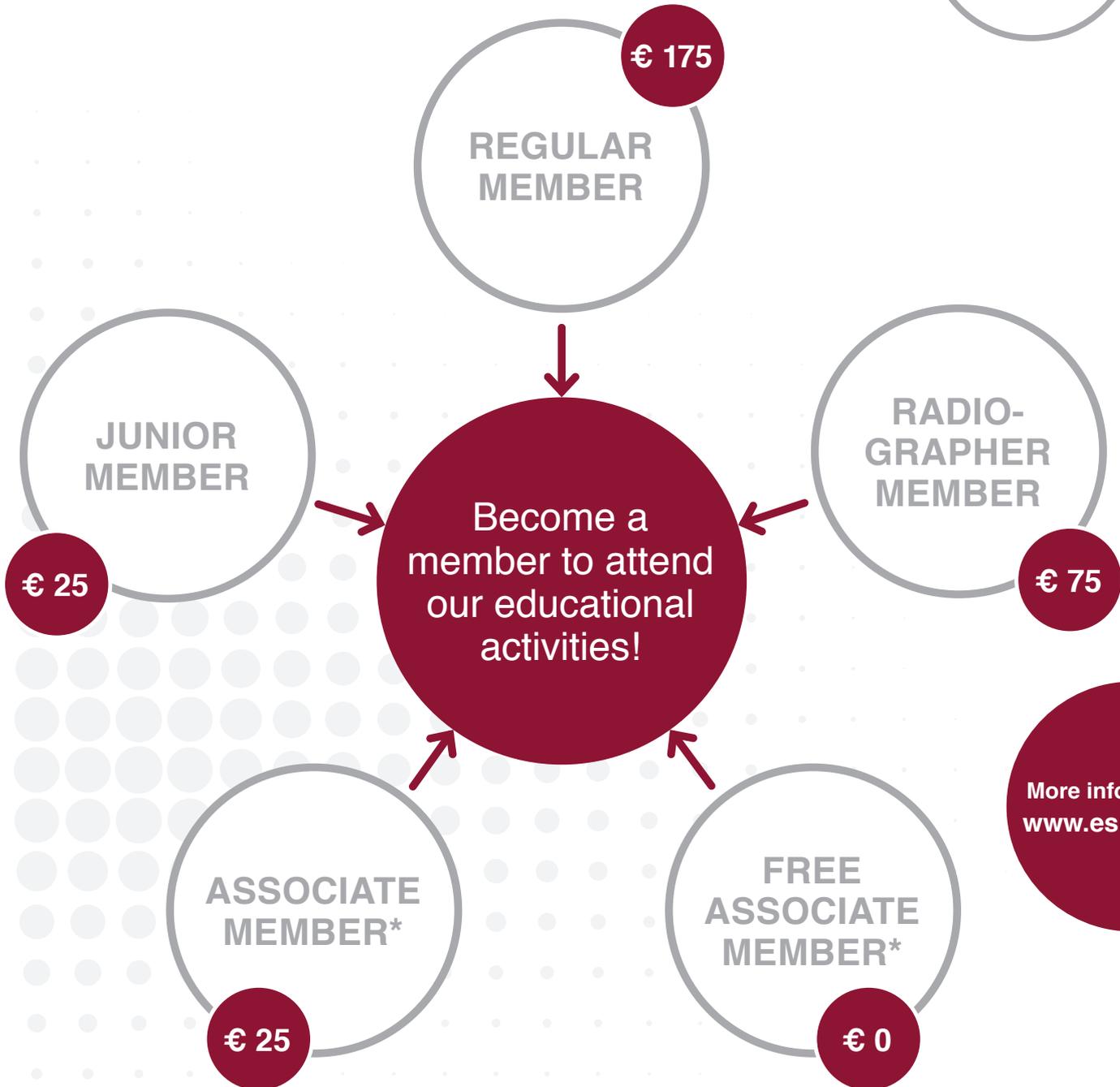
* Access to educational activities is available to ordinary ESMRMB members in good standing, who have paid their 2018 membership fee.

Join the European Forum for MR Research and Clinical Practice

ESMRMB Membership Types

ESMRMB

European Society for Magnetic Resonance in Medicine and Biology



Lectures on MR

Educational courses, exercises, and practical demonstrations on MR physics and engineering



Hands-On MRI

Educational courses for radiologists, MR technologists, and other interested physicians

*Associate members have to become ordinary members in order to gain access to ESMRMB educational activities.

ESOR 2018 – OVERVIEW OF ACTIVITIES

The European School of Radiology (ESOR) is an established and growing project, fulfilling the mission of the European Society of Radiology (ESR) in the field of education. Its main goal is to assist in harmonising radiological education in Europe.

With its wide range of activities, ESOR additionally aims to raise standards in the field of scientific radiology, to extend and coordinate teaching resources worldwide and to help young radiologists to obtain the knowledge and skills to fulfil tomorrow's requirements.

ESOR stands for education in partnership.

EUROPE

GALEN Foundation Course

Neuroradiology
April 26-28, Paris/France

LEVEL I+II

GALEN Advanced Courses

Imaging in Vascular Diseases
May 17-18, Lublin/Poland

LEVEL II+III

Oncologic Imaging of the Abdomen
September 13-14, Athens/Greece

LEVEL II+III

Musculoskeletal Radiology
October 18-19, Ghent/Belgium

LEVEL II+III

ESOR Courses for EDiR

LEVEL II

Neuroradiology
November 5, Vienna/Austria

Head and Neck Radiology
November 6, Vienna/Austria

Hybrid Imaging
November 7, Vienna/Austria

Cardiac Imaging
November 8, Vienna/Austria

Paediatric Radiology
November 9, Vienna/Austria

Breast Imaging
November 10, Vienna/Austria

Chest Imaging
November 12, Vienna/Austria

Musculoskeletal Radiology
November 13, Vienna/Austria

Abdominal Imaging
November 14, Vienna/Austria

ASKLEPIOS Courses in Europe

Women's Imaging **LEVEL II+III**
May 11-12, Bucharest/Romania

Advanced Cardio-Thoracic Imaging **LEVEL II+III**
June 21-22, Sochi, Krasnaya Polyana/Russia

Introduction to Hybrid Imaging in Oncology **LEVEL III**
August 30-31, Vienna/Austria

Infectious and Inflammatory Disorders **LEVEL II+III**
September 27-28, Krakow/Poland

Cardiac Imaging **LEVEL II+III**
October 17-19, Graz/Austria

Symposium on Imaging Hallmarks of Cancer **LEVEL III**
October 18-19, Lisbon/Portugal

Multidisciplinary Approach to Cancer Imaging **LEVEL III**
November 5-6, Rome/Italy

Cardio-Thoracic Imaging Biomarkers **LEVEL III**
December 10-11, Valencia/Spain

Visiting Professorship Programmes within the ESR Support Initiative

Abdominal Oncologic Imaging **LEVEL II+III**
Armenian Congress of Radiology
June 29, Yerevan/Armenia

Urogenital Radiology **LEVEL II+III**
Balkan Congress of Radiology
October 4, Kuşadası/Turkey

Please note that programmes are marked with a logo to indicate their classification according to the European Training Curriculum.

LEVEL I First three years of training

LEVEL II Fourth and fifth year of training (general radiologist standard)

LEVEL III Subspecialty training standard

INTERNATIONAL

ASKLEPIOS Courses International

ASKLEPIOS Course Thailand **LEVEL III**

Neuroradiology
July 20-21, Bangkok/Thailand

ASKLEPIOS Courses Brazil **LEVEL II+III**

Advances in MRI
August 24, Recife/Brazil
August 25, Brasilia/Brazil

ASKLEPIOS Courses China **LEVEL II**

Abdominal Imaging
September 19, Chengdu/China
September 21, Beijing/China

AIMS Advanced Imaging Multimodality Seminars

AIMS Mexico **LEVEL II+III**

Chest and Abdominal Oncologic Imaging
April 11, Mexico City/Mexico
April 13, Guadalajara/Mexico

AIMS Korea **LEVEL II+III**

Multimodality Paediatric Body Imaging
July 7, Seoul/Korea

Visiting Professorship Programmes

Abdominal and Paediatric Imaging **LEVEL II+III**
May 31, Tashkent/Uzbekistan

Emergency Radiology **LEVEL II+III**
July 31, Bogotá/Colombia

August 2, Cartagena/Colombia
Pre-Congress to CCR 2018

Tutorials

Astana Tutorial **LEVEL II+III**
May 28 - June 8, Astana/Kazakhstan

Graz Tutorial **LEVEL I+II**
October 15-19, Graz/Austria

Visiting Scholarship Programmes **LEVEL II** (3 months)

Visiting Scholarship Programme Europe
Visiting Scholarship Programme USA
Visiting Scholarship Programme for
Chinese Radiologists - Jo Li

Exchange Programmes for Fellowships EUROPE **LEVEL III** (3 months)

Abdominal Radiology Fellowship
Breast Radiology Fellowship
Cardiac Radiology Fellowship
Head and Neck Radiology Fellowship
Hybrid Imaging Fellowship
Musculoskeletal Radiology Fellowship
Neuroradiology Fellowship
Oncologic Imaging Fellowship
Paediatric Radiology Fellowship
Thoracic Radiology Fellowship

Exchange Programme for Fellowships USA **LEVEL III** (6 months)

Breast Imaging Fellowship

One-year Fellowships **LEVEL III**

Abdominal Imaging
Hôpital Beaujon, Clichy/France
Breast Imaging
Hadassah Hebrew University Medical Center,
Jerusalem/Israel
Cardiac MRI
Medical University of Graz - LKH, Graz/Austria

Chest Radiology
Heidelberg University Medical Center,
Heidelberg/Germany

Imaging Biomarkers in Cancer
Champalimaud Foundation, Lisbon/Portugal

Interventional Neuroradiology
Hospital Clínic of Barcelona/Spain

Interventional Radiology
Radboud University Medical Center, Nijmegen/
The Netherlands

Neuroradiology/Head and Neck Radiology
Erasmus MC, University Medical Center, Rotterdam/
The Netherlands

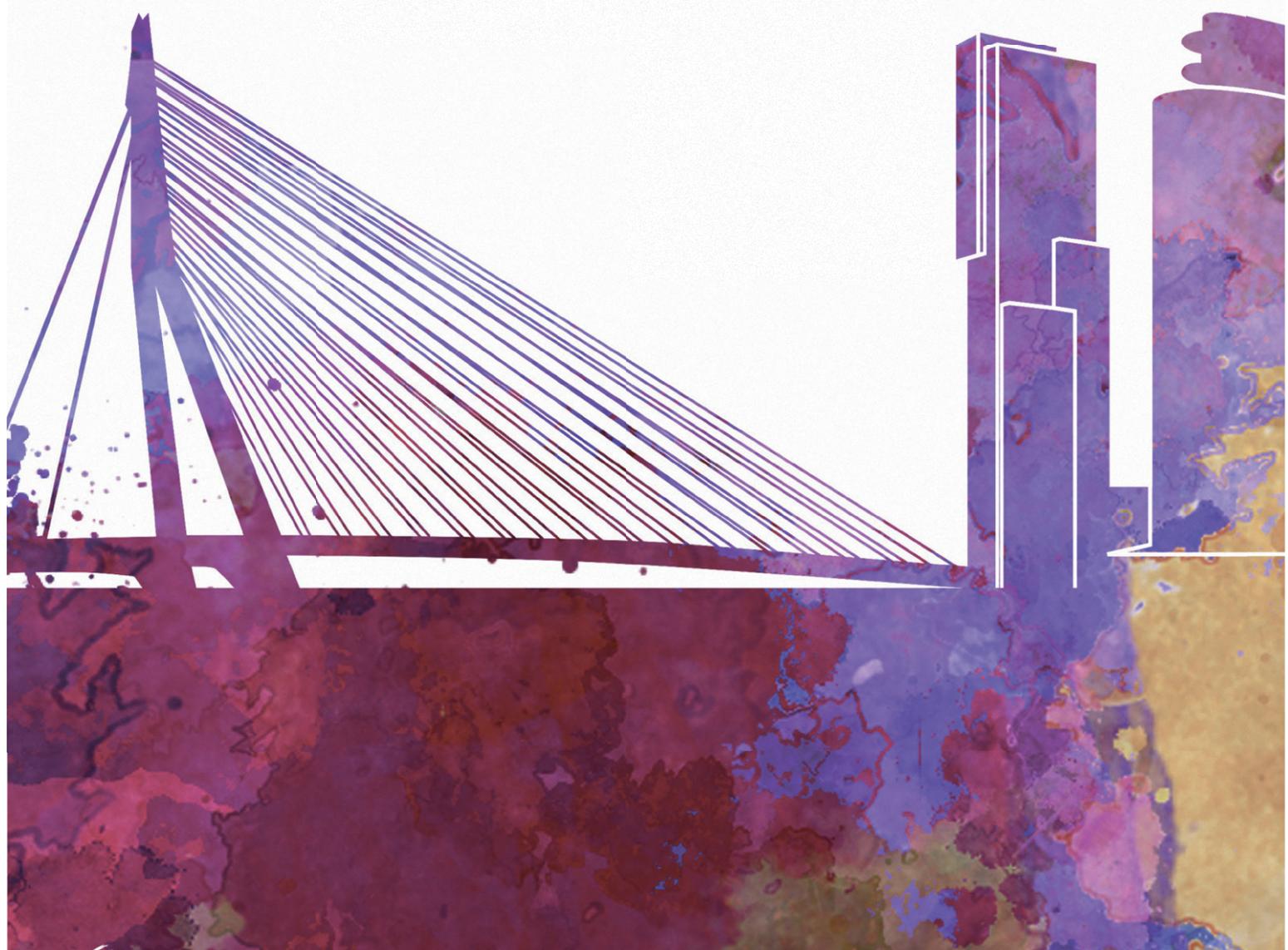
Paediatric Radiology
Hôpital Bicêtre, Le Kremlin Bicêtre/France

Bracco Fellowships **LEVEL II+III** (2 months / 4 months)

Clinical Fellowship
Management Fellowship
Research Fellowship

ESMRMB 2019 OCT. 3 – OCT. 5 ROTTERDAM/NL

36TH ANNUAL SCIENTIFIC MEETING



The European Forum
for MR research and clinical practice
www.esmrmb.org

ESMRMB

European Society for Magnetic Resonance in Medicine and Biology