ESOR
European School of Radiology

ESMRMB
European Society for Magnetic Resonance in Medicine and Biology

ESMRMB
SCHOOL OF MRI
Course Programme 2013

Body Diffusion–weighted MR Imaging: From Theory to Practice
April 4–6, Lisbon/PT

Clinical fMRI & DTI – Theory and Practice
May 30–June 1, Rotterdam/NL

Advanced MR Imaging of the Musculoskeletal System
July 4–6, Malta/MT

Advanced MR Imaging in Paediatric Radiology
September 5–7, Graz/AT

Advanced Cardiac MR Imaging
September 12–14, Marseille/FR

Advanced MR Imaging of the Chest
September 19–21, València/ES

Advanced Head & Neck MR Imaging
September 19–21, Krakow/PL

Advanced Neuro Imaging: Diffusion, Perfusion, Spectroscopy
October 17–19, Split/HR

Advanced MR Imaging of the Abdomen
October 24–26, Bruges/BE

Advanced Breast & Female Pelvis MR Imaging
November 7–9, Barcelona/ES

Advanced MR Imaging of the Musculoskeletal System
November 7–9, Bergen/NO

Advanced MR Imaging of the Musculoskeletal System – Spanish language
November 7–9, Bilbao/ES

MR Safety
November 21–23, Tübingen/DE

myESR.org/esor esmrmb.org

The ESMRMB School of MRI courses are exclusively sponsored by Bayer Pharma AG.

BAYER Bayer HealthCare

Education in partnership

ESR European Society of Radiology

The Power of Contrast

- Highest T1-shortening [1]
- Delivering high diagnostic efficacy [2]
- Macrocyclic compound – class with highest stability [3]

Gadovist® 1.0

Gadobutrol

EU.DI.05.2009.0093 January 2012

1 Rohrer M, Bauer H, Mintorovitch J, Requardt M, Weinmann HJ. Comparison of magnetic properties of MRI contrast media solutions at different magnetic field strengths. Investigative Radiology 2005; 40(11):715-724.
2 Tombach B, Bohndorf K, Brodtrager W, Claussen CD, Duber C, Galanski M, Grabbe E, Gortemuli G, Kuhn M, Gross-Fengels W, Hammerstingl R, Happel B, Heinz-Peer G, Jung G, Kittner T, Lapa la R, Lengsfeld P, Loose R, Oyen RH, Pavlica P, Pering C, Pozzi-Mucelli R, Persgehl T, Reimer P, Renken NS, Richter GM, Rummeny EJ, Schafer F, Szczerbo-Trojanowska M, Urbanik A, Vogl TJ, Hajek P.
Comparison of 1.0 M gadobutrol and 0.5 M gadopentate dimeglumine-enhanced MRI in 471 patients with known or suspected renal lesions: results of a multicenter, single-blind, interindividual, randomized clinical phase III trial. Eur Radiol 2008.
3 Frenzel T, Lengsfeld P, Schirmer H, Hutter J, Weinmann HJ. Stability of gadolinium-based magnetic resonance imaging contrast agents in human serum at 37 degrees C. Invest Radiol. 2008; 43(12):817-828.

Gadovist® 1.0 mmol/ml solution for injection. Composition: 1 mL solution for injection contains 604.72 mg gadobutrol (equiv. 1.0 mmol) as active ingredient. **Excipients:** calcobutrol sodium, tromethamol, hydrochloric acid, water for injections. **Indications:** This medicinal product is for diagnostic use only. Gadovist® 1.0 is indicated in adults, adolescents, and children aged 7 years and older for: Contrast enhancement in cranial and spinal magnetic resonance imaging (MRI), contrast enhanced MRI of liver or kidneys in patients with high suspicion or evidence of having focal lesions to classify these lesions as benign or malignant, contrast enhancement in magnetic resonance angiography (CE-MRA). **Contraindications:** Hypersensitivity to the active substance or any of the excipients. **Special warnings and precautions for use:** While injecting Gadovist® into veins with a small lumen there is the possibility of adverse effects such as reddening and swelling. The usual safety requirements for MRI, especially the exclusion of ferromagnetic materials, also apply when using Gadovist®. Hypersensitivity reactions, including anaphylactoid reactions ranging to shock, have been observed after administration of Gadovist®. To be able to react immediately to an emergency, medicinal products and equipment (e.g. endotracheal tube and respirator) should be within hand reach. Hypersensitivity reactions are not predictable; however in patients with an allergic disposition hypersensitivity may occur more often than in patients without such a disposition. In rare cases delayed anaphylactoid reactions (after hours to days) have been observed. Severe cardiovascular disease: Gadovist® should only be administered after careful risk/benefit assessment because only limited data are available so far. Gadovist® should be used with special care in patients: 1.) with known congenital long QT syndrome or a family history of congenital long QT syndrome; 2.) with known previous arrhythmias after taking medicinal products that prolong cardiac repolarisation; 3.) who are currently taking a medicinal product that is known to prolong cardiac repolarisation e.g. a Class III antiarrhythmic (e.g. amiodarone, sotalol). The possibility that Gadovist® may cause torsade de pointes arrhythmias in an individual patient cannot be excluded. Hypokalemia: Gadovist® should not be used in patients with uncorrected hypokalemia. Impaired renal function: Prior to administration of Gadovist®, it is recommended that all patients are screened for renal dysfunction by obtaining laboratory tests. There have been reports of nephrogenic systemic fibrosis (NSF) associated with use of some gadolinium-containing contrast agents in patients with acute or chronic severe renal impairment (GFR <30 ml/min/1.73m²). Patients undergoing liver transplantation are at particular risk since the incidence of acute renal failure is high in this group. As there is a possibility that NSF may occur with Gadovist®, it should therefore only be used in patients in the perioperative liver transplantation period after careful risk/benefit assessment, and if the diagnostic information is essential and not available with non-contrast enhanced MRI. Haemodialysis shortly after Gadovist® administration may be useful at removing Gadovist® from the body. There is no evidence to support the initiation of haemodialysis for prevention or treatment of NSF in patients not already undergoing haemodialysis. Elderly: As the renal clearance of gadobutrol may be impaired in the elderly, it is particularly important to screen patients aged 65 years and older for renal dysfunction. Seizure disorders: Like with other gadolinium containing contrast agents special precaution is necessary in patients with a low threshold for seizures. **Undesirable effects:** The following adverse reactions have been observed in clinical trials. Uncommon (≥ 1/1,000 to < 1/100): Headache, dizziness, paresthesia, dysgeusia, nausea, vasodilatation, injection site pain, injection site reaction. Rare (≥ 1/10,000 to < 1/1,000): Anaphylactoid reaction, parosmia, hypotension, dyspnoea, vomiting, urticaria, rash. The following additional adverse reactions have been reported from postmarketing spontaneous reporting: Rare (≥ 1/10,000 to < 1/1,000): Cardiac arrest, tachycardia, loss of consciousness, convulsion, conjunctivitis, eyelid oedema, respiratory arrest, bronchospasm, cyanosis, oropharyngeal swelling, cough, sneezing, face edema, hyperhidrosis, pruritus, erythema, circulatory collapse, flushing, feeling hot, malaise, anaphylactoid shock. **Additional safety information:** Short-lasting mild to moderate feelings of coldness, warmth or pain at the injection site have been uncommonly observed in association with the venous puncture or contrast medium injection. On paravascular injection Gadovist® may cause tissue pain lasting up to several minutes. Hypersensitivity reactions (e.g. urticaria, rash, vasodilatation) have been uncommonly reported and were mostly of mild to moderate intensity. In rare cases, anaphylactoid reactions ranging to shock may occur. Delayed anaphylactoid reactions (after hours to days) have been observed rarely. Patients with an allergic disposition suffer more frequently than others from hypersensitivity reactions. Isolated cases of renal impairment or renal impairment aggravation have been reported. Isolated cases of nephrogenic systemic fibrosis (NSF) have been reported with Gadovist®. **Date of revision of text:** June 2011 **Please note:** for current prescribing information refer to the package insert and/or contact your local Bayer HealthCare organisation. Bayer Pharma AG, 13342 Berlin, Germany. Adverse reactions can be reported to GPV.CaseProcessing@bayerhealthcare.com

Welcome from the Director of the School of MRI Programme

Dear Colleagues,

In 2013, the School of MRI, one of three ESMRMB educational programmes, will begin its 14th year of existence. Since its launch in 2000, 119 courses have been held all over Europe as well as some in the Middle East, Egypt and South Africa. During this time, our School has developed to become the leading educational programme within the field of applied MRI in Europe. In the early years the programme mainly had to fulfil the needs for a better understanding of the technique itself. Meanwhile the focus has moved towards a more detailed application and image interpretation in various fields of specialised imaging. So the evolution of the programme also reflects the evolution of radiology and other imaging disciplines.

Alongside this clinically driven development MRI has also evolved significantly with new imaging strategies, which constantly have to be integrated into the programme's various courses. MR imaging could yield new and promising information, for example functional information about flow or diffusion, which had to be integrated into new or existing courses. The latest of these new courses was the Body Diffusion Course with Dr. Dow-Mu Koh as course organiser, which took place in London for the first time in 2012. With the application of higher and higher field strengths, and more and more electronic devices being used in medicine, safety has become an important topic that requires more attention. Professor Siegfried Trattnig from the Medical University of Vienna has helped meet this demand with a new course on safety in MRI, which was also held for the first time in 2012.

On the basis of all this, we can start the year 2013 with a well-established programme of 13 courses in total, all on an advanced level, and all following the same didactic concept. Several factors have ensured the success of the programme:

- The quality and expertise of the lecturers and teachers is perhaps the most important factor. The selection of the best experts in Europe together with the long-standing involvement of the course organisers has helped guarantee the consistently high quality of the programme. Moreover, continuous evaluation of all teachers throughout the programme allows for improvement based on feedback from participants. Course organisers together with their faculty have created a learning curve over the year, which is the best way to meet the quality requirements of the School of MRI, no matter where the courses take place.
- From the evaluations we know that the most appreciated structural element of the course programme is the didactic concept of repeating every single topic after the lecture in small repetition classes of no more than 17 participants. This structure could be introduced into all School of MRI courses and it is the main theme of the entire programme. The concept is very popular, as similar initiatives in other societies have shown.
- Another element of the success of the School of MRI is the European approach and the international atmosphere with multinational faculties. The idea that all courses should rotate throughout European countries has led to a balanced distribution between northern, central, southern and eastern Europe and has made education available all over Europe. Since 2001 5.466 participants have come from 88 countries worldwide, 87% of them from Europe, 7,5% from Asia, 3,4% from Africa, and the rest from America and even Australia (38 participants).
- With its motto 'Education in Partnership', the ESR's European School of Radiology (ESOR) has built up a network of quality assured European educational programmes, including a partnership with the School of MRI. Within this partnership over the years our programme has become increasingly establishes within the radiological community. Today word of mouth promotion of the programme has been an important factor in the success of our School of MRI. It's also common for participants from one particular course to register for another course, or even repeat a course to increase their knowledge in the relevant field.
- Last but not least, the ESMRMB Office is without doubt the backbone of the School of MRI, which ensures consistency and excellent service. Today, a group of three people is responsible for the educational programmes within the ESMRMB Office and they are happy to answer any questions you may have.

I would be delighted to have the chance to welcome you to some of our courses in 2013. Within the School of MRI programme you will find plenty of opportunities to expand your knowledge within the field of MRI.

Prof. Wolfgang Steinbrich
Director of the ESMRMB School of MRI
Basel University, Switzerland

150 Years
Science For A Better Life

Welcome from our Sponsor

Magnetic Resonance Imaging (MRI) has continued to develop rapidly since its introduction as a clinical tool in the early 1980s. Since then, contrast agents and new developments in hardware and software have contributed significantly to improvements in clinical diagnosis. For the past 14 years, the School of MRI has provided the knowledge that radiologists need to know to keep pace with these changes. The success of the programme is due not only to the excellent quality of the courses provided, but also to the individual teaching in small workgroups, the experienced international experts involved, and the long-standing commitment of the organizers.

Bayer HealthCare is proud to support this unique programme as the exclusive sponsor. As a company with a long tradition in radiology we understand the demands and increasing economic pressure on today's radiology departments and practices. It is not just a matter of delivering consistently high diagnostic quality within a certain timeframe, it is also about ensuring patient safety dealing with methods such as in vivo MR Imaging, processing the growing amount of diagnostic data, and collaborating effectively with the referring physicians.

This constantly changing environment is also reflected in the way we as a company support our customers. In early 2012, Bayer integrated the contrast media franchise from the Pharmaceuticals division with the MEDRAD medical device business to form a single business called Radiology & Interventional (R&I). Bayer HealthCare Radiology & Interventional combines two successful businesses into a single source for contrast media, innovative fluid delivery devices and application services, intravascular diagnostic and therapeutic devices and accessories as well as excellent equipment-support services. We offer radiologists and physicians a wide range of high quality diagnostic and therapeutic products that are tailored to their individual requirements and needs. For example, only recently Bayer HealthCare announced a European label extension for gadobutrol for the diagnosis of diseases in whole-body MRI. Gadobutrol offers excellent image quality as well as such practical advantages as smaller injection volumes. And beyond this, we are also developing solutions with added value in informatics, services and, not least, in training and education.

MRI plays a crucial role in the diagnosis of a wide range of diseases from joint injuries to hepatic malignancies, and can help diagnose diseases as diverse as breast cancer, multiple sclerosis and pediatric disorders. Moreover, MRI's high spatial and temporal resolution reveals subtleties of cardiac anatomy, physiology and pathology. I wish you all the very best as you take part in these excellent training courses, and wish you a great learning experience.

Per Edlund
Head of Region Europe
Bayer HealthCare
Radiology & Interventional

Organisation Committee

Wolfgang Steinbrich
Director of the School of MRI
Radiologist, University of Basel/CH

Fred Avni
Radiologist, Department of Paediatric Radiology
Jeanne de Flandres Hospital, Lille/FR

Jens Bremerich
Radiologist, Department of Radiology
University Hospital of Basel/CH

Per Edlund
Bayer Pharma AG, Berlin/DE

Nicholas Gourtsoyiannis
Professor Emeritus, Department of Radiology
University of Crete/GR

Hans-Ulrich Kauczor
Radiologist, Department of Diagnostic
and Interventional Radiology
University Hospital of Heidelberg/DE

Dow-Mu Koh
Consultant Radiologist, Department of Radiology
Royal Marsden Hospital, London/UK

Rahel Kubik
Radiologist, Department of Radiology
Cantonal Hospital, Baden/CH

Roberto Maroldi
Radiologist, Department of Radiology
University of Brescia/IT

Marion Smits
Neuroradiologist, Department of Radiology
Erasmus MC, Rotterdam/NL

Siegfried Trattnig
Chairman of the ESMRMB Education & Workshop Committee
Medical Director of the Centre of Excellence for High-field MR
Department of Radiology
Medical University Vienna/AT

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

Kai Vilanova
Radiologist, Department of Radiology
University of Girona/ES

Johan Wikström
Radiologist, Department of Radiology
Uppsala University Hospital, Uppsala/SE

Course Secretariat
ESMRMB Office
Neutorgasse 9, 1010 Vienna, Austria
Phone: +43 1 535 13 06, Fax: +43 1 535 70 41
office@esmrmb.org
www.esmrmb.org
www.school-of-mri.org

ESMRMB OFFICE

Neutorgasse 9, 1010 Vienna, Austria
Phone: +43 1 535 13 06, Fax: +43 1 535 70 41
office@esmrmb.org
www.esmrmb.org
www.school-of-mri.org

Vienna, December 2012
Coordination: Denise Cosulich, Claudia Passuello
ESMRMB Office, Vienna/AT

Content

ESMRMB

European Society for Magnetic Resonance in Medicine and Biology

Join us to celebrate

30 years of the

ESMRMB Congress

ESMRMB 2013

30th Annual Scientific Meeting
October 3–5, Toulouse/FR

The European Forum for MR research and clinical practice

www.esmrmb.org

cnrs · Hôpitaux de Toulouse · Instituts thématiques · Inserm · Institut national de la santé et de la recherche médicale · Université de Toulouse · Université Paul Sabatier Toulouse III · SFRMBM

Goals of the Courses

Do you really know what k-space means, how to optimise contrast in MR images using a FLASH sequence, what a bSSFP 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 inborn heart defects and the optimal sequence to visualise cartilage? If you are easily able to answer all these questions, there is perhaps no need for you to sign up for one of the MR teaching courses of ESMRMB. If not, ESMRMB offers you the opportunity to enhance your knowledge and to get prepared for the needs of modern daily MR business.

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 at an advanced educational level. Participants should be physicians with well established knowledge in MRI physics and techniques. In addition they should have a minimum of 6 months of experience in applied MRI in the relevant field.

General Information

- All courses are held in English language.
  The course in Bilbao will be held in Spanish language.
- The duration of each course is of 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 are available at the ESMRMB website.
- 50% of the total teaching time is used for repetitions in small groups (maximum 17 people per group) to intensify the learning experience.
- A maximum of 65 places per course is available. If less than 30 participants register, 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 30 participants. The course on 'Advanced MR Imaging of the Musculoskeletal System' in Spanish language is limited to 80 participants.
- 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. Participants who have successfully passed the examination will be provided with a special confirmation of attendance on-site.

Filming and Recording Policy

Filming and recording during the courses is basically 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

The School of MRI programme is accredited by the European Accreditation Council for Continuing Medical Education (EACCME). A certificate of attendance will be handed out on-site for participation in the entire course.

Registration Information

For information regarding registration and registration fees, please refer to page 35.
Please note that registration is possible online at www.esmrmb.org

The Fine Art of Liver Imaging

Defining Liver Imaging

- **Mastership** [1]
  in detection, delineation and characterization
- **Masterpieces**
  of clear imaging support clear diagnosis and treatment
- **Master's degree** [2]
  in tolerability

Primovist®
Gadoxetic Acid

EU.DI.05.2009.0091 January 2012

1. Hammerstingl et al. Diagnostic efficacy of gadoxetic acid (Primovist)-enhanced MRI and spiral CT for a therapeutic strategy: comparison with intraoperative and histopathologic findings in focal liver lesions. Eur Radiol 2008; 18:457–467
2. Huppertz A, Balzer T, Blakeborough A et al. Improved Detection of Focal Liver Lesions at MR Imaging: Multicenter Comparison of Gadoxetic Acid–enhanced MR Images with Intraoperative Findings. Radiology 2004; 230:266–275.
Bluemke DA, Sahani D, Blakeborough A et al. Efficacy and Safety of MR Imaging with Liver-specific Contrast Agent: U.S. Multicenter Phase III Study. Radiology 2005; 237:89–98

Primovist® 0.25 mmol/ml, solution for injection, prefilled syringe (gadoxetate disodium) Prescribing Information (Refer to full Summary of Product Characteristics (SmPC) before prescribing) **Presentation:** Each ml solution for injection contains 181.43mg/ml gadoxetate disodium. **Indication:** Detection of focal liver lesions and providing information on the character of lesions in T1-weighted magnetic resonance imaging (MRI). **Posology and method of administration:** Observe usual safety precautions for MRI (eg. exclude cardiac pacemakers and ferromagnetic implants). Administer dose undiluted as an intravenous bolus injection at a flow rate of about 2ml/sec. After injection, flush cannula/line with 0.9% saline. Observe patients for at least 30 minutes after the injection. Recommended doses are: ***Adults:*** 0.1ml/kg body weight. ***Impaired renal function:*** Use of Primovist should be avoided in patients with severe renal impairment (GFR <30ml/min/1.73m²) and in patients in the perioperative liver transplantation period unless the diagnostic information is essential and not available with non-contrast enhanced MRI. If use cannot be avoided, dose should not exceed 0.025mmol/kg body weight. Do not use more than one dose per scan. Do not repeat the dose for at least 7 days. ***Paediatric population:*** Not recommended. No clinical experience yet available. ***Patients with hepatic impairment:*** No dose adjustment necessary. ***Elderly population (≥65yrs):*** No dose adjustment necessary. Exercise caution. **Contra-indications:** Hypersensitivity to active substance or to any excipients. **Warnings and precautions:** Gadolinium-containing contrast agents are contra-indicated in patients with acute renal failure (GFR <30ml/min/1.73m²) or hepatorenal syndrome in the perioperative liver transplantation period. Due to risk of nephrogenic systemic fibrosis (NSF), use with caution in patients with severe renal impairment (GFR <30–59ml/min/1.73m²) or perioperative liver transplantation period unless diagnostic information is essential and not available with non-contrast enhanced MRI. Haemodialysis shortly after Primovist administration may be useful at removing Primovist from the body, however there is no evidence that haemodialysis is suitable for prevention of nephrogenic systemic fibrosis (NSF). Please note, for current prescribing information refer to the package insert and/or contact your local Bayer healthcare organization. **Date of preparation: November 2011.** Adverse events can be reported to GVI.caseprocessing@bayer.com

Grant Programme

Grants for Residents offered by Bayer Pharma AG

Further to the exclusive sponsoring of the courses, Bayer Pharma AG offers up to 2 grants per course to residents in less developed countries. The grant covers the course fee and includes a contribution to lodging (€ 120).

Applicants are kindly invited to send:

- a letter of application
- a CV
- an attestation of the head of department confirming their resident status
- the grant application form

no later than **8 weeks** prior to the beginning of the relevant course to the ESMRMB Office.

Please note that it is possible to choose a maximum of three courses for which you would like to apply for a grant. However, you will only be able to receive a grant for one course in 2013.

Notifications of acceptance/rejection will be sent to all applicants 6 weeks prior to the course beginning.

Applicants have to be residents in the first 5 years of clinical radiological training.

Please note that for grant applicants from the host city only the registration fees will be waived (no contribution to lodging).

Please send your grant application to

ESMRMB Office
School of MRI Programme
Neutorgasse 9
AT-1010 Vienna
or by email to **office@esmrmb.org**

The grant application form is available online at www.school-of-mri.org

Become a member now!

Benefit from reduced fees for educational activities, online access to MAGMA and much more.

For further information refer to page 36.

Body Diffusion-weighted MR Imaging: From Theory to Practice

Grants available for **Body Diffusion-weighted MR Imaging: From Theory to Practice**
more information on page 9

European Multidisciplinarity for excellence in teaching

April 4–6, 2013
Lisbon/PT

Course organiser:
Dow-Mu Koh
London/UK

Local organiser:
Celso Matos
Brussels/BE

Course venue:
Champalimaud Foundation
Champalimaud Centre for the Unknown
Av. Brasília
1400–038 Lisbon
Portugal

Preliminary faculty:
F. De Keyzer, D-M. Koh, R. Maroldi, C. Matos, A. Padhani, H.P. Schlemmer, O. Sedlaczek, T. Takahara, H. Thoeny, I. Thomassin-Naggara

Course duration:
Thursday noon – Saturday evening

The aim of this course:
Diffusion-weighted MR imaging is increasingly utilised in the body in oncology to improve patient management. In this course, an expert panel will review the use of diffusion-weighted MR imaging according to regions of the body, highlighting the current and emerging roles for disease detection, disease characterisation, tumour response assessment, disease prognostication and the evaluation of disease relapse. The technical aspects of performing diffusion-weighted MR imaging in the body will be discussed. Other roles for the technique such as whole body imaging and the evaluation of inflammatory conditions will also be covered.

Participation requirements:
Participants should be physicians or technicians/radiographers who have basic knowledge in MRI techniques and are experienced in MRI (6 months minimum).

Learning Objectives

Principles of body diffusion-weighted MR imaging (DW-MRI) and technical optimisation
- Principles of DW-MRI
- Choice of imaging sequence
- Selection of b-values
- ADC quantification
- Sources and types of artefacts
- Technical optimisation to improve signal-to-noise and to reduce artefacts

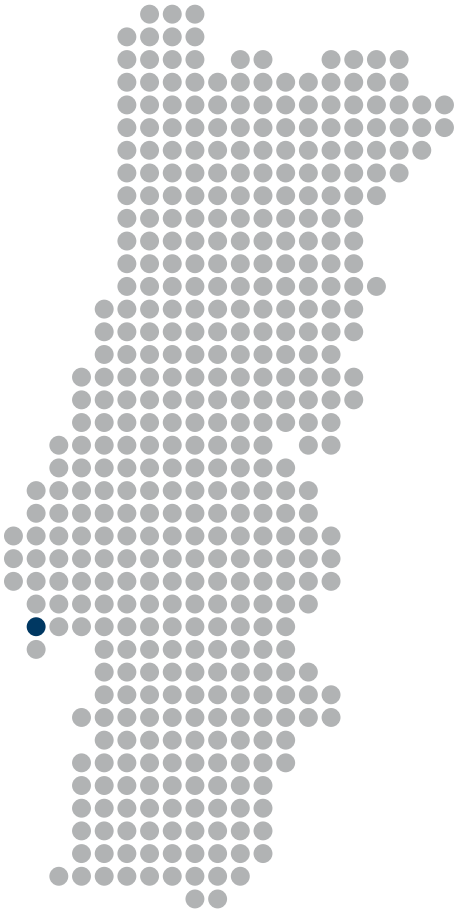
DW-MRI in the head and neck
- Implementation of DW-MRI in head and neck region
- Detection and characterisation of head and neck tumours
- Nodal assessment
- Treatment response assessment
- Residual and recurrent diseases
- Evaluation of salivary glands

DW-MRI in the thorax
- Technical implementation in the thorax
- Disease detection: lung and mediastinum
- Characterisation of benign and malignant lesions
- Assessment of tumour response
- Future developments

DW-MRI of the liver and abdomen
- Choice of imaging technique in liver and abdomen
- Implementation of DW-MRI in clinical protocols
- Applications in the cirrhotic and non-cirrhotic liver
- Applications in the pancreas
- Applications in the biliary tract
- Applications in the small bowel and colon
- Tumour detection, characterisation and assessment of treatment response

DW-MRI of the kidney
- Technical implementation in the kidneys and upper urinary tract
- Evaluation of renal function using DW-MRI
- Clinical applications of DW-MRI in diffuse renal disease
- Application of DW-MRI in the assessment of focal renal lesions
- Potential challenges

DW-MRI of the male pelvis
- Technical implementation in the male pelvis
- Choice of b-values
- Disease of the prostate: tumour versus benign prostatic hypertrophy
- Combining DW-MRI with morphological and other imaging
- Evaluation of diseases of the urinary bladder
- Evaluation of diseases of the rectum



DW-MRI of the female pelvis
- Technical implementation for evaluating the female reproductive organs
- Evaluation of diseases of the vagina
- Evaluation of diseases of the cervix
- Evaluation of diseases of uterus
- Evaluation of adnexal masses and the ovaries
- Tumour detection, characterisation and assessment of treatment response
- Practical usage in clinical routine

DW-MRI for the assessment of treatment response: why, when and how?
- Assessment of tumour response to treatment using validated criteria
- Impetus of using functional imaging techniques to assessment treatment response
- ADC as a quantitative metric for response assessment
- ADC reproducibility
- Evidence of using ADC to access tumour response to radiotherapy, chemotherapy, radiochemotherapy and minimally invasive treatments
- Unmet challenges

Whole-body MRI including DW-MRI: assessing bone and soft tissues
- Current challenges of evaluating metastatic bone disease and diffuse marrow involvement
- Impetus for whole body MRI and whole body DW-MRI
- Technical implementation
- Image interpretation and avoidance of pitfalls
- Normal evolution of marrow DW-MRI signal and ADC values
- Potential clinical applications

Non-oncological applications of body DW-MRI
- Key non-oncological applications of body DW-MRI
- MR neurography for evaluation of peripheral nerves: technical implementation and clinical application
- Evaluation of infective and inflammatory conditions in the body

City information Lisbon/Portugal

Population:	approx. 2.800.000 (Metropolitan Area)
Time zone:	CET -1
Currency:	EUR
Country dialling code:	+351
Closest airport:	Lisbon Portela International Airport (LIS)

Lisbon is a historical capital city with 800 years of cultural influences that mingle with modern trends and lifestyles creating intricate and spectacular contrasts, which are spread across its seven hills, providing a view over the majestic Tagus River. Lisbon is the only European capital with sandy beaches, which are within 20 minutes from the cobbled streets of Lisbon's city centre. There are also the luxuriant hills of nearby Sintra, an oasis of lush parks dotted with fairytale palaces, and Estoril, a cosmopolitan resort with Victorian-era charm. Other famous sights worth visiting include São Jorge Castle, Tower of Belem, Monastery of Jerónimos, Avenida da Liberdade, Sé Cathedral and Alfama Borough.

Transport:
Lisbon's Portela Airport is located within the city limits. Every day there is a special service named 'Aerobus'. This line connects the Airport to the city centre. It is a service with a special fare (only tickets sold on-board by the driver are valid) and runs every 20 minutes. The 'Linha vermelha' of the metro system also gets you to the city centre. Within the city, the major public transport companies – Carris and Metro – serve the entire city with regular buses, trams and subway services. Apart from these transport companies, there are more than 3.500 taxis operating in Lisbon.

Hotel information: www.school-of-mri.org

Clinical fMRI & DTI – Theory and Practice

Grants available for **Clinical fMRI & DTI – Theory and Practice** more information on page 9

May 30–June 1, 2013 Rotterdam/NL

Course organiser: Marion Smits Rotterdam/NL

Local organiser:
Marion Smits
Rotterdam/NL

Course venue:
Erasmus MC – University Medical Centre Rotterdam
Department of Radiology
's Gravendijkwal 230
3015 CE Rotterdam
The Netherlands

Preliminary faculty:
D. Jones, S. Lehéricy, A. Leemans, R. Peeters, M. Smits, S. Sunaert, 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 imaging (DTI). 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 will be taught using a mixture of lectures and small group exercises. Furthermore, there will be a practical session on a 3T MR system performing fMRI studies on healthy volunteers. A hands-on workshop on data analysis will also be provided. Finally, special attention is given to the (clinical) interpretation of specific cases. These cases include results from both routine presurgical fMRI examinations and more advanced fMRI (group) studies. We are happy to welcome you to this course in Rotterdam!

Participation requirements:
Physicians, technicians/radiographers and psychologists who have good knowledge of MR imaging; minimum 3 months experience in applied MR imaging and/or fMRI or DTI.

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 DTI
- Physiological principles of anisotropic diffusion
- DTI technique and imaging sequences
- Concepts of quantification of white matter integrity
- Concepts of fibre tractography

Experimental Design
- Technical set-up for fMRI
- Blocked versus event-related paradigms
- Paradigms: development, implementation and pitfalls

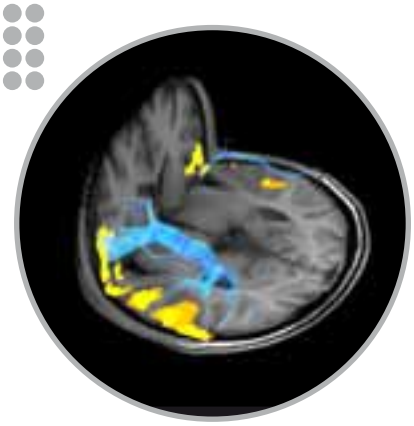
Data Analysis
- Spatial preprocessing
- Statistical analysis
- Fibre tractography

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

fMRI/DTI in Neurology
- Application in stroke
- Application in multiple sclerosis
- Application in neurodegenerative disease
- Plasticity

Presurgical fMRI/DTI
- Risk estimation in brain tumour patients
- Combining fMRI and DTI in brain tumour patients
- Challenges and pitfalls

fMRI/DTI in Psychiatry
- Applications in psychiatric disease
- Pharmacological fMRI
- Pitfalls



City information Rotterdam/The Netherlands

Population:	approx. 611.000
Time zone:	CET
Currency:	EUR
Country dialling code:	+31
Closest airports:	Rotterdam The Hague Airport (RTM), Amsterdam Schiphol Airport (AMS)

Rotterdam is the second largest city in the Netherlands and also one of the largest ports in the world. The city is of major importance to international commerce as it is ideally located on the Rhine-Meuse-Scheldt delta which flows into the North Sea. Apart from this, Rotterdam is famous for its Erasmus University which is named after Desiderius Erasmus Roterodamus, who was a humanist and theologian in the 15th century.
The impressive skyline of Rotterdam can be seen from afar, enhancing the city's already imposing appearance characterised by such landmarks as the Euromast observation tower and the swan-like curve of the Erasmus Bridge. Rotterdam is known in the Netherlands and abroad as a city of great architecture, featuring many examples of innovative construction. Rotterdam's museums offer a highly diverse range of collections and exhibits: from modern art to historical artefacts, from architecture to photography and from historical ships to exotic animals.

Transport
Rotterdam The Hague Airport is 6km northwest of the city of Rotterdam. It is easily accessible by public transport, by means of the RET bus line 33. The journey takes around 20 minutes and costs approximately € 5 when the ticket is bought on the bus and € 2 when the ticket is bought in advance (see www.ret.nl/en/ for bus times and ticket information). A taxi to Rotterdam city centre takes around 20 minutes and costs approximately € 30.
Amsterdam Schiphol Airport is well connected to Rotterdam and offers frequent train services to Rotterdam central station, located in the city centre. The journey takes around 30–45 minutes (see www.ns.nl/en/travellers/home for train times) and costs approximately € 11. Tickets need to bought before boarding the train. A supplement ticket of € 1,50 is required to use the fast train (Fyra). There are numerous airport taxi services that will charge around € 70–90 for a single journey when it is booked in advance. It is inadvisable to take a taxi without booking it in advance, as prices for a single journey are generally well over € 120.

Hotel information: www.school-of-mri.org

Advanced MR Imaging of the Musculoskeletal System

Grants available for **Advanced MR Imaging of the Musculoskeletal System**
more information on page 9

July 4–6, 2013
Msida/MT

Course organiser:
Prudencia Tyrrell
Oswestry/UK

Local organiser:
Ruben Depasquale
Msida/MT

Course venue:
Central Auditorium
Block C, Floor 3
Mater Dei Hospital
Msida MSD 2090
Malta

Preliminary faculty:
A. Baur-Melnyk, C. Glaser, A. Grainger, A. Karantanas, E. McNally, V. Pullicino, N. Theumann, P. Tyrrell, K. Verstraete, K. Wörtler

Course duration:
Thursday morning – Saturday noon

November 7–9, 2013
Bergen/NO

Course organiser:
Prudencia Tyrrell
Oswestry/UK

Local organiser:
Anagha P. Parkar
Bergen/NO

Course venue:
Haraldsplass Diakonale Høgskole
Ulriksdal 10
5009 Bergen
Norway

Preliminary faculty:
C. Czerny, C. Glaser, E. McNally, I. Noebauer-Huhmann, V. Pullicino, P. Robinson, N. Theumann, P. Tyrrell, F. VanHoenacker, M. Zanetti

Course duration:
Thursday morning – Saturday noon

The aim of this course:
MR Imaging of the musculoskeletal system is one of the most common requests in clinical routine work. MRI is more sensitive than x-rays and CT in the detection of tumours, degeneration, inflammation and sports injuries. However, specificity is often low and requires the knowledge of morphologic signs or specific sequence protocols. In this advanced course 10 topics are addressed: bone and soft-tissue tumours, hip/pelvis, bone marrow, knee, sports injuries, shoulder, elbow, hand and wrist, spine and foot/ankle. In each topic 4–5 challenging subjects are presented with anatomy, typical and atypical imaging examples and results from the recent literature. The course will be a combination of lectures and case based repetitions in small groups. We are looking forward to welcoming you to this international course, which is held by renowned clinical experts from Europe.

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

City information Msida/Malta

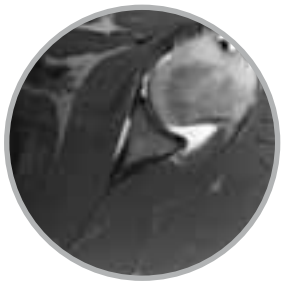
Population:	approx. 8.157
Time zone:	CET
Currency:	EUR
Country dialling code:	+356
Closest airport:	Malta International Airport (MLA)

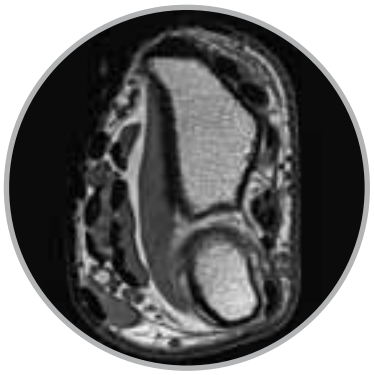
Msida or L-Imsida is a harbour town in Malta and is located just west of Valletta, the capital of Malta, on the northeast coast of the island. Malta is an island nation in the Mediterranean Sea just south of Sicily, Italy. The country of Malta is actually an archipelago, although only three of the largest islands are inhabited: Malta, Gozo, and Comino. Over the last 15 years, the island has become a major freight shipping hub, financial centre, and tourist destination. If any country deserves the reputation of a being a melting pot of cultures, Malta certainly does, having been ruled by the Phoenicians, Greeks, Carthaginians, Romans, Byzantines, Arabs and the Order of the Knights of St. John.

The name of the city of Msida comes from an Arabic word meaning 'a fisherman's dwelling' and the city was indeed once a fishing village. Although it is now more urbanised, some fishermen still operate from the city. Msida is a bustling university town and development has centred on a growing student population at the University, as well as various new service industries that have been set up in the town in recent years.

Transport:
The airport of Malta is only 8km from Msida. Public transportation in Malta is operated by 'Arriva Malta'. With the airport express services X4 as well with other bus lines you can easily get to Msida. The cities on the island of Malta are well connected with several bus lines, and the bus company offers an online journey planner via their website at www.arrriva.com.mt.
Taking a taxi from the airport of Malta to Msida costs approx. € 15.

Hotel information: www.school-of-mri.org





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
- Lesions of the muscle tendon unit including myositis ossificans
- Athletic groin injuries
- Sports injuries of fingers and toes

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

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

Hand + Wrist
- How I perform, read and report an exam of the wrist
- TFCC Lesions
- Carpal instability
- Tumours of the hand and wrist

Spine
- Disc degeneration and disc prolapse
- Spondylodiscitis
- Sero-negative spondylarthropathies
- Sacrum and sacroilitis

Foot/Ankle
- How I perform, read and report a foot exam (including ligaments and tendons)
- Variants sometimes causing disease
- Bone marrow edema: Transient osteoporosis – osteonecrosis – mechanical stress reaction
- Nerve entrapments including Morton´s neuroma and its differential

City information Bergen/Norway

Population:	approx. 264.000
Time zone:	CET
Currency:	NOK (Norwegian Krone)
Country dialling code:	+47
Closest airport:	Bergen Airport, Flesland (BGO)

Ever since its foundation in 1070, Bergen has attracted people from all over the world. Today Bergen is a centre of arts and culture, aquaculture, offshore petroleum industries and higher education. Bergen is located in the region of Hordaland on the southwestern coast of Norway. It is an important cultural hub in its region, recognised as the unofficial capital of western Norway and sometimes also referred to as the capital of Norway's Atlantic coast. The city was one of nine European cities honoured with the title 'European Capital of Culture'. Bergen's city centre is situated among a group of mountains collectively known as 'de syv fjell' (the seven mountains). The most famous sights of Bergen are the fish market, Håkon's Hall, Fantoft Stave Church as well as the Old Hanseatic wharf, Bryggen.

Bergen features a temperate oceanic climate with relatively mild winters and cool summers. Despite being so far north, Bergen's weather is relatively mild.

Transport:

Bergen has an international airport, Bergen Airport, Flesland, with direct flights to several European cities. The Airport Flesland is situated about 20km southwest of the centre of Bergen. To go to the city centre by taxi takes approx. 25 min and costs around € 35. An airport bus line operates between Bergen Flesland Airport and the centre of Bergen every 15 – 20 minutes. The ticket costs approx. € 11. Bergen is mainly served by the E39 (leading to Trondheim and Stavanger) and the E16 (leading to Oslo). Drivers have to pay a toll to enter the city centre. The Bergensbanen railway line runs east to Voss, Geilo, Hønefoss and Oslo. Express buses go to all major destinations in Norway.

Hotel information: www.school-of-mri.org

Advanced MR Imaging in Paediatric Radiology

Grants available for **Advanced MR Imaging in Paediatric Radiology**
more information on page 9

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September 5–7, 2013
Graz/AT

Course organiser:
Fred Avni
Lille/FR

Local organiser:
Michael Riccabona
Graz/AT

Course venue:
LKH Univ.-Klinikum Graz
Auenbruggerplatz 34
8036 Graz
Austria

Preliminary faculty :
F. Avni, M. Beer, A. Borthne, L. Guibaud, O. Olsen, L.S. Ordning-Mueller, J. Schneider, A.M. Smets, E. Sorantin, B. Tilea

Course duration:
Thursday morning – Saturday noon

The aim of this course:
With this course, we intend to familiarise the attendees with MR Imaging in children so that the indications would be better understood and the examinations optimised. The ten topics that have been chosen cover most of nowadays indications. Experienced lecturers have been chosen according to their technical and pedagogic skills.

Participation requirements:
Physicians and technicians/radiographers who have good knowledge in MR techniques; minimum of 6 months experience in applied Paediatric MRI.

Learning Objectives

MRI of the Fetus
- To revisit what we need to know form fetal development, anatomy and physiology
- To discuss the best indications and sequences of fetal MR imaging
- To illustrate anomalies affecting the fetal brain, chest and abdomen

Techniques of MRI in Children
- To describe the environment and monitoring indispensable for a successful examination
- To describe tricks and essential aspects of tailoring MRI sequences particularly for small children, and properly chose and then optimise the sequences for paediatric examinations
- To address modern techniques such as non-enhanced MRA, diffusion weighted imaging, 3T MRI, BOLD imaging, etc. and their applications in children

Oncology MRI and Full Body Applications
- To describe indications for MRI in relation to CT for oncology imaging
- To address MRI in paediatric tumour assessment & staging as well as follow-up (as far as not included in the other talks)
- To demonstrate potential new future MR applications in this field

MRI of the Liver and Biliary Ducts
- To illustrate MRI applications in the paediatric liver, including biliary tract evaluation and liver tumour imaging
- To address specific (technical) challenges for liver and biliary tract MRI in neonates and infants
- To address restrictions and role of other imaging in the child

MRI in the paediatric nervous system part I
- To describe the role of MRI in assessing paediatric tumours of the brain, the spinal cord and peripheral tumours
- To address modern techniques useful for these applications
- To revisit benign and syndromatic tumorous nervous system masses and their differential

MRI in the paediatric nervous system part II
- To illustrate the role and indication for MRI in assessing congenital anomalies of the spine and brain as well as metabolic disease in neonates infants and children
- To discuss the value and applicability of MRI in neonatal and childhood HIE
- To address the role of MTI in infectious nervous system conditions

Musculoskeletal MRI: Joints and Tumours
- To describe successful techniques for joint and bone MRI in children and their various applications (e.g. Perthes, malformations, etc.)
- To address the role of MRI in paediatric bone (marrow) and muscle tumours

Musculoskeletal MRI: Infection, trauma, etc.
- To describe the role of MRI in typical paediatric musculoskeletal inflammatory conditions
- To describe the value of MRI in imaging paediatric musculoskeletal trauma
- To address the role of chest MRI in relation to other imaging modalities

Chest MRI in children
- To describe successful techniques for performing chest and lung MRI in children
- To describe the value and limitations of MRI in imaging the lung and the chest wall in children
- To address the role of chest MRI in oncologic queries (i.e. tumours and lung metastasis)
- To address modern and more recent applications or techniques in tumour imaging (e.g. whole body imaging, DWI, MR-Spectroscopy, etc.)

Genitourinary MR Imaging
- To discuss the strategy for the work-up of congenital urinary tract malformations
- To discuss the role of uro-MRI in the assessment of renal function
- To demonstrate the potential of MRI in assessment of paediatric genital anomalies
- To discuss the use of MRI for other urogenital conditions such as inflammation, VUR, MRA, cysts, transplants, etc.

Cardiovascular Imaging: MR(A) versus CT(A)
- To discuss the strategy of imaging cardiovascular anomalies in neonates, infants and children
- To illustrate the strengths and limitations of the respective technique
- To revisit basic and advanced MR techniques for imaging the paediatric cardiovascular system, with focus on the respective individual needs for all age groups

City information Graz/Austria

Population:	approx. 265.300
Currency:	EUR
Time Zone:	CET
Country dialling code:	+43
Closest airport:	Graz Airport (GRZ)

Graz is the second-largest city in Austria after Vienna and the capital of the federal state of Styria. Graz has a long tradition as a student city: its six universities have over 40.000 students. Graz's old town is one of the best-preserved city centres in central Europe and has been designated a World Heritage site. The main landmark of Graz is its clock tower located on the famous 'Schlossberg' hill, easily accessible by elevator or by foot, with spectacular views. The mannerist-Baroque Mausoleum of Emperor Ferdinand II and the double spiral staircase in the 'Burg', a castle complex built between 1438 and 1453 that today houses the government of Styria, should not be missed when visiting Graz. The oldest settlement within the modern city of Graz dates back to the Copper Age. In Slovenian, 'gradec' literally means `small castle.' The German name 'Graz' was first used in 1128. The weather in Graz is Mediterranean-influenced and it has more hours of sunshine than Vienna or Salzburg, with less wind and rain per year.

Transport:
Graz airport, also known as 'Thalerhof', is around 9km south of the city centre.
The approximate fare from the airport to the centre by taxi is between € 20–25. Bus lines 630 and 631 stop at Jakominiplatz (the central point of public transport). Train line ('S-Bahn') S5 connects to Graz main station taking 15 minutes at a fare of approx. € 2 for a single ticket.
Although the best way to discover the city is by walking, the well-developed public transport network offers a great deal of flexibility, with the well-priced Graz 3-day ticket allowing you to explore the city for the fee of € 10,90 per person.

Hotel information: www.school-of-mri.org

Advanced Cardiac MR Imaging

European Multidisciplinarity for excellence in teaching

September 12–14, 2013
Marseille/FR

Course organiser:
Jens Bremerich
Basel/CH

Local organiser:
Alexis Jacquier
Marseille/FR

Course venue:
Université de la Méditérranée
Faculté de Médecine de Marseille
27 Boulevard Jean Moulin
13385 Marseille Cedex 5
France

Preliminary faculty:
J. Bremerich, P. Buser, M. Carlsson, F. Kober, A. Redheuil, D. Didier, P. Hunold, A. Jacquier, G. Lund, L. Natale

Course duration:
Thursday morning – Saturday noon

The aim of this course:
MRI has evolved to a valid clinical tool in everyday practice. Its unique capabilities of imaging cardiac morphology and function with excellent spatial, temporal and contrast resolution explain its outstanding role in imaging cardiac disease. Successful cardiac imaging requires thorough knowledge of both, pathology and modality. Beginners and advanced course participants learn basic principles of cardiac MR and review dedicated protocols. 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 will be 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 and technicians/radiographers who have good knowledge in MR techniques; minimum of 6 months experience in applied Cardiac MRI.

Grants available for **Advanced Cardiac MR Imaging**
more information on page 9

Learning Objectives

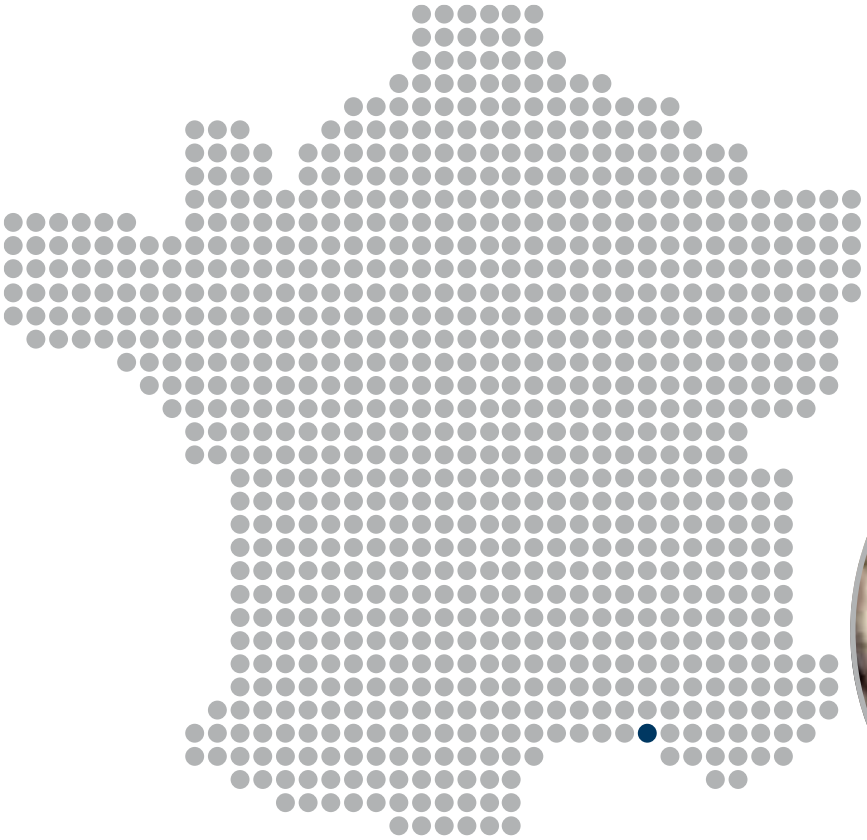
Tissue Characterisation
- T1, T2, T2*-weighted sequences
- Late enhancement
- Sarcoidosis
- Amyloidosis
- Hemosiderosis, Thalassemia
- Myocarditis

Heart Failure
- Definition
- Pathophysiology
- Clinical presentation
- Treatment options

Protocols Step-by-Step, Safety
- Set-up for stress test
- Safety considerations
- Dedicated protocols
- Cooperation Radiology/Cardiology/Physics

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



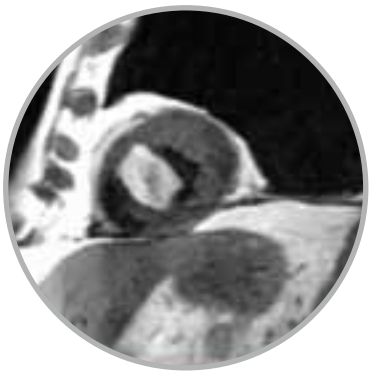
Congenital Heart Disease
- Segmental analysis
- Grown up congenital heart disease
- MR or CT
- Regurgitation, Insufficiency

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 Marseille/France

Population:	approx.1.582.000
Time zone:	CET
Currency:	EUR
Country dialling code:	+33
Closest airport:	Marseille Marignange-Provence Airport (MRS)

Marseille is the second most populated city in France, its largest Mediterranean port and the economic centre of the Provence-Alpes-Côte d'Azur region. Marseille has a complex history. It was founded by the Phoceans in 600 BC and is one of the oldest cities in Europe. Its population is a melting pot of different cultures. The people of Marseille have varying ethnic backgrounds, with a lot of Italians and Spanish having immigrated to the area after the Second World War. From colourful markets (like Noailles market) that will make you feel like you are in Africa, to the Calanques (a natural area of big cliffs falling into the sea – Calanque means fjord), as well as the Panier area (the oldest part of the town and historically the place where newcomers settled), the Vieux-Port (old harbour) and the Corniche (a road along the sea), there is plenty to see and do.

Transport:
The airport is located about 30km from the city of Marseille. Buses, taxis and trains connect the airport with the city in less than 30 minutes. Airport transfers are available for € 8,50 each way to/from Gare St. Charles (the main railway station). It is well linked to the rest of the city, as two subway lines and many buses stop there. Marseille is served by a public transport system, the 'Régie des Transports de Marseille' (RTM) made up of two underground lines, two tram lines and 74 bus lines. The tickets for bus/metro can be bought in cafes, underground stations, or on the bus; a single ticket costs € 1,50, a 10 journey ticket costs approx. € 12,80.

Hotel information: www.school-of-mri.org

Advanced MR Imaging of the Chest

September 19–21, 2013
València/ES

Course organiser:
Hans-Ulrich Kauczor
Heidelberg/DE

Local organisers:
Lucía Flors
Luis Martí-Bonmatí
José Vilar
València/ES

European Multidisciplinarity for excellence in teaching

Grants available for **Advanced MR Imaging of the Chest**
more information on page 9

Course venue:
Escola Valènciana d'Estudis de la Salut (EVES)
C/ Juan de Garay nº 21
46017 València
Spain

Preliminary faculty:
J. Biederer, H.-U. Kauczor, F. Laurent, F. Molinari, M. Puderbach, G. Sommer, E. van Beek, J. Vogel-Claussen, J. Wild

Course duration:
Thursday morning – Saturday noon

The aim of this course:
Technical advances have opened up more and more diagnostic applications in MRI of the chest. It plays an increasing role in chest radiology even in a routine clinical setting. This course will offer an overview of current and easy-to-use MRI strategies including morphological and functional imaging for the diagnosis of pulmonary diseases as well as pulmonary and mediastinal vascular diseases and congenital anomalies. Established as well as potential future indications will be reviewed and compared to other imaging techniques. Since MRI of the chest is still a rather infrequent request in clinical routine work, there are some deficits of expertise and lack of confidence when MRI of the chest is to be performed. Although MRI has a lower spatial resolution than CT, which is the gold standard for imaging the pulmonary parenchyma, MRI offers a unique package combining structural and functional image-based information. MRI provides images and quantitative data about the different aspects of pulmonary disease, lung function and cardiopulmonary interaction. The course will be a combination of lectures and case-based interactive teaching in small groups. We are looking forward to welcoming you to this international course, which is held by renowned clinical experts from Europe in the beautiful city of València.

Participation requirements:
Physicians who have good knowledge in MR techniques; minimum of 6 months experience in applied MRI of the chest, abdomen, heart or vascular system.

Learning Objectives

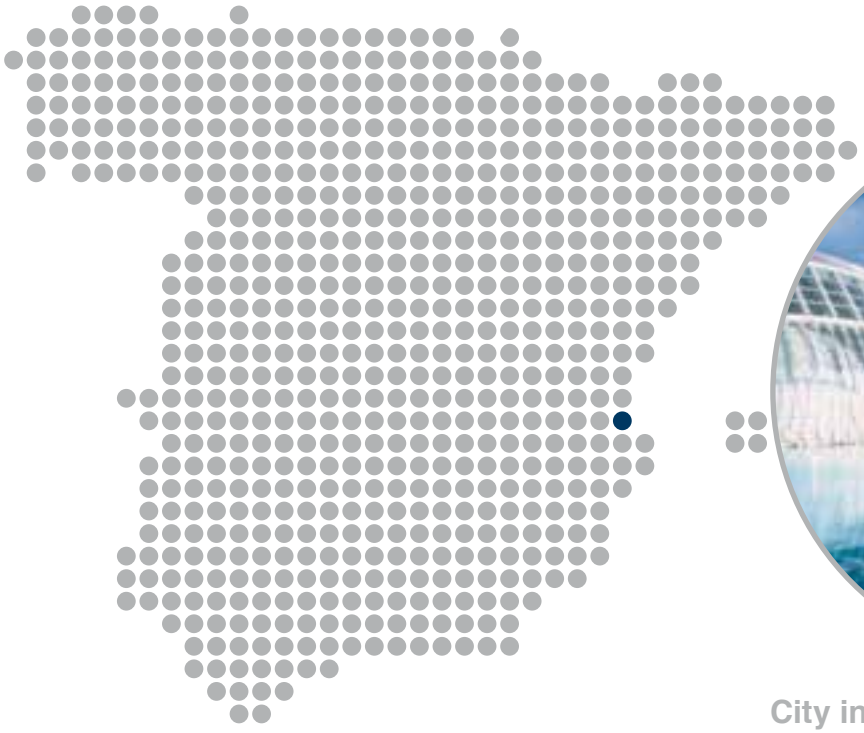
Techniques
- Signal and contrast optimisation
- Respiratory motion and pulsation
- Suggested standard protocol
- MRA and perfusion imaging
- Flow measurements and cardiopulmonary interaction
- Proton-based ventilation imaging
- Non-proton imaging
- Paediatric and prenatal protocol

Vascular Disease
- Acute pulmonary embolism
- Pulmonary hypertension
- Vascular anomalies

Airway Disease
- Cystic Fibrosis
- Obstructive lung disease: asthma, COPD
- Paediatric lung diseases

Inflammatory Disease
- Pneumonia
- Tuberculosis
- Pneumonitis

Neoplastic Disease
- Pulmonary nodules
- Lung cancer staging
- Pleural and chest wall tumours
- Mediastinal tumours
- Pulmonary staging in whole body MRI



City information València/Spain

Population:	approx. 798.000
Time zone:	CET
Currency:	EUR
Country dialling code:	+34
Closest airport:	València Airport (VLC)

València is the capital of the region of València in eastern Spain. Founded in 138 BC, València is a living museum that reflects the rich history and different cultures that have influenced the town. In València you will find a wonderful mix of the old and the avant-garde.
With approximately 2.700 hours of sunshine per year, València enjoys an excellent average temperature of 20° Celsius. Perhaps it's the pleasant climate and the ever-present sunshine that make València such a vibrant city, with countless open-air bars, restaurants and, above all, people out in the streets. The fruit and vegetables of this fertile land as well as the abundance of fresh seafood provide the main ingredients of its exquisite Mediterranean-style cuisine.
The centre of València nightlife is the Barrio del Carmen, in the heart of the old town. There are restaurants, quiet cafes, lively open-air terraces, and all sorts of bars and discos where you can listen to the latest sounds or dance the night away.
When visiting València, tourists should visit the following important and impressive sights of this lively city: Plaza del Mercado, La Ciudad de las Artes y las Ciencias, La Catedral, Torres de Serranos, Iglesia de San Juan del Hospital, El Puerto y la Playa and the Monasterio de San Miguel de los Reyes.

Transport:
València Airport is 8km from the city centre. Major European airlines operate from València airport such as Lufthansa, Ryanair, Spanair, Vueling, Brussels Airlines, Alitalia, Norwegian Airlines, EasyJet, Swiss and many more.
There is a direct bus service from the city centre to the airport (Aero-Bus), operating every 20 minutes from 6:00 am to 10:00 pm at an approx. price of € 2,50.
The bus stops at Av. del Cid with Burgos Street (Local Police Headquarters), Bailén (G.V.Ramón y Cajal tunnel), Ángel Guimerá with Juan Llorens Street.
Underground lines 5 and 3 also serve the airport.
A taxi from the airport to the city centre costs approx. € 17.

Hotel information: www.school-of-mri.org

Advanced Head & Neck MR Imaging

Grants available for **Advanced Head & Neck MR Imaging** more information on page 9

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September 19–21, 2013 Krakow/PL

Course organiser: Roberto Maroldi Brescia/IT

Local organiser:
Andrzey Urbanik
Krakow/PL

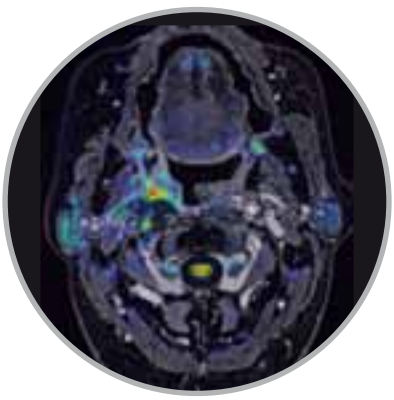
Course venue:
Andrzej Frycz Modrzewski Kraków University
Gustawa Herlinga-Grudzińskiego 1
30–705 Kraków
Poland

Preliminary faculty:
A. Borges, C. Czerny, F. de Keyzer, D. Farina, N. Freling, R. Maroldi, B. Schuknecht, A. Trojanowska, 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
- 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
- Imaging arteries and veins. Black blood, TOF, PC, CE-MR

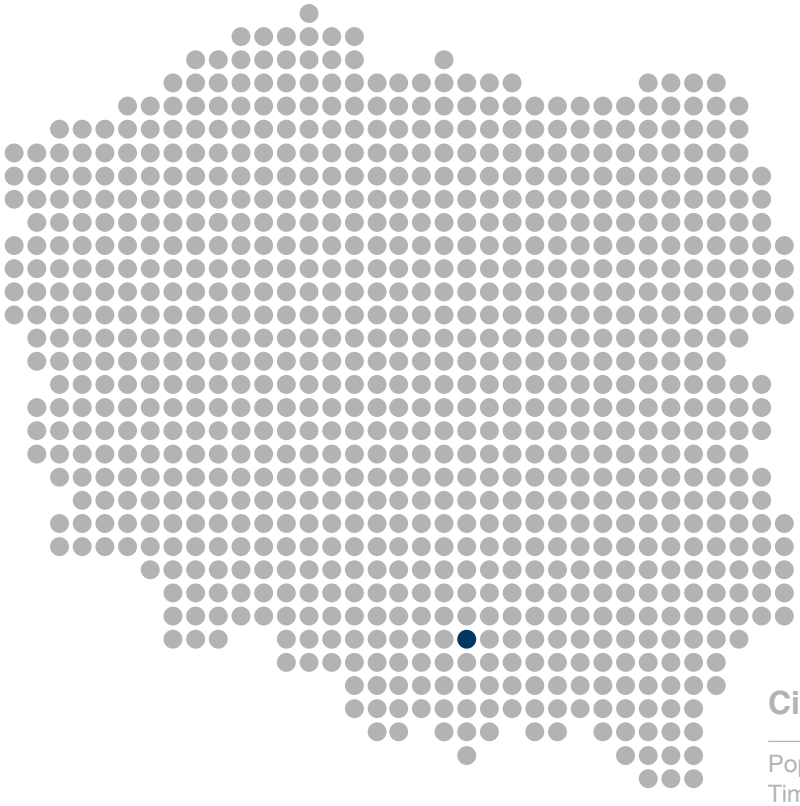
MR Signal of Normal and Abnormal Tissues
- Normal and abnormal fat on different sequences
- The signal intensity of water, CSF, mucus, saliva, and 'cysts'
- The cortical and cancellous bone. Erosion, sclerosis, invasion
- The normal mucosa. Edema and scar
- Normal findings of cranial nerves, arteries, veins, and dural sinuses

MR Imaging of the supra and infrahyoid spaces in the neck
- Compartment organisation of the suprahyoid spaces
- Compartment organisation of the infrahyoid spaces
- Patterns of expansile lesions growth: which influence on diagnosis?
- How to image the lower infrahyoid neck?

MR Imaging of the Sinonasal Tract and the Skull Base
- MR anatomy of the anterior skull base floor, orbit, pterygopalatine fossa, cavernous sinus and Meckel's cave
- MR examination of the sinonasal tract and anterior skull base
- Polypoid masses. Feasibility of endonasal surgery. Grading skull base invasion. MR in predicting orbit preservation

MR Imaging of the Nasopharynx and Parapharyngeal Space
- MR anatomy of the nasopharyngeal walls and parapharyngeal space
- How to study the nasopharynx and parapharyngeal space lesions
- Differential diagnosis of submucosal masses
- MR patterns of pre- and post-styloid masses
- Staging nasopharyngeal neoplasms

MR Imaging of the Oropharynx and Oral Cavity
- MR anatomy of key oral cavity structures
- MR strategies to image flaps and post-treatment changes
- Role of DCE-MR and DWI imaging
- Role of MR in detecting mandible invasion. Perineural spread and bone invasion



City information Krakow/Poland

Population:	approx. 757.600
Time zone:	CET +1
Currency:	PLN (Polish Zloty)
Country dialling code:	+48
Closest airports:	John Paul II Kraków-Balice Airport (KRK), Katowice Airport (KTW)

Krakow, Poland's ancient royal capital is one of the great survivors of this part of Europe. And much like the embattled old countess, who managed to come through the war and the Soviet era, it is a proud city having retained much of its splendour. It is the kind of place where each day you can stumble across something that you haven't noticed before – a little baroque church, a hidden courtyard, or perhaps just one of the myriad gargoyles and culptures that peer down from the city's houses. Krakow's seven universities (the most famous is agiellonian University established in 1364), plus almost twenty other institutions of higher education, make it the country's leading centre of science and education. When in Krakow, you should really visit the Rynek Główny (market), Kazimierz (the old Jewish district of Krakow), the Royal Castle, the cathedral, and the salt-mines Wieliczka. The temperatures in Krakow can vary enormously, with temperatures of -20˚C not uncommon in winter and 30˚C during summer. Autumn can be surprisingly mild, with t-shirt weather lasting until October or even November (known as 'Golden Autumns').

Transport:

If you plan to fly to Krakow, you have two options: Krakow or Katowice.

Krakow has its own airport, appropriately named after Pope John Paul II, who was born near the city. It takes around 30 minutes by taxi to go to the city and costs approx. PLN 90. There are also buses as well as trains, which can take you from the airport to the city.

A fair number of routes also land at nearby Katowice airport. The Matuszek Buses connect the city of Krakow with the Katowice airport. The Krakow's main railway station is within walking distance of the city centre. An important thing to remember when taking taxis in Krakow is to avoid taking one from a rank on the street. You will pay 30% less if you order one by phone. The network of trams and buses is cheap and efficient. Buy your tickets from any of the little kiosks that are dotted around the town.

Hotel information: www.school-of-mri.org

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

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 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 Temporal Bone 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
- DW imaging
- Inner ear malformations: is cochlear implant feasible? Neuro-vascular conflict. Detecting the recurrent cholesteatoma

MR Imaging of the Orbit

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

Photo of Krakow by Marcin Jochimczyk

Advanced Neuro Imaging: Diffusion, Perfusion, Spectroscopy

Grants available for **Advanced Neuro Imaging: Diffusion, Perfusion, Spectroscopy**
more information on page 9

October 17–19, 2013
Split/HR

Course organiser:
Johan Wikström
Uppsala/SE

Local organiser:
Liana Cambj Sapunar
Split/HR

Course venue:
University of Split
School of Medicine
Soltanska 2
21 000 Split
Croatia

Preliminary faculty:
A. Björnerud, S. Brockstedt, E.R. Danielsen, J. Hald, L. Knutsson, R. Kreis, E.M. Larsson, M. Smits, J. Wikström, W. Van Hecke

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 Split 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.

European Multidisciplinarity for excellence in teaching

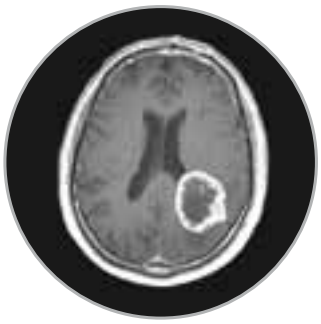
Learning Objectives

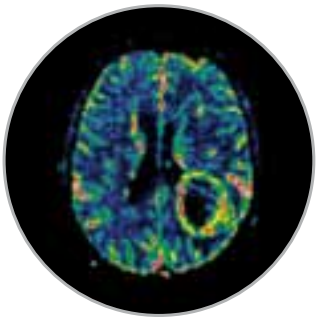
Diffusion (dMRI: DWI and DTI)
- Basic mechanisms
- Isotropic diffusion
- Anisotropic diffusion
- The ADC concept
- Pulse sequences and acquisition techniques
- Diffusion tensor imaging
- Introduction to axonal fibre tracking and q-space imaging
- Pitfalls, practical issues, implementation

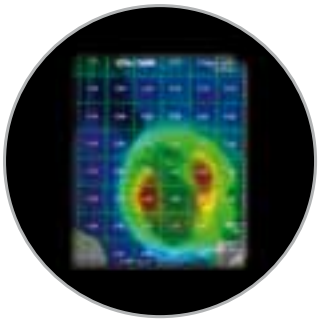
Perfusion (pMRI or PWI)
- Basic Physiology
- Dynamic Susceptibility Contrast (DSC) methods
- Pulse sequences
- Modelling, implementation and pitfalls
- Convolution and deconvolution
- Advanced modelling, heterogeneity, leakage correction
- Arterial spin labelling (ASL)

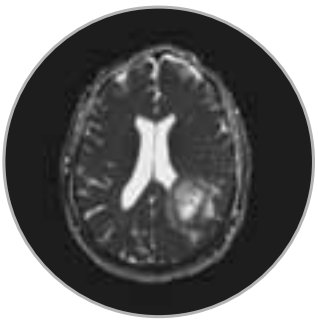
Clinical Applications of dMRI and pMRI
- Stroke
- Epilepsy
- Brain tumours
- Infection/inflammation
- Dementia
- Trauma
- Metabolic diseases

MR Spectroscopy (MRS)
- Basic principles
- Sequences for proton spectroscopy
- Postprocessing
- Metabolite quantification
- Quality Control and artefacts
- Clinical aspects
- Interpretation
- Pitfalls
- Applications









City information Split/Croatia

Population:	approx. 178.200
Time Zone:	CET
Currency:	HRK (Croatian Kuna)
Country dialling code:	+385
Closest airport:	Airport Split-Kaštela (SPU)

Split is the second largest city in Croatia and as the centre of Dalmatia the largest city on the eastern shores of the Adriatic Sea. With its Mediterranean climate and its wonderful old town around the famous Diocletian Palace this lively city is definitely worth to visit. Founded as a Greek colony in the 6th century BC, Split received important influence from the Roman Emperor Diocletian, the Byzantine Empire and the Venetian Republic in the following centuries. Apart from the Diocletian Palace the bell tower of St. Duje Cathedral and Saint Dommios Cathedral are city's major sights. Spread over a peninsula Split's greater area includes the surrounding seaside towns as well. As a regional transport hub the city is a link to numerous Adriatic islands especially the well-known islands of Brač and Hvar as well as to attractive touristic destinations along the coast of middle Dalmatia. In general the area around Split is counted to be one best destination for water sports, especially sailing in the whole Mediterranean Sea.

Transport:
Split-Kaštela Airport is one of the most important airports in Croatia. The airport is about 25km west of Split, near the city of Trogir. Airport buses run from the terminal to the city and stop at the eastern end of 'Riva', the waterside promenade along the Diocletian palace.
Tickets can be bought at kiosks or from the bus driver. Only single-journey tickets can be bought on the buses.

Hotel information: www.school-of-mri.org

Advanced MR Imaging of the Abdomen

Grants available for **Advanced MR Imaging of the Abdomen**
more information on page 9

October 24–26, 2013
Bruges/BE

Course organiser:
Nicholas Gourtsoyiannis
Iraklion/GR

Local organisers:
Celso Matos
Brussels/BE
Kenneth Coenegrachts
Bruges/BE

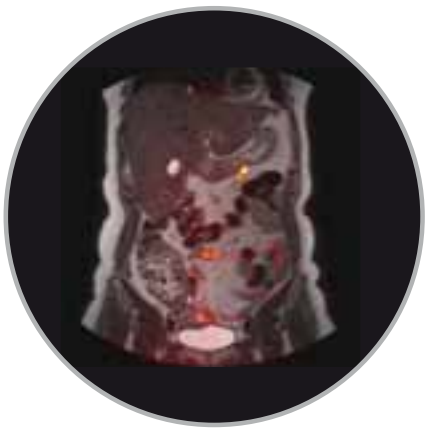
Course venue:
AZ Sint-Jan Brugge – Oostende AV
Campus Sint-Jan
Ruddershove 10
8000 Bruges
Belgium

Preliminary faculty:
F. Caseiro-Alves, N. Gourtsoyiannis, S. Halligan, G. Heinz-Peer, C. Matos, N. Papanikolaou, R. Pozzi-Mucelli, Ch. Triantopoulou, V. Vilgrain

Course duration:
Thursday noon – 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 pancreas and biliary tract. The course also focuses on MR imaging of the GI tract, the kidneys, adrenal glands, prostate and bladder. A team of renowned teachers with expert knowledge in abdominal imaging ensures a high quality teaching programme and looks forward to welcoming you in Bruges.

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



Learning Objectives

Technical Advances in abdominal MR Imaging
- To review diffusion-weighted imaging technical aspects and clinical challenges
- To review perfusion-weighted imaging technical aspects and clinical challenges
- To present technical advances and clinical applications of abdominal MR Spectroscopy

Diffusion-weighted Imaging and MR perfusion studies: Clinical applications in the abdomen
- To present the different options to acquire diffusion-weighted imaging data
- To explain how to interpret diffusion-weighted images and ADC maps
- To provide the results for the detection and the characterisation of abdominal tumours and inflammatory masses
- To comment on the potential of diffusion-weighted imaging to predict and to evaluate the response to therapy

MR Imaging of the Focal Liver Lesions
- Appearance on T1 and T2-w sequences
- Contribution of chemical shift imaging and T2* effects
- Role of DWI on detection and characterisation
- Differential diagnosis based on enhancement patterns
- Role of hepatocyte-specific contrast agents

MR Imaging of Diffuse Hepatic Parenchymal Disease and HCC
- Diffuse fatty infiltration, focal non-steatosis, hemosiderosis, hemochromatosis, cirrhosis, portal hypertension, collateral routes, ascites, regenerative nodules, dysplastic nodules, diffuse and focal manifestations of HCC
- Appearance on T1-weighted sequences
- Role of in- and opposed phase imaging
- Role of multiecho GE sequences (detection of both fat and iron)
- Role of Diffusion-weighted sequences
- Appearance on T2-weighted sequences
- Role of hepatospecific contrat-agents

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 Imaging of the Small Intestine
- Intraluminal contrast agents
- Route of contrast administration
- MR enteroclysis technique
- Normal appearances
- Familiarity with MRE imaging findings in inflammatory and neoplastic diseases
- Crohn disease activity

MR Imaging of Kidneys and Adrenal Glance
- 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

MR Imaging of Anorectal Diseases
- To understand the evidence and perspectives in anal sepsis and rectal cancer MRI
- To understand the role of MR staging in respect to other imaging modalities
- To understand the MR anal and rectal protocol and what clinicians want to know from us

Evolving role of MRI in gynaecology malignancies
- To know the current application of MRI in cervical, endometrial and ovarian cancer
- To understand the limitations of imaging with conventional MRI
- To know future clinical requirements from imaging
- To evaluate the role of dynamic contrast enhanced MRI and diffusion-weighted imaging in ovarian, cervical and endometrial cancer
- To discuss emerging use of spectroscopy in ovarian cancer

City information Bruges/Belgium

Population:	approx. 45.000
Time zone:	CET
Currency:	EUR
Country dialling code:	+32
Closest airport:	Brussels Airport (BRU)

Bruges is a town in Flanders, the northern part of Belgium. It has a charming small city centre, ideal for strolling around and enjoying the atmosphere. Relatively cosmopolitan and bourgeois given its compact size, it is one of the best-preserved medieval cities in Europe and offers the kind of charms rarely available elsewhere. The newly renovated buildings of the city seem to be newly constructed, but they are in fact centuries old. Besides the Belgian chocolate shops there are several interesting sights to visit in Bruges such as the Groeninge Museum, Basilica of the Holy Blood (‚Heilige Bloed Basiliek'), Brewery 'De Halve Maan' as well as the fascinating Romanesque and Gothic 'Onze Lieve Vrouwkerk' church.

Transport:
A large number of carriers offer direct flights to Brussels. Belgium's main airport has its own railway station. Bruges can be reached easily from the airports of Brussels, Charleroi (Brussels South) and Lille, and getting to Bruges by train is by far the easiest way. Only one change at one of the three main stations is needed and the entire journey takes about one hour and twenty minutes.
The only mode of public transport inside the city is bus. A taxi from the market place to the station costs about € 10.

Hotel information: www.school-of-mri.org

Advanced Breast & Female Pelvis MR Imaging

Grants available for
Advanced Breast & Female Pelvis MR Imaging
more information on page 9

November 7–9, 2013
Barcelona/ES

Course organiser:
Rahel Kubik
Baden/CH

Local organisers:
Rafael Ramos de la Rosa
Barcelona/ES
Vincente Martinez de Vega
Madrid/ES

Course venue:
USP Institut Universitari Dexeus
Sabino de Arana 5
1908028 Barcelona
Spain

Preliminary faculty:
B. Hamm, K. Kinkel, R. Kubik, R. Manfredi, V. Martinez de Vega, T. Metens, M. Müller-Schimpfle, R. Ramos de la Rosa, A. Rieber-Brambs, A. Rockall, D. Weishaupt

Course duration:
Thursday morning – Saturday noon

The aim of this course:
Technical advances have opened up new diagnostic applications in female 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 breast and pelvic pathologies including fetal 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 breast and pelvic female organs under pathological conditions. We would like to welcome you to this course in Barcelona/ES, where European experts in the field of female MR imaging will be given the opportunity to share their knowledge with you in plenary lectures and small group exercises.

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

Learning Objectives

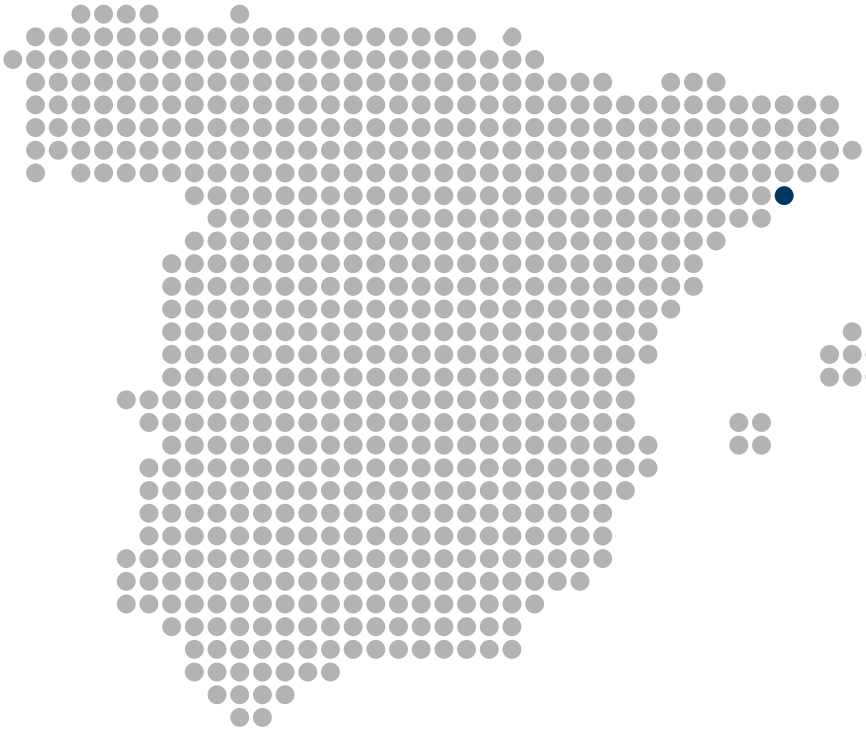
MR Imaging Techniques (Breast & Female Pelvis)
- Hard- and software requirements
- Basic pulse sequences for breast and pelvic MRI
- Advanced pulse sequences (including ultrafast sequences)
- Image post processing
- Recent and future developments

Female Pelvis: Protocol Optimisation, Benign Disease of the Uterus
- Optimised MR imaging strategy
- Normal MR appearance of the female pelvis according to age and menstrual cycle
- Mullerian duct abnormalities: indication for MRI compared to HSG and US
- To diagnose and differentiate leiomyoma from adenomyosis
- Questions to be answered by MRI before and after leiomyoma embolisation

MR Imaging of the Cervix and the Uterus: Malignant Lesions
- Optimised MR imaging strategy
- MR appearance of malignant lesions of the cervix
- MR appearance of malignant lesions of the uterus
- Staging of malignancies
- Follow-up of malignant tumours

MR Imaging of the Ovaries
- Optimised MR imaging strategy including DWI
- Appearance of the normal ovaries on T1-, and T2-weighted images and the enhancement patterns
- Indications for MRI compared to US and CT for imaging in patients with adnexal masses
- Benign and malignant lesions
- Staging and follow-up of ovarian carcinoma

MR Imaging of the Pelvic Floor
- Hard- and software requirements
- Application of open magnet systems
- Optimised MR imaging strategy
- Anatomy of the pelvic floor
- Indications for MRI in the incontinent patient
- Anorectal diseases



MRI in the Obstetric Patient/Fetal MRI
- Safety considerations
- Contrast agents in the pregnant and nursing patient
- Optimised MR imaging strategy, including ultrafast sequences
- Indications for MRI in the obstetric population
- MRI of the healthy fetus and the uteroplacental unit
- Morphological changes in fetal malformation and pathology

Technical Aspects of Breast MRI
- Hard- and software requirements
- Currently used 2D and 3D techniques
- Post-processing of the source images
- Importance of temporal and spatial resolution
- New sequences: Diffusion-weighted image (DWI) and spectroscopy of the breast

MR Imaging of the Breast
- Breast imaging protocol
- Imaging breast implants at 1.5 and 3 Tesla
- BIRADS-classification for breast MRI
- Indications of breast
- Pitfalls & limitations
- Interventional techniques in breast MRI
- Breast MRI following breast surgery
- Breast implants and implant failure

MRI of the Breast: Screening the high Risk Population
- Pros and Cons of breast cancer screening using MRI
- How to select women who benefit most?
- How and when to perform MRI?

MRI: Lymph node Staging
- Imaging strategy
- Plain MRI
- Contrast-enhanced MRI
- Lymphatic spread in uterine tumours

City information Barcelona/Spain

Population:	approx. 1.621.500
Time zone:	CET
Currency:	EUR
Country dialling code:	+34
Closest airport:	Barcelona Airport (BCN)

Barcelona is the second largest city in Spain and the most famous city in Catalonia. It is also the largest city on the Mediterranean coast. Founded as a Roman city, Barcelona became the capital of the County of Barcelona. Besieged several times during its history, Barcelona has a rich cultural heritage and is today an important cultural centre and a major tourist destination. Particularly renowned are the architectural works of Antoni Gaudí and Lluís Domènech i Montaner, which have been designated UNESCO World Heritage Sites. Gaudí's masterpiece La Sagrada Família, which is still under construction, is the international symbol of Barcelona. Barcelona is internationally renowned a tourist destination, with numerous recreational areas, one of the best beaches in the world, mild and warm climate, historical monuments, including eight UNESCO World Heritage Sites, many good-quality hotels, and developed tourist infrastructure.

Transport:
Barcelona is served by Barcelona-El Prat Airport, 17km from the city centre. The airport is connected to the city by highway, commuter train (Barcelona Airport railway station) and scheduled bus service. The TMB (Transports Metropolitans de Barcelona) – line 46 – runs every 16 minutes and terminates at Plaça Espanya. A one-way ticket costs around € 1,45. Taxis are available at both terminals I & II.

Hotel information: www.school-of-mri.org

Curso Avanzado de RM Músculo-Esquelética

European Multidisciplinarity for excellence in teaching

07–09 de Noviembre de 2013
Bilbao/ES

Organizador del curso:
Joan C. Vilanova
Girona/ES

Organizador local:
Mª José Ereño,
Bilbao/ES

Sede:
Colegio Oficial de Médicos de Vizcaya
Calle Lersundi 9
48009 Bilbao (Vizcaya)
España

Duración del curso:
Jueves mañana – Sábado mediodía

Profesorado preliminar:
J. Barceló, L. Cerezal, F. Idoate, A. Kassarjian, A. Luna, E. Llopis, M. Padrón, R. M. Rodrigo, X. Tomás, J.C. Vilanova

Objetivo del curso:
La RM del sistema músculo-esquelético es una de las exploraciones con mayor demanda en la práctica diaria. La RM es más sensible que la radiografía simple y la TC en la detección de tumores, patología degenerativa, inflamatoria y lesiones deportivas. Sin embargo, la especificidad a menudo es baja y requiere el conocimiento de los signos morfológicos y de protocolos específicos en las distintas secuencias. En este curso avanzado se abordan 10 temas: los tumores óseos y de partes blandas, la cadera/pelvis, médula ósea, rodilla, lesiones deportivas, hombro, codo, mano/muñeca, columna vertebral y el pie/tobillo. De cada tema se desarrollan 4–5 materias relevantes en relación a la anatomía, ejemplos de la patología con las imágenes típicas/atípicas; y resultados de la literatura reciente. El curso será una combinación de clases teóricas y talleres con casos prácticos de cada tema en pequeños grupos. Será impartido por reconocidos expertos en el estudio de la patología musculoesquelética mediante RM. Esperamos daros la bienvenida a todos.

Requisitos para la asistencia:
Médicos o técnicos con conocimiento de las técnicas de RM y un mínimo de 6 meses de experiencia en RM del sistema músculo-esquelético.

Grants available for **Curso Avanzado de RM Músculo-Esquelética** more information on page 9

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

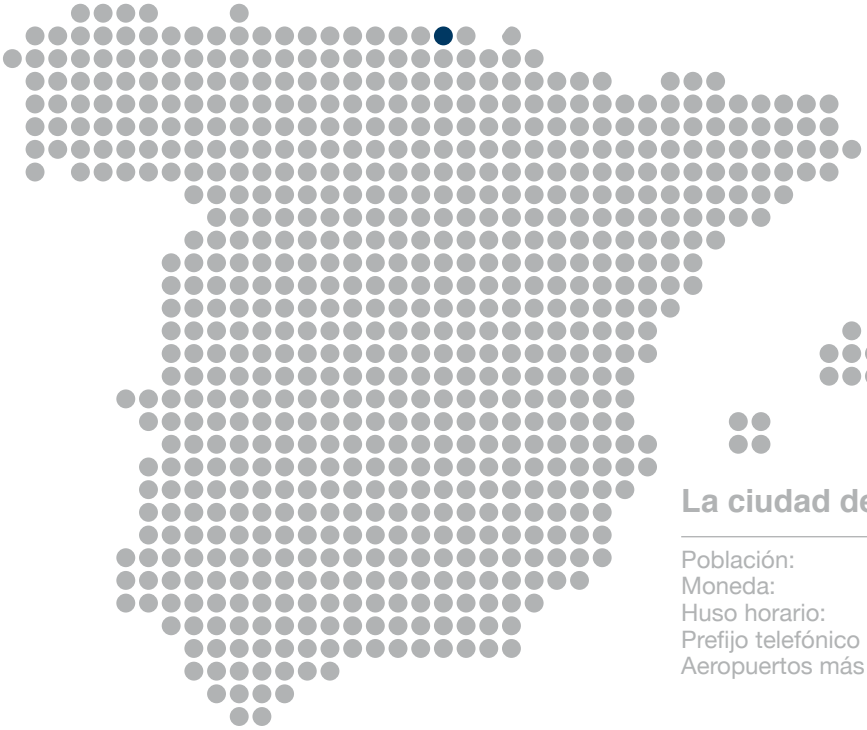
Rodilla
- Secuencias y estrategias en el protocolo de estudio
- Edema óseo. Patrones en las lesiones de rodilla
- Imagen del cartílago
- Ligamentos cruzados y meniscos
- Osteonecrosis y defectos subcondrales

Cadera/Pelvis
- Estrategia de imagen, protocolos, secuencias, informe
- Diagnóstico diferencial del edema óseo: coxitis, artrosis, edema transitorio, necrosis
- Patología articular y lesiones de ruptura 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 en diferentes localizaciones
- Lesiones de estrés, y de alto riesgo
- Interés clínico y seguimiento de las lesiones musculares y de estrés

Raquis
- Protocolo, secuencias para valorar el raquis
- Discopatia, degeneración, protrusión, hernia
- Espondilodiscitis
- Espondiloartropatia inflamatoria



La ciudad de Bilbao/España

Población:	aprox. 353.000
Moneda:	EUR
Huso horario:	CET
Prefijo telefónico de España:	+34
Aeropuertos más cercanos:	Aeropuerto internacional de Bilbao (BIO). Ubicado a 12 kilómetros de la ciudad de Bilbao en el municipio de Sondika.

Bilbao es la ciudad más poblada del País Vasco y una de las ciudades más importantes del norte de España. Con más de 700 años de antigüedad, cuenta con un bello y dinámico casco antiguo, un idioma propio y un pasado industrial y marinero recuperado actualmente para el turismo. El botxo, nombre coloquial de la villa, es una de esas ciudades indispensables para todos los amantes del arte y la buena mesa. El Museo Guggenheim, la Alhóndiga, la Torre Iberdrola o el Palacio Euskalduna de Congresos y de la Música son algunos de sus referentes mundiales. Arquitectos como Cesar Pelli, Frank Gehry, Philippe Starck, Arata Isozaki, Zaha Hadid, Santiago Calatrava y Norman Foster han hecho de Bilbao vanguardia de la arquitectura mundial lo que le valió en 2010 el premio Lee Kuan Yew World City Prize otorgado por la ciudad estado de Singapur, en colaboración con la Academia Nobel sueca y considerado el Nobel del urbanismo. El Metro Bilbao obtuvo asimismo en 1998 el Premio Brunel de arquitectura ferroviaria.
Entre sus atractivos destacan además imprescindibles museos, exquisitos comercios, una bien estructurada red hotelera y unos alrededores de gran belleza paisajística, con espectaculares playas.
Bilbao posee una infrastructura de transporte envidiable: autobuses urbanos, metros, tranvía y funicular a pesar de que las distancias no son extremadamente grandes.

Transporte:
El aeropuerto tiene inmejorables comunicaciones con las ciudades más importantes del norte de España: la autopista A8 comunica con Santander (108km) y con San Sebastián (119km) La autopista A68 comunica el aeropuerto con Vitoria-Gasteiz (66km), Logroño (152km), Burgos (158km) o Pamplona (159km.).
Autobuses: La línea A3247 de Bizkaibus (frecuencia de 20 minutos entre las 06:20 y las 24:00 horas) conecta en 15 minutos la ciudad de Bilbao con el Aeropuerto. Precio del billete: € 1,30. También hay un servicio que une el aeropuerto con San Sebastian a € 15,70 por trayecto.
Taxis: El recorrido al centro de la ciudad no supera los 15 minutos y el coste aproximado es de € 20.

Hotel information: www.school-of-mri.org

Mano/Muñeca
- Indicaciones comparado con otras técnicas
- Estrategia de imagen, protocolos, secuencias
- Lesiones del fibrocartílago
- Inestabilidad
- Osteonecrosis

Tobillo/Pie
- Indicaciones comparado con otras técnicas
- Estrategia de imagen, protocolos, secuencias
- Variantes de la normalidad que simulan patología
- Ligamentos y tendones. Neuroma de Morton y diagnóstico diferencial.
- Diagnóstico diferencial del edema óseo y de partes blandas. Lesiones de estrés

Hombro
- Indicaciones comparado con otras técnicas
- Estrategia de imagen, protocolos, secuencias
- Lesiones del manguito de los rotadores
- Lesiones traumáticas e inestabilidad del hombro

Tumores Oseos y de Partes Blandas
- Indicaciones comparado con otras técnicas
- Estrategia de imagen, 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

MR Safety

Grants available for
MR Safety
more information on
page 9

November 21–23, 2013
Tübingen/DE

Course organiser:
Siegfried Trattnig
Vienna/AT

Local organiser:
Fritz Schick
Tübingen/DE

Course venue:
University Hospital of Tübingen
Hoppe-Seyler-Strasse 3
72076 Tübingen
Germany

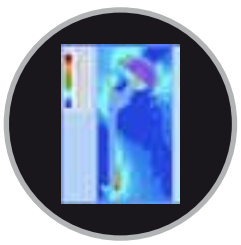
Preliminary faculty:
P. Bauer, O. Clement, H. Engels, S. Keevil, C. Löwe, A. Melzer, M. Mühlenweg, G. Schaefers, F. Schick, S. Trattnig

Course duration:
Thursday morning – Saturday noon

This course is limited to 30 participants!

The aim of this course:
The aim of the course is to offer deep insights into the complex physical laws of MR interactions and their dangers with respect to the static magnetic field, the HF field and the gradient fields as well as detailed knowledge of actual laws and norms. In addition the course will provide the training of practical abilities such as to save humans from the control area, behaviour in case of fire and magnetic emergency. We will also focus on competence and the expertise in clinical strategies how to handle implant safety issues in the MR environment, enhance patient safety and improve the MR workflow in daily routine by avoiding unnecessary loss of scanner time. 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 three categories:
Hospital: radiologist, radiological technologist, physician, anaesthesiology staff, nurse, technical or medical researcher, maintenance staff and patient supervisor
Scientific institute: operator/bio-technician, researcher, maintenance staff
MRI manufacturer: application specialists, researcher, developer, system tester, production staff member



Learning Objectives

Statutory framework, standards, responsibilities, EU directive
- 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

Introduction to construction and function of an 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 fields
- Induction of electrical currents by time varying electrical and magnetic RF fields in conductive structures and tissue
- Conditions for undesired heating effects

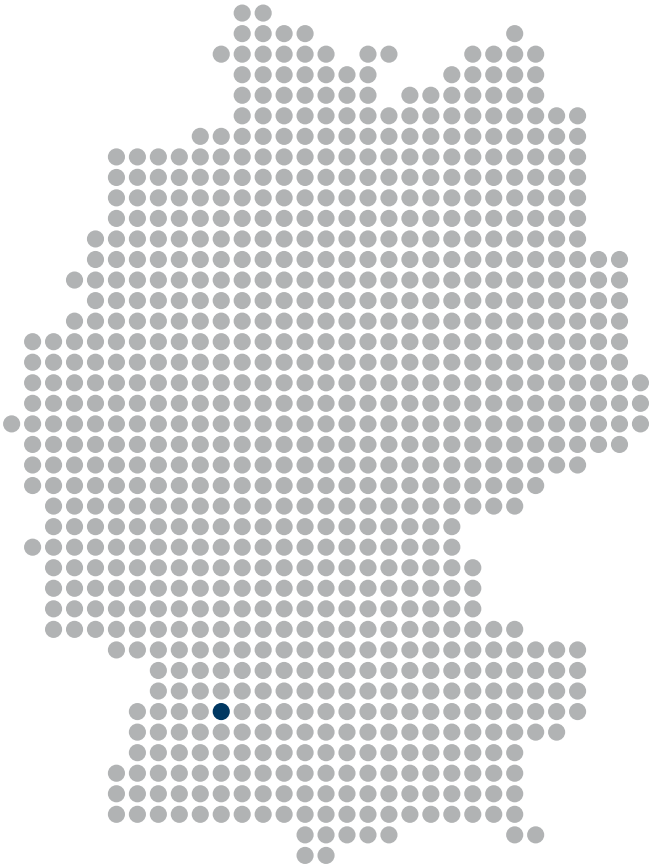
Risks in MRI I: static B0 field, dangers due to superconductors
- Value of the static magnetic field around the magnet
- Exposure limits for static magnetic fields
- Potential risks for human exposure to static magnetic fields
- Dependency of physiologic effects on relevant parameters of the static magnetic field
- Potential risks of superconducting magnets

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 HF fields
- Potential risks of high frequency HF fields
- Dependency of SAR from the static magnetic field

Contrast agents, pregnancy
- Chemical characteristics of Gd chelates
- Risks of Nephrogenic Systemic Fibrosis
- Evaluation of renal function
- Allergic reactions with Gd chelates

Implant problems and optimisation. Researching implants
Impact of implants on clinical MRI, its pitfalls and financial consequences by example of the Department of Radio diagnostic of the General Hospital of Vienna
- Strategies of improvement
- Workflow
- Effective research of MRI-conditions of implants
- Understanding the details of MRI-conditions of implants
- Special implants and future development
- MRI conditional pacemaker
- Fixed Parameter mode
- Exchange of personal experience and strategies by the class

MR safety issue in Interventional MR
- Principles of Interventional MRI
- Potential risks for clinicians and patients
- Technical requirements for safe Interventional MRI



- Limitations of Visualisation and Tracking of interventional Devices
- How to avoid reaching exposure limits during interventions

Cardiovascular implants and cardiac pacemakers in MRI
- To discuss risks and subsequent limitations of MR imaging after stent and stentgraft implantation
- To discuss the risks of conventional, 'old' cardiac pacemakers
- To present the advantages and limitation of new, MR-conditional pacemakers
- To discuss the possibilities of MR examinations after cardiac pacemaker implantation
- To present the newest guidelines of MR safety after stent and pacemaker implantation

Safety basics and quality management
- Pre-MR – Screening Procedures
- Patient MRI Safety Screening Form
- Safety Questions and Information
- Correct patient positioning while measurement
- Safety documents

MR worker training, documentation duties

Documentation provided by the MR manufacturer
- Exposure limits for MR workers
- Potential risks for MR workers
- Training requirements for the MR worker
- Responsibilities of the MR worker

Practical session: Systematic inspection with entering the MR area
- Definition of zones within the MR environment, in particular zone III and IV
- Supervision of entrance to the magnet room and the ways how to control it
- Labelling of equipment with respect to MR safety (MR safe, unsafe)
- To get familiar with the location of emergency equipment

Practical session: Demonstration of MR effects
- Spatial distribution of the static magnetic field of wholebody MR systems
- Forces and torques on different materials. Eddy current effects on moving conductive plates
- Generation of image artefacts by (slightly) magnetic materials
- Generation of image artefacts by conductive ring structures
- Heating in copper rings with different ohmic resistance

Practical session: Emergency situations
- Training of typical medical emergency situations in a live MRI setting
- Recalling and practicing of means of basic life support techniques including Resuscitation
- Emergency evacuation of persons directly out of the MRI scanner

Practical session: Researching implants and apply MR labelling in practice
- To understand the parameter complexity of MR labelling of devices/items
- To differentiate between different MR interactions
- To know the necessities for interpretation of MR labelling
- To apply MR labelling in practice

City information Tübingen/Germany

Population:	approx. 87.000
Time zone:	CET
Currency:	EUR
Country dialling code:	+49
Closest airport:	Stuttgart International Airport (STR)

The ancient Swabian university town of Tübingen is beautifully situated in the middle of the Neckar valley, northwest of the Swabian Alps. Small steps and narrow alleys give the old town of Tübingen its unique character. The Swabian university town combines the charm of a lovingly restored city centre, which dates back to the Middle Ages, with the colourful, bustling and vibrant dynamism of a young and cosmopolitan student city. Numerous street cafes, wine taverns, student pubs, extravagant stores and shops, exquisite restaurants and cosy inns beckon visitors to take a stroll through the city. The most frequently photographed sights in Tübingen are the historical buildings overlooking the Neckar river and the market square with its town hall and Neptune fountain. A trip on one of the renowned 'Stocherkahn' punts along the river Neckar allows for a great view of the picturesque waterfront and Hölderlin tower, named after the German poet Friedrich Hölderlin.

Transport:

Stuttgart Airport is about 40km away from Tübingen. A shuttle-bus called the 'Airport-Sprinter' (line 828) runs between the airport and Tübingen central bus station. The bus stop is located on the ground floor of the airport building. The bus departs every hour on weekdays and every second hour on Sundays. It takes about 1 hour to reach Tübingen central bus station (in front of the main railway station). The airport is also connected to Stuttgart's main railway station by the 'S-Bahn' (lines S2 and S3). Trains depart for Stuttgart every 10 to 20 minutes. Stuttgart railway station is about 50km away from Tübingen. There are regular trains between Stuttgart railway station and Tübingen railway station that cost approx. € 12,20 and take between 45 – 60 minutes.

Hotel information: www.school-of-mri.org

ESMRMB

European Society for Magnetic Resonance in Medicine and Biology

ESMRMB Society Journal MAGMA

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 (see below the current special issues):

- ➡ **'MR Thermometry'** with Robert Turner as Guest-Editor (February 2012)
- ➡ **'Arterial Spin Labelling MRI'** with David Alsop as Guest-Editor (April 2012)
- ➡ **'MRI and PET together: friends or foes'** with Thomas Beyer and Ewald Moser as Guest-Editors (March 2013)
- ➡ **NEW in 2013! 'X-nucleus magnetic resonance imaging'** with Lothar Schad and Simon Konstandin as Guest-Editors (see call for papers on-line, deadline extended until March 1st, 2013)
- ➡ Forthcoming special issue on **'Hyperpolarized Nuclei for MR'** with Axel Haase as Guest-Editor

MAGMA's dissemination as a journal is rapidly increasing:

- **Manuscript submissions:** increase of 40% in 2012
- **Electronic subscriptions:** the journal is currently read by 7.864 institutions worldwide through the 370 Springer library consortia
- **Downloads with full text hits:** more than 120 full-text article downloads daily in 2012
- **The reviewing cycle** (5 weeks) and **time-to-publication on-line after acceptation** (3 weeks) remain the shortest among MR journals

Finally, as a bonus to authors, MAGMA keeps with its policy of not applying charges for colour illustrations!

Become an ESMRMB member now to benefit from

An ESMRMB Membership is already available from € 10!

- online access to MAGMA
- printed MAGMA copy
- reduced fees for ESMRMB's annual scientific meetings
- reduced fees for educational activities of ESMRMB
- access to the online membership directory
- access to the Society minutes and documents
- continuous information about the Society and MR in Europe

Please note that membership benefits depend on your membership type.

Visit **www.esmrmb.org** for more information on MAGMA, ESMRMB's membership types and benefits as well as membership application.

Registration Information

Reduced registration fee for **ESR & ESMRMB members!**

Registration (online only)

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

Please note that your registration becomes valid only after the receipt of payment and after confirmation by the ESMRMB Office. The confirmation of payment is available for download in the online 'MyUser Area'. In order to obtain a valid registration as student or resident, a copy of the diploma has to be sent to the Office no later than 10 days after the registration or uploaded during the registration procedure online.

MR technologists/radiographers are asked to provide the Office with an official document from the head of department confirming the technician status no later than 10 days after the registration or to upload the document during the online registration procedure.

Terms of cancellation
In case of written 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 30 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.

Registration Fee

The registration fee includes:
- Course attendance
- Teaching material for the course (syllabus)
- Coffee and Lunch
- Welcome Dinner

Participants are responsible for their travel and hotel arrangements.

A list of suitable hotels for the individual courses is available at the ESMRMB website. When making your flight bookings, please make sure that you will be able to stay for the entire course duration.

Courses either start on Thursday morning or noon and last until Saturday noon or evening.

Residents in their first 5 years of clinical radiological training from less developed countries may apply for a grant (see page 9).

Early registration fees
(until 8 weeks prior to the course)

Physicists, Physicians, Chemists and other professionals with equivalent university degree:

ESMRMB Members***.....€ 350
ESR Members***.....€ 460
Non-Members.....€ 500

Students*, Residents* and MR technologists/ radiographers:**

ESMRMB Members***.....€ 200
ESR Members***.....€ 250
Non-Members.....€ 275

Late registration fees
(after 8 weeks prior to the course)

Physicists, Physicians, Chemists and other professionals with equivalent university degree:

ESMRMB Members***.....€ 450
ESR Members***.....€ 570
Non-Members.....€ 625

Students*, Residents* and MR technologists/ radiographers:**

ESMRMB Members***.....€ 250
ESR Members***.....€ 320
Non-Members.....€ 350

* Eligibility for the student and resident status is limited to 6 years following the date of the diploma (bachelor, masters, medical degree; not applicable for PhD degrees!). A copy of the diploma (bachelor, masters, medical degree) has to be sent to the ESMRMB Office no later than 10 days after the registration in order to validate your registration. Please note that for residents an attestation from the head of department is not sufficient! According to the ESMRMB regulations a copy of the diploma is required.

** MR technologists/radiographers are requested to provide a signed attestation from the head of the institution/head of department no later than 10 days after the registration.

*** Reduced course fees are available for members in good standing who have paid their 2013 ESMRMB or ESR membership fee.

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

Registration is possible online at **www.esmrmb.org**

Join the European Forum for MR Research and Clinical Practice

ESMRMB Membership Types

Become a member of ESMRMB and benefit from reduced registration fees at the School of MRI courses!

REGULAR MEMBER

€ 140

Benefits: Journal (online and print), reduced member fees for annual scientific meetings and educational activities of ESMRMB, access to the online membership directory and Society minutes and documents.

STUDENT MEMBER

€ 70

Criteria: Student membership is limited to 6 years following the date of the diploma (bachelor, masters, medical degree). A copy of the diploma (bachelor, masters, medical degree) has to be uploaded during online application or sent to the ESMRMB Office no later than 10 days after membership application in order to validate the membership. Please note that this does not apply for PhD degrees.

Benefits: Journal (online and print), reduced member fees for annual scientific meetings and educational activities of ESMRMB, access to the online membership directory and Society minutes and documents.

STUDENT MEMBER

€ 10

Criteria: Student membership is limited to 6 years following the date of the diploma (bachelor, masters, medical degree). A copy of the diploma (bachelor, masters, medical degree) has to be uploaded during online application or sent to the ESMRMB Office no later than 10 days after membership application in order to validate the membership. Please note that this does not apply for PhD degrees.

Benefits: online Journal, reduced member fees for annual scientific meetings and educational activities of ESMRMB, access to the online membership directory and Society minutes and documents.

RADIOGRAPHER MEMBER

€ 50

Criteria: Applicant needs to be a MR technologist/ radiographer.

Benefits: online Journal, reduced fees for annual scientific meetings and educational activities of ESMRMB, access to the online membership directory and Society minutes and documents.

ASSOCIATE MEMBER

€ 10

Criteria: Applicant needs to be member of a national society which is a partner society of ESMRMB.

Benefits: online Journal, information on Society news

FREE ASSOCIATE MEMBER

FREE!

Criteria: Applicant needs to be member of a national society which is a partner society of ESMRMB.

Benefits: information on Society news

ESMRMB Office, Neutorgasse 9, 1010 Vienna, Austria
Phone: (+43) 1 535 13 06, Fax: (+43) 1 535 70 41
office@esmrmb.org

Teach The Teacher in Clinical MRI

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of the ESMRMB and the ISMRM.

ESMRMB / ISMRM certifies teachers in clinical MRI

ESMRMB and ISMRM together offer young academic radiologists from emerging countries the opportunity of a two month fellowship in one of the leading MRI centres worldwide to be trained as an ESMRMB/ISMRM certified teacher in a specific field of applied MRI (e.g. musculoskeletal, cardiac, abdominal MRI)

Find out more at www.esmrmb.org

ESMRMB
European Society for Magnetic Resonance in Medicine and Biology

INTERNATIONAL SOCIETY FOR
ISMRM
MAGNETIC RESONANCE IN MEDICINE

GLOBAL ACADEMY OF MR
ISMRM ★ ESMRMB

ESOR
European School of Radiology

ESMRMB Office

Neutorgasse 9 | 1010 Vienna | AUSTRIA
Phone: +43–1-535 13 06
Fax: +43–1-535 70 41
office@esmrmb.org
esmrmb.org
school-of-mri.org

myESR.org/esor esmrmb.org

ESR
European Society of Radiology