exclusive training programmes in minimally invasive treatment techniques

interdisciplinary teaching

modern hands-on trainings in small groups (using phantoms or animal models)

individualised workshops on request

www.dafmt.com
Contact

Scientific Director
Prof. Max Seidensticker

Training Course Management
Annika Kral
Madeleine Beneke
tel +49 (0)391 67 15561
fax +49 (0)391 67 13383
info@dafmt.de

Address
Deutsche Akademie für Mikrotherapie e.V.
Leipziger Strasse 44
39120 Magdeburg
Germany
www.dafmt.com
Contents

3  Greetings
4  Prologue

1 Interdisciplinary courses

6  Master class for the interdisciplinary, minimally invasive treatment of patients with HCC
7  Critical lower leg ischemia and diabetic foot
8  Interdisciplinary strategies for the treatment of colorectal carcinomas
12  Tumour conference simulation: Minimally invasive oncology
14  User workshop Artis Zee/Zeego
16  CT-guided brachytherapy
18  Cardiac imaging with open high field MRI (Panorama HFO)
19  Up-to-date MR imaging of the shoulder using direct arthrography
20  Focal One – Focal therapy with HIFU
22  HCC master class training course in Magdeburg
24  Interdisciplinary treatment of portal hypertension
26  Interdisciplinary vascular conference simulation: Strategies and evidence

2 Interventional radiology courses

29  Master Class: Onyx-embolisations of AV-malformations (AVM)
30  Microcatheter embolisations
32  Embolisation with Vascular Plugs
34  RFA of liver, lung and kidney malignancies
36  SIRT workshop
37  MRI of the liver with hepatocyte-specific contrast agents
38  PICC Line (Peripherally Inserted Central Catheter)
40  Interventions using high-field open MRI (Panorama HFO)

3 Endoscopic courses

42  Endoscopy course: Gastrointestinal bleeding
43  Stent course: Gastrointestinal stents

4 Laparoscopic/surgical courses

45  Minimally invasive pancreatic surgery
46  Tumour conference simulation for surgeons
47  Hyperthermic Intraperitoneal Chemotherapy (HIPEC)
49  Hands-on workshop: Single Incision Laparoscopy (SILS)
50  Hybrid-operation: Rotation angiography with Artis Zee/Zeego for surgeons

5 Teaching of company representatives

General information

55  Instructors and speakers
56  Services/Research
57  Technical equipment
59  Cooperations
60  Special cooperation partner
61  Team
62  Directions and maps
64  Information
exclusive training programmes in minimally invasive treatment techniques

interdisciplinary teaching

modern hands-on trainings in small groups (using phantoms or animal models)

individualised workshops on request
Greetings

Dear doctors,
dear health service workers,
friends and supporters of microtherapy

The Deutsche Akademie für Mikrotherapie success story continues!

Microtherapy or minimal-invasive medicine provides a range of completely new therapeutic dimensions in numerous medical subspecialties. It has already brought changes to existing treatment paradigms in fields such as oncology angiology. Technical advances are enabling the treatment of an increasing number of diseases with a minimum of trauma and discomfort to the patient. However, such strategies demand highly developed interdisciplinary thinking and a culture of teamwork and communication across medical specialties. The same challenges apply to the development of new materials, tools and interventional techniques which can only be successfully implemented in close cooperation between doctors, scientists and industrial developers to meet the demands of patients and users.

Scholars will be guided to develop treatment algorithms that include microtherapeutic techniques, and they will undergo training on phantoms and animal models to learn essential practical skills.

The Deutsche Akademie für Mikrotherapie, along with LIAM, its new partner in medical company counselling and preclinical research and validation of applications, also offers specific services for preclinical science and development in microtherapeutic techniques and the accompanying tools.

I hope this brochure captures your interest. Further details can be found on our website. Please feel free to contact us directly by email or phone.

Jens Ricke
Professor of radiology and chairman of the board of DAfMT

The Deutsche Akademie für Mikrotherapie is a platform for this interdisciplinary dialogue. Academic teaching in practical courses and workshops forms the focus of its present activities. Our philosophy is based on a disease-centred approach, with doctors from various specialties gathering to teach interdisciplinary thinking in addition to practical skills in microtherapy.
Prologue

Dear ladies and gentlemen,

The Deutsche Akademie für Mikrotherapie – a story of success

I am happy to present our course programme for 2018 to you.

To meet the ever increasing demand for interdisciplinary treatments, we continue to develop new course concepts. In addition to our usual courses, we offer a new interdisciplinary workshop on vascular conference simulations and we have developed and expanded the scope of the tumour conference simulation for minimally invasive oncology even further. We are proud to introduce innovative course concepts, such as the onyx embolisation course on AV-malformations with hands-on trainings using a large animal model. The scope and content of our surgical courses has been equally expanded to better meet the needs of today’s ever growing field of surgery. It now comprises six different course formats such as minimally invasive treatment of patients with HCC, tumour conference simulation for surgeons and hybrid surgery courses.

Of course, we will continue to offer our established course concepts. For example, the SIRT-workshop will be offered ten times, and the microcatheter embolisation course eight times in 2018. We were pleased receiving very positive feedback from participants of our training courses especially tailored to the needs of our medical and medical-technology partners in 2017, confirming our alignment and motivating us to host future courses.

During the IROS in Berlin, the Deutscher Röntgen-Kongress in Leipzig, the DGCH in Munich and the CIRSE in Copenhagen, we noticed a remarkable increase in the Academy’s name recognition in the community of interventional radiology, minimally invasive surgery, gastroenterology and urology, undoubtedly reinforced by the ever growing number of course participants (currently a total of 1250).

We will continue participating at congresses in 2018, and will be happy to see you at the LINC in Leipzig, the Deutscher Röntgenkongress in Leipzig, the Deutscher Chirurgen-Kongress in Berlin and the CIRSE in Lisbon.

We are looking forward to your visit to our website www.dafmt.com or at our congress stand and we hope to see you in one of our courses, again.

Kind regards,

Prof. M. Seidensticker
Radiologist
and Scientific Director at the DAfMT
Master class for the interdisciplinary, minimally invasive treatment of patients with hepatocellular carcinoma (HCC)

Instructors:
Prof. C. Bruns, Prof. P. Malfertheiner, Prof. J. Ricke, PD Dr. C. Benckert,

Maximum number of participants: 12
Duration: 2 days
Course fee: on request

Day 1
Theoretical section
- State of the art lecture: Interdisciplinary treatment strategies for patients with hepatocellular carcinoma
- Influence of liver function on the therapeutical management and preventive strategies to omit postinterventional liver decompensation
- Indications and techniques of laparoscopic liver surgery
- Interventional methods to treat intermediate stage HCC

Day 2
Practical section
Emboliisation techniques of liver tumours
- SIRT preparation with coil embolisation
- SIRT with different particles
- Selective transarterial coil embolisation with different particles

Laparoscopic liver resection
- Intraoperative ultrasound
- Hand-assisted and pure laparoscopic liver resection
- Techniques: SonoSurg®, CUSA®, Thunderbeat®, Ligasure®

Course objective: The therapy of patients suffering from hepatocellular carcinoma requires a well developed interdisciplinary teamwork. The course lasts two days and is addressed to surgeons and radiologists who work together at the same facility and are experienced in the therapy of HCC patients. In a first theoretical part, therapeutical options depending on different underlying diseases (viral hepatitis, NASH, progressive cirrhosis with portal hypertension) will be presented by renowned hepatologists. In a second hands-on part, chemo- and radioemboIisation methods and different techniques of laparoscopic liver surgery will be performed using an animal model. The combined participation of surgeons and radiologists deepens the mutual understanding of subject specific methods and broadens their applicability.

Major target group: Surgeons and radiologists experienced in treating patients with HCC.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

Under the patronage of
Deutsche Gesellschaft für Chirurgie
Critical lower leg ischemia and diabetic foot

Instructors:
Prof. P. Mertens, Prof. M. Pech, Prof. J. Ricke, Prof. Z. Halloul,
Prof. M. Seidensticker, Dr. A. Wagner

Maximum number of participants: 10
Duration: 2 days
Course fee: on request

**Course objective:** Diabetic foot syndrome leads to 40,000 amputations in Germany every year. The relative immobilisation of patients after major amputations is an extraordinarily unfavourable predictor for their survival. To reduce the number of amputations, the technique of below-the-knee PTA and recanalisation has been extensively developed in recent years. To continue this development and to familiarise young doctors with the techniques, we have created a high-quality intensive course for the treatment of diabetic foot syndrome that includes exercises using large animal models.

**Major target group:** Doctors experienced in performing endovascular interventions.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

**Day 1**

**Theoretical section**

**Diabetic foot syndrome**

Speaker: endocrinologist
- Epidemiology and its importance for clinical praxis in microtherapy
- Pathophysiology
- Clinical appearance, definition of critical extremity-dangering ischemia, patient selection, prognosis
- Importance of multidisciplinary management

**Diagnostic algorithm**

Speaker: radiologist
- Clinical appearance, Texas classification system of ulcers
- Importance of ABI for diabetics
- Importance of non-invasive diagnostics: duplex sonography, CT- and MR-angiography
- Importance of TcpO2 measuring
- Diagnostic algorithms

**CT- and MR-angiography in case of diabetic nephropathy**

Speaker: nephrologist
- Handling of iodine-based contrast media
- Handling of MR contrast media >>
1 Interdisciplinary courses

Basics of crural surgery  
* Speaker: vessel surgeon  
  - Surgical techniques: femoral und popliteal bypass, patch anastomosis, in situ vein bypass and vessel prothesis  
  - Possibilities and restrictions of crural surgery (hybrid operations)

Day 2  
Theory and hands-on exercises in small groups  
* Using a large animal model

Theory  
Infraoppliteal endovascular revascularisation- overview  
* Speaker: radiologist  
  - Indications and contraindications  
  - Treatment strategies, possibilities and limits with modern materials  
  - Literature update on results of treatments with balloons and stents  
  - Identification of the treatment goal: do all three vessels have to be revascularised?  
  - Medication  
  - Follow-up

Infraoppliteal endovascular revascularisation materials and selection of materials  
* Speaker: radiologist  
  - Introducers  
  - Wires for intraluminal, subintimal passage, CTO (chronic total occlusion) wires  
  - Catheters  
  - Balloons: standard balloons, low-profile balloons, drug-eluting balloons  
  - Stents: balloon mounted, self-expanding, drug-eluting  
  - Overview of the current literature: drug-eluting balloons and stents

Infraoppliteal PTA step-by-step  
* Speaker: radiologist  
  - Access paths  
  - Alternate access paths (a. tibialis ant/post, a. poplitea)  
  - Technique of the intraluminal recanalisation  
  - Technique of the subintimal recanalisation  
  - SAFARI technique  
  - Indications for stents  
  - Tips and tricks  
  - Management of complications

Case discussions  
* Presentation of instructive individual cases for the development of treatment strategies  
* Participants can present cases for discussion

Practical section  
Hands-on practice  
* Using a large animal model  
  - Demonstration of available materials  
  - Exercises

Content  
* Sonography-guided antegrade vessel puncture  
* Deployment of different guide wires  
* PTA with dedicated lower leg balloon-dilatation catheters  
* Placement of stents  
* Exercises using the foot model  
* Deployment of closure systems
Interdisciplinary strategies for the treatment of colorectal carcinomas

**Instructor:**
Prof. J. Ricke

**Maximum number of participants:** 20 in the theoretical section, practical section is limited to small groups

**Duration:** 3 days, practical section can be booked by module

**Course fee:** on request

**Course objective:** The spectrum of treatments for metastatic colorectal carcinoma is very complex. The choice between systemic and local therapies is not covered sufficiently by the current guidelines. This course aims to convey knowledge about therapeutic standards and new therapy forms in order to ease decision-making.

**Major target group:** Doctors engaged in oncological work with surgical, internistic and radiological backgrounds favoured. This course can be adapted to individual needs of e.g. hospitals and practitioners.

---

**Day 1**

**Theoretical section**

**Colorectal carcinoma**

**Introduction**

**Speaker:** oncologist
- Epidemiology
- Etiology and pathophysiology of the evolution of carcinoma
- Clinical presentation
- Role of molecular markers
- Staging

**Diagnostics**

**Speaker:** radiologist
- Diagnostic algorithm at colorectal- or rectal carcinoma
- Imaging in the follow-up of colorectal carcinoma
- State-of-the-art options beyond the S3 guideline

**Endoscopic management**

**Speaker:** gastroenterologist
- Prevention, screening, risk groups (adenomas, FAP, AAPC, chronic-inflammatory intestinal diseases)
1 Interdisciplinary courses

> Surgical treatment of primary colon cancer
Speaker: surgeon
- Surgical techniques for colon cancer
- The complete mesocolic excision
- Importance of laparoscopic techniques
- Surgical techniques for rectal carcinoma

Basics of systemic treatment of colorectal carcinoma
Speaker: oncologist
- Substances, profiles, management

Day 2
Theoretical section
Chemotherapy of CRC: S3 guidelines and more
Speaker: oncologist
- Neoadjuvant, adjuvant and palliative approaches

Diagnostic imaging
Speaker: radiologist and expert in nuclear medicine
- Radiological state-of-the-art diagnostics (ultrasound, CT and MRI including DWI)
- Role of PET/CT
- State-of-the-art options beyond the S3 guideline
- Surgical techniques

Surgical resection techniques
Speaker: surgeon

Lung metastases surgery
- Indications, contraindications
- Preoperative functional diagnostics
- Overview: access paths, resection techniques, video-assisted thoracoscopy (VATS)

Liver metastases surgery
- Indications, contraindications
- Traditional surgical techniques
- Specifics of neoadjuvant chemotherapy concepts
- Extreme Liver Surgery: combination therapies, portal vein embolisations

Image-guided microtherapeutic techniques
Speaker: radiologist

Microtherapeutic treatment of lung metastases
Speaker: radiologist
- Indications, contraindications
- Methods: RF ablation, microwave ablation, brachytherapy
- Technical implementation
- Periinterventional patient management
- Tips and tricks
- Management of complications
- Follow-up and relapse diagnosis

Percutaneous portal vein embolisation
- Indications, contraindications, evidence
- Technical implementation
- Periinterventional patient management
- Tips and tricks
- Management of complications
Percutaneous ablative microtherapy
- Presentation of the techniques: RFA, brachytherapy, microwave
- Indications, contraindications, evidence
- Technical implementation
- Periinterventional patient management
- Tips and tricks
- Management of complications
- Follow-up and relapse diagnosis

Trans-arterial chemoembolisation (TACE)
- Indications, contraindications, evidence
- Technical implementation
- Periinterventional patient management
- Tips and tricks
- Dealing with complications
- Follow-up and relapse diagnosis

Hepatic arterial infusion chemotherapy (HAI)
- Indications, contraindications, evidence
- Technical implementation
- Periinterventional patient management
- Tips and tricks
- Dealing with complications

Yttrium-90 radioembolisation (SIRT)
- Indications, contraindications, evidence
- Technical implementation
- Periinterventional patient management
- Tips and tricks
- Dealing with complications
- Follow-up and relapse diagnosis

Day 3
Practical section
*Intervention and exercises using phantom and a large animal laboratory*

Guest visit
- Surgery
  (Instructors: surgeons)
  **Content** Rectal resection, (laparoscopic) hemicolectomy
- Radiology
  (Instructors: radiologist)
  **Content** CT and MR-guided AL, RFA, SIRT evaluation, SIRT
- Gastroenterology
  (Instructors: gastroenterologists)
  **Content** endoscopic polypectomy, mucosectomy

Hands-on
- RFA applicators and generators
- Electroporation
- Microwave ablation
- Brachytherapy systems
- SIRT delivery device
- TACE preparation of drug-eluting beads

Interventions using phantom and a large animal model
- CT-guided tumour ablation
  (tumour mimicked by injection of a glycerol/agarose gel)
- MR-guided tumour ablation
- Laparoscopic liver resection
- Endoscopic mucosectomy, polypectomy
1 Interdisciplinary courses

Tumour conference simulation: Minimally invasive oncology

Instructors:
Prof. C. Bruns, PD Dr. D. Modest, Prof. J. Ricke, PD Dr. K. Schütte

Maximum number of participants: 12
Venue: Berlin
Duration: 1.5 days
Course fee: on request

Course objective: Local and locoregional tumour therapies are increasingly utilised in multimodal treatment concepts of metastastatic solid tumours. However, the evidence is not strong as compared with pharmacological treatment of solid tumours and, as a consequence, the implementation of these techniques in treatment recommendations is scarce. Anyway, a significant number of phase II data unequivocally underline the clinical benefit of local (RFA) and locoregional (TACE, SIRT) therapies in selected patients. Aim of the course is the transfer of the current literature regarding minimally invasive oncology, surgery and medical oncology of selected solid tumours. Utilisation of the supplied informations will be trained with interdisciplinary experts during interactive tumour board simulations using case examples.

Major target group: Interventional radiologists, medical oncologists, surgical oncologists, surgeons and nuclear medicine specialists. This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Hepatocellular carcinoma
- Welcome, introduction to interdisciplinarity in HCC treatment
- HCC treatment according to current guidelines, overview
- Surgery in BCLC stage 0 and A
- RFA in BCLC stage 0 and A
- Case discussions – RFA vs. resection
- Therapy concepts beyond guidelines – evidence for SIRT
- Therapy concepts beyond guidelines – surgery in BCLC stage B
- Case discussions – BCLC stage B
- Liver function: what is important regarding decision making
- Case discussions and tumour board simulation
- Test
Day 2
Morning:
Metastatic colorectal cancer
- Introduction to systemic and personalised therapy of mCRC
- Resection of CRC liver metastases
- RFA of CRC liver metastases
- Case discussions – RFA vs. resection
- SIRT in liver only mCRC from the perspective of the medical oncologist
- Case discussions and tumour board simulation

Neuroendocrine carcinoma
- Treatment of mNET according to current guidelines
- Evidence of SIRT
- Case discussions and tumour board simulation

Afternoon:
Interdisciplinary clinical management of SIRT patients
- Preparation and indication, which clinical parameters are important? Monitoring after SIRT, Follow-up
- Prevention, identification and management of complications
- Test
1 Interdisciplinary courses

User workshop Artis Zee/Zeego

Instructors:
Prof. J. Ricke, Dr. J. Jürgens

Maximum number of participants: 8

Duration: 1 or 2 days, second practical day can be booked additionally, practical section optionally using phantom or a large animal model

Course fee: on request

Course objective: Modern angiographic equipment offers fascinating technical possibilities and superb image quality. However, its use has become increasingly complex. This course was developed to teach the professional operation of the Siemens Artis Zee/Zeego. For this purpose, intensive coaching on the devices installed in Magdeburg as well as practical exercises on a phantom or large animal model are recommended.

Major target group: Interventional or endovascular medical personnel with identical equipment (current/planned). This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Theoretical section
System operation
- Presentation of the key functions of the console operation
- Examination: screening, recording, reference images, roadmap, overlay
- Presentation of the main functions for image and scene postprocessing

Console operation
(MultiModality Workplace)
- Introduction to the terminology: InSpace 3D, DynaCT, DR DynaVision (3D DR), (DSA) DynaVision (3D DSA), i-Dentify, i-Guide, i-Pilot, PBV
- Presentation of the core applications:
  - Syngo patients list, syngo viewing, loading 3D volume
  - Technique for reconstruction of a 3D data set (InSpace reconstruction), DYNA-CT illustrations, syngo 3D Basic -MIP, MPR and SSD reformats, syngo 3D VRT
  - Volume Rendering, advanced 3D processing and bone removal
  - Archiving: exporting/saving reconstructions
Advanced rotational angiography studies
- Preparations (patient/device/KM injector)
- DR DynaVision (3D DR): examination process, reconstruction, clinical applications
- (DSA) DynaVision (3D DSA): examination process, reconstruction, clinical applications
- Syngo i-Guide Needle Guidance:
  - Examination process, reconstruction, clinical applications
- Syngo i-Pilot (3D overlay): examination process, reconstruction, clinical applications

Peripheral angiography
- Quantitative vessel analysis:
- Analytical procedure, course, analysis, clinical application
- Peristepping and perivision:
- Examination process, reconstruction, clinical applications

Neuro
- PBV determination in stroke patients: Examination process, reconstruction, clinical applications
- Coclear illustration: examination process, reconstruction, clinical applications

Clinical applications

**Head/neck**
- Embolisation of AV malformations
- Coil embolisation of aneurysms at the base of the brain
- Inner ear and temporal bone representation before and after CI implantation
- PBV calculation at ischemic stroke

**Body**
- pre-, peri- and post-interventional imaging in the context of a TACE
- Radioembolisation in primary and secondary liver tumours
- Embolisation of visceral aneurysms
- Percutaneous embolisation of aortic endoleaks
- Illustration of cement distribution after vertebroplasty/kyphoplasty

Extra Day
*Can be booked alternatively or in addition to day 1*

Practical section
**Venue:** Experimental Factory, Magdeburg

Using a large animal model
- Implementation of rotational angiography by standard acquisition protocol for head/neck and body using a large animal model (pig)
- Puncture simulation using i-Guide (renal pelvis)
- Catheter navigation using i-Pilot (hepatic arteries)
- Cerebral PBV measurements
- Practical exercises for postprocessing at the workstation

Day 1
**Practical section**
**Venue:** Experimental Factory, Magdeburg

*Working on a phantom*
- Implementation of rotational angiography on the phantom (Flow model)
CT-guided brachytherapy

**Instructors:** Prof. J. Ricke, Dr. P. Hass, Dr. K. Mohnike

**Maximum number of participants:** 6

**Duration:** 2 days

**Course fee:** on request

**Course objective:** The objective of this course is to provide the technical basis for CT-guided brachytherapy. This includes both interventional techniques. The course introduces the brachytherapy catheter under CT fluoroscopy as well as expertise in radiation for dose planning. Current clinical indication data are provided along with recommendations for the management of patients before, during and after operations. The course covers preparation for potential complications, their prevention and their management in detail. With this course we hope to enable participants from radiology, radiotherapy and medical physics to inaugurate successful programmes in their own clinics.

**Major target group:** Radiation oncologists, radiologists, medical physicists, ideally teams that work together.

This course can be adapted to individual needs of e.g. hospitals and practitioners.

---

**Day 1**

**Theoretical section**

**Technical basics**

- Principles of CT-guided brachytherapy (radiologist, radiotherapist)
- Fundamentals of HDR brachytherapy with Iridium192 (medical physicist)
- Tumour-dependent target doses and dose tolerance of typical organs at risk (radiation therapist)
- Image guidance using CT or MRI (radiologist)

**Clinical context**

- Evidence base and indications for CT brachytherapy
- Patient management
- Preparation, sedation, periprocedural management
- Follow-up
Day 2
Practical section
*Using a large animal model and a treatment planning system*
- Planning of the catheter position before the procedure including treatment planning using planning systems
- Positioning of applicators in the phantom using computed tomography
- Positioning of brachytherapy catheters under computed tomography image guidance using a large animal model (liver, lung, kidney, artificial tumour imaging by injection)
- Removal of the brachytherapy catheters and closure of penetration canal in a large animal model (liver, kidney, Gelfoam; lung: fibrin glue)
- Debriefing: interdisciplinary, interactive development of treatment pathways and standard operating procedures
Cardiac imaging with open high field MRI (Panorama HFO)

**Instructors:**
PD Dr. K. Fischbach, Dr. J. Smid

**Maximum number of participants:** 14

**Duration:** 1 day

**Course fee:** on request

**Course objective:** MRI is an important and firmly established pillar in the diagnostic imaging of cardiac diseases. The development of Panorama High Field Open (HFO) at a field strength of 1 Tesla has made it possible, for the first time, to make state-of-the-art imaging with an open system part of clinical routine. The open system’s design offers advantages not only for image-guided interventions, examinations of patients with claustrophobia or children, but also for monitoring during cardiac stress tests. This course provides an overview of the most common clinical indications for cardiac MRI based on the current recommendations of German professional societies. The focus is on the link between specific cardiac issues and the MR-tomographic sequence protocols, and imaging findings. While the course does not provide complete coverage of this complex subject area, it gives an efficient introduction to typical questions from everyday cardiology. In the practical section, participants are given the opportunity to become familiar with the special features of the open MRI system and to witness clinical examinations. In addition, cardiac MRI examinations can be analysed under guidance and independently as well.

**Major target group:** Radiologists, cardiologists.

This course can be adapted to individual needs of e.g. hospitals and practitioners.

---

**Theoretical section**
- MRI of the heart at 1T: technical possibilities
- Disease entities and specific sequence techniques (questions of cardiologists and responses of radiologists)
- Coronary heart disease - Viability assessment and detection of ischemia
- Myocarditis
- Cardiomyopathies
- Cardiac masses

**Practical section**
- Technical introduction
- Panorama HFO - Hardware and software
- 2 live investigations
- Independent and interactive case analysis
Up-to-date MR imaging of the shoulder using direct arthrography

Instructors:
Prof. F. Fischbach, PD Dr. K. Fischbach, PD Dr. A. Berth, Dr. C. Wybranski
Maximum number of participants: 12
Duration: 1 day
Course fee: on request

Course objective: Magnetic Resonance Imaging (MRI) plays an important role in the diagnosis of shoulder joint injuries and the related treatment planning. In the absence of joint effusion (intrinsic contrast agent) the exact classification of the injury pattern and localisation is improved by direct puncture of the joint, and intraarticular administration of contrast media (direct arthrography). The puncture of the joint of mostly young patients is carried out under fluoroscopy or - because of the lack of radiation exposure - X-ray or sonography guidance. This course gives an overview of the most important indications of direct shoulder arthrography, taking into account recent recommendations by the German professional societies. In the theoretical section, indications and anatomical and pathological changes are systematically presented from the perspective of the orthopaedist and the radiologist. In the practical section, participants are trained in the techniques of joint puncture. Additionally the course includes an interactive case analysis of typical shoulder joint pathologies.

Major target group: Radiologists, orthopaedic, trauma surgeons.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

Theoretical section
- Shoulder diagnosis from the perspective of orthopaedists
- MR sequence technique and anatomy of the shoulder joint
- Pathologies of the shoulder joint in MRI
- Direct shoulder arthrography:
- Examination technique and implementation (fluoroscopy/sonography)

Practical section
- Hands-on training of the shoulder puncture under X-ray and sonography guidance using anatomical phantoms
- Interactive case analysis
1 Interdisciplinary courses

Focal One - Focal therapy with HIFU

Instructors:
Prof. F. Fischbach, Dr. D. Schindele

Maximum number of participants: 3-5
Duration: 1.5 days
Course fee: on request

Day 1

Lecture:
- Basics of multiparametric MRI of the prostate, technique and clinical indications

Live case:
- MRI examination of the prostate

Lecture:
- HIFU with Focal One – basics and technique

Hands-on:
- Prostate contour drawing and tumour contour drawing for HIFU

Course objective: Prostate cancer (PCa) is the most common male malignancy in Germany with 75,000 new diagnosis and 12,000 deaths each year. PCa seems to be a heterogeneous tumour with varying clinical courses. Therefore standard therapies vary between active surveillance and active treatment therapies such as radical prostatectomy (open, laparoscopic, robot-assisted laparoscopic) or external beam radiation therapy as well as LDR- or HDR-brachytherapy. Current standard treatment options show excellent cure rates but they may be accompanied by severe side effects that can strongly interfere with the patient’s quality of life.

Due to early detection programs PCa detection rates increased over the last years diagnosing particularly patients with low- and intermediate risk profiles. Especially in those risk groups, the individual risk stratification can be very difficult. Whilst some patients might be undertreated by active surveillance, the majority of those patients bear a potential risk of being overdiagnosed and overtreated by the current standard treatment options with the risk of suffering from potentially unnecessary side effects.
In this area of conflict between over-/under-diagnosis on the one side and over-/under-treatment on the other side, some patients may benefit from focal therapy of the tumour-bearing part of the prostate. HIFU therapy with Focal One offers the technical requirements to perform targeted therapy of the tumour-bearing part of the prostate in order to achieve oncological effectiveness without or with minor side effects when compared to the active standard treatment options.

This course gives an overview of focal HIFU therapy with Focal One. It aims to identify patients that are eligible for focal HIFU therapy and show the technical capabilities of Focal One. Particularly MRT-TRUS fusion should be practiced in the real intervention situation.

**Major target group:** In particular, urologists and radiologists.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

**Day 2**

**Hands-on:**
- MRT-TRUS-fusion

**Live case:**
- Focal One HIFU-therapy
HCC Master Class Training Course in Magdeburg

Instructors:
Prof. C. Bruns, Prof. J. Ricke, Prof. P. Malfertheiner

Maximum number of participants: 8-12
Duration: 2 days
Course fee: on request

Course objective: Modern therapeutic approaches for patients suffering from hepatocellular carcinoma require patient adapted, multidisciplinary treatment strategies. A clinical setting comprising profound hepatological, oncological, surgical and (interventional) radiological expertise is essential, in order to be able to offer all modern diagnostic tools and treatment options. At the University Hospital in Magdeburg a unique workflow for HCC patients, consisting of an interdisciplinary HCC outpatient clinic, an interdisciplinary in hospital HCC unit and weekly interdisciplinary HCC tumour conferences has been established. As a result every single HCC patient is seen by a specialist of each discipline and a concordant therapeutic pathway will be created. Most of the patients are included in various clinical trials taking place at the institution, of which the SORAMIC trial is one of the largest investigator initiated trials worldwide. The curriculum of the HCC course targets to convey the broad experience of the University of Magdeburg interdisciplinary HCC patient care. In small groups the participants will be integrated in the daily schedule of HCC consultants and therefore be involved into the clinical decision making. In addition all interventional procedures (loco regional and surgical) will be attended. In between state of the art lectures will be held by renowned specialists in the field.

Lectures can be translated simultaneously into Russian language.

Major target group: Radiologists, oncologists, hepatologists and surgeons.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Theoretical section & guest visit
Welcome
- presentation of the programme and the hospital
Lecture
- Liver function and treatment outcome in HCC (hepatologist)
Lecture
- Liver transplantation and bridging to transplantation in HCC patients (surgeon)
Lecture
- Guidelines for the treatment of advanced HCC: Update on staging systems
- Sorafenib: evidence and clinical practice
- Is there a role of resection, TACE or combined concepts with Sorafenib in advanced HCC?
- Is it time to abandon systemic chemotherapy from HCC treatment? (oncologist)

HCC interventions (Live cases):
- CT-guided Brachytherapy
- Transarterial chemoembolisation (radiologist)
Lecture
- Second line systemic therapy in HCC - Are there any options? (Oncologist)
Practical orientation - ward rounds, interdisciplinary HCC ward: optimal care for HCC patients
Lecture
- Management of patients undergoing Sorafenib therapy – optimising outcomes (hepatologist)

Day 2
Theoretical section & guest visit

Lecture
- How to build an interdisciplinary HCC unit? (surgeon)

Lecture
- Evidence based interdisciplinary management of HCC
  1. Management of BCLC A patients (surgeon)
  2. Management of BCLC B patients (radiologist)

HCC interventionen (Live cases)
- Laparoscopic liver resection
- RFA
- TACE

Science conference, Discussion of ongoing clinical trials

Lecture
- Management of the underlying disease (cirrhosis, hepatitis) (hepatologist)

Case demonstrations
- Cases presented by guests

Interdisciplinary HCC tumourboard

Resumé
Interdisciplinary treatment of portal hypertension

Instructors:
Prof. J. Ricke, Dr. J. Weigt
Maximum number of participants: 6
Duration: 2 days
Course fee: on request

Day 1
Theoretical section
- Pathophysiology of portal hypertension
- Complications of portal hypertension
- Medical treatment
- Interventional therapy: possibilities of gastroenterologists
- Interventional therapy: possibilities of radiologists
- Guidelines and recommendations

Day 2
Practical section
- Oesophageal variceal ligation (gastroenterologist)
- TIPSS (radiologist)
- Sclerotherapy (gastroenterologist)
- Histoacryl therapy (gastroenterologist)
- Transarterial hemorrhagic embolisation with coils and liquid embolic agents (radiologist)
- Final discussion: interdisciplinary, interactive development of treatment paths

Course objective: The optimal treatment of portal hypertension is an interdisciplinary problem. Of course the majority of uncomplicated variceal bleeding can be prevented or stopped by endoscopy. Beyond that, symptomatical ascites is usually adjusted excellently with drugs. Nevertheless, in many cases the cooperation between gastroenterologists and interventional radiologists is very helpful or crucial for the therapeutic success. This concerns especially the patients who are seriously ill with recurrent oesophageal bleeding and refractory ascites. Perfect cooperation between gastroenterology and radiology means that standard operating procedures are determined exactly for the implementation of variceal ligation, deployment of histoacryl, hemorrhagic embolisation and the installation of TIPSS from indication to technical implementation. For these patients, such cooperation can be lifesaving.

The goal of the portal hypertension course is not only to convey technical skills, but also construct interdisciplinary algorithms. Accordingly, this course is aimed at doctors from different disciplines, but especially at gastroenterologists and radiologists. In our opinion, it would be ideal if doctors from different disciplines at one hospital booked this course together to develop a feeling for their colleagues’ abilities and to develop common standard operating procedures.

Major target group: Especially gastroenterologists and radiologists, ideally working in the same hospital; hepatologists, surgeons.

This course can be adapted to individual needs of e.g. hospitals and practitioners.
Interdisciplinary vascular conference simulation: Strategies and evidence

Course leaders:
Prof. J. Ricke, Prof. M. Pech, Prof. M. Seidensticker
Maximum number of participants: 10-15
Duration: 1.5 days
Course fee: on request

Day 1
Lecture: Management of the PAD patient, interdisciplinarity (angiologist)
Key note speeches: Iliac and femoropopliteal PAD
  - Endovascular therapy (radiologist)
  - Surgical therapy (surgeon)
  - Conservative therapy (angiologist)
Vascular board conference simulation
  - Case discussion (all)

Course objective: Effective treatment of vascular diseases of all kinds (PAD, aortic aneurysms, vascular malformations etc.) requires an interdisciplinary work-up including vascular surgery, interventional radiology and angiology. The treatment of below the knee PAD illustrates this paradigm appropriately.

Based on evidence based medicine, an individualised and interdisciplinary treatment concept should be aimed. However, due to several reasons, this is not reality in most hospitals. To overcome this nuisance, intense knowledge about treatment concepts (of the own medical subdivision as well as of the others) with their pros and cons is necessary together with an understanding of associated comorbidities and their impact on treatment. Sound knowledge is needed to establish interdisciplinary treatment concepts.

This course aims to transfer knowledge and strategic concepts for the development of interdisciplinary treatment concepts for patients with PAD.
Experts in the fields of vascular surgery, interventional radiology and angiography will give short lectures to communicate the present evidence. Main focus will be the guided discussion of cases in the setting of a simulated vascular board conference with all participants. Contributions of case-studies by the participants are explicitly encouraged.

**Major target group:** Interventional radiologists, vascular surgeons, angiologists. This course can be adapted to individual needs of e.g. hospitals and practitioners.

**Day 2**

**Key note speeches:**

**Below the knee PAD**
- Conservative therapy and wound management (angiologist)
- Surgical therapy (surgeon)
- Endovascular therapy (radiologist)

**Vascular board conference simulation**
- Case discussion (all)

**Key note speeches:**

**acute ischemia**
- Surgical therapy (surgeon)
- Endovascular therapy (radiologist)
- Conservative therapy (angiologist)

**Vascular board conference simulation**
- Case discussion (all)
Master Class: Embolisations of arteriovenous malformations

Instructors:
Prof. J. Ricke, Prof. W. Wohlgemuth
Maximum number of participants: 8-10
Duration: 2 days
Course fee: on request

Course objective: Conquering vascular malformations is somewhat the holy grail of the interdisciplinary interventional community. Vascular malformations can be extremely demanding to manage and although non-malignant, they are frequently associated with hereditary syndromes, aggressive growth and a tendency to recurrence despite all preventing efforts. In addition, vascular malformations are rare and their individual properties make each of these tumours unique. The key to success for each interventionalist is in-depth knowledge, experience in microcatheter techniques and the use of liquid embolics. Among those, Onyx® embolisation has proven to be a popular choice.

In this training course, participants will not only gain theoretical knowledge of the appropriate diagnosis and classification of vascular malformations and AVMs in particular, but also valuable hands-on experience. Divided into small groups, participants train the use of Onyx and sclerosants using a large animal model. To incorporate the theoretical knowledge into a clinical setting, real clinical cases will be discussed and two AVM embolisation cases will be observed.

Major target group: Interventional radiologists with experience in microcatheter and embolisation techniques, as well as their “team mates” from their home institution
This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Practical section
• Fundamentals of AVM embolisation with Onyx
Participants will be separated in 2 groups
Group 1: Hands-on using a large animal model with simultaneous access to 2 workplaces
Group 2: Basics
• Classification of vascular malformations
• Diagnostic workup of vascular malformations and associated syndromes: clinical assessments and imaging
• Specifics of AVMs
• Embolisation techniques for AVM
• Indications for treatment, treatment endpoints
• Sclerosants and embolic agents, catheters, plug and push techniques
• Case discussions (each participant should bring at least one case; teaching cases will be provided in addition)

switch between groups
• Final Discussion, Summary

Day 2
Clinical case demonstrations
• Clinical cases: AVM embolisation with Onyx
• Final Discussion, Summary, Test
Microcatheter embolisations

Instructors: Prof. M. Pech, Prof. J. Ricke, Prof. M. Seidensticker, PD Dr. M. Powerski

Maximum number of participants: 5
Duration: 1.5 days
Course fee: on request

Course objective: Microcatheter techniques have become standard in interventional radiology. A popular example is TACE in hepatocellular carcinoma, which is the standard treatment in intermediate disease stages, or embolisation of uterine fibroids. Furthermore, the use of microcatheters is required to cease gastrointestinal bleeding by transarterial embolisation. Profound knowledge of visceral vascular anatomy, available materials and microcatheter techniques are critical for the success of the intervention. This course is intended to provide the theoretical basis for TACE, fibroid embolisation as well as gastrointestinal bleeding embolisation. In addition, microcatheter interventions are trained using a large animal model.

Major target group: Interventional radiologists with or without previous experience in microcatheter interventions. This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Theoretical section
Basic embolisation principles/
Emboliisation materials
• Material presentation: selective catheters
• Material presentation: microcatheters
• Use of the coaxial technique
• Presentation of embolisation material: particles, coils (standard pushable fibered coils, extra long coils, mechanically detachable coils, bioactive coils, hydrocoils), occluder, glue (histoacryl), onyx, gelfoam
• Criteria for the selection of most appropriate embolisation material

Transarterial chemoembolisation
• Treatment concepts according to BCLC
• Patient selection: indications & contraindications for TACE
• Principle of TACE
• Substances: chemotherapeutics, lipiodol, particles, drug-eluting beads
• Treatment strategies & technical execution
• Complications
• Challenging cases
• Summary
Uterine fibroid embolisation
- Current available data for the value of uterine fibroid embolisation
- Patient selection: indications & contraindications
- Preprocedural diagnostics
- Technical execution: vascular anatomy of hypogastric artery branches,
- Material: selective catheters, microcatheters, particles
- Endpoints of embolisation
- Complications
- Periinterventional drugs
- Follow-up
- Summary

Gastrointestinal bleedings
Acute upper GI bleedings
- Causes
- Medical emergency treatment, management
- Risk stratification, diagnostic algorithm, clinical treatment pathways
- Endoscopic treatment: variceal haemorrhage, Ulcer bleeding, other causes
- Role of CT angiography
- Endovascular treatment: vascular anatomy of the upper GI tract under special consideration of collaterals, technical execution & embolisation strategies, tips & tricks, challenging cases, results
- Summary

Lower GI bleedings
- Facts, causes, and classification
- Role of colonoscopy in diagnosis and treatment
- Role CT angiography
- Role of endovascular treatment
- Role of red blood cell scintigraphy
- Role of capsule endoscopy & double balloon endoscopy
- Diagnostic algorithm in acute and chronic lower GI bleedings
- Endovascular treatment: vascular anatomy of the lower GI tract, embolisation strategies, challenging cases, tips & tricks, pitfalls
- Summary

Day 2 – Practical section
Lab exercises with large animal model
- Material demonstration - microcatheter catherisation techniques
- coil embolisation techniques: scaffold technique, anchor technique, use of the coil pusher, saline flush technique - coil retrieval
- Embolisation technique with PVA particles-simulation of TACE-embolisation of rete mirabile with glue (histoacryl)
Embolisation with Vascular Plugs

Instructors:
Prof. M. Pech, Prof. J. Ricke, Prof. M. Seidensticker

Maximum number of participants: 10
Duration: 1.5 days
Course fee: on request

Course objective: In this workshop the use of the most diverse generation of vascular plugs will be trained in an authentic environment. The safe and effective placement of vascular plugs is the focus of the course and is achieved with exercises using a large animal model.

Major target group: Interventionalists who are generally familiar with embolisations, but so far have little or no experience with the use of vascular plugs. This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Theoretical section
Technical background
- Presentation of the Amplatzer™ Vascular Plug family
- Technical data, existing sizes, other materials for plug embolisation

Embolisation of pulmonary AV malformations
- Diagnosis of pulmonary AV malformations
- Technique of plug embolisation
- Pitfalls, tips and tricks

Embolisation of extrahepatic vessels in patients scheduled for SIRT
- Indications for Y90 radioembolisation
- Technique of plug embolisation of the gastroduodenal artery
- Advantages of embolisation of the gastroduodenal artery with the vascular plug as compared to pushable coils
- Pitfalls, tips and tricks
Embolisation of splenic aneurysms
- Indications for treatment of splenic aneurysms
- Diagnostics
- Technique of plug embolisation of splenic artery
- Pitfalls, tips and tricks

Embolisation of aneurysms of the iliac arteries
- Diagnosis and treatment strategies in AAA with involvement of the pelvic axis
- Technique of plug embolisation of iliac vessels
- Diagnosis and treatment strategies of isolated iliac artery aneurysms
- Embolisation technique
- Pitfalls, tips and tricks

Day 2
Practical section
Using a large animal model
- Transcardiale plug embolisation of the pulmonary artery
- Plug embolisation of the gastroduodenal artery
- Plug embolisation of the splenic artery
- Plug embolisation of the iliac arteries (crossover)
RFA of liver, lung and kidney malignancies

Instructor:
Dr. K. Mohnike, Prof. M. Seidensticker

Maximum number of participants: 5
Duration: 1 day
Course fee: on request

Course objective: The course teaches the technical principles of radiofrequency ablation of liver, lung and kidney malignancies as well as the value of such interventions in the clinical context. Approaches from the perspective of cooperating specialist clinics such as oncology, liver surgery, thoracic surgery and urology are used to provide insights into clinical indications in oncology and oncosurgery. The course presents the methodology for the application of radio frequency generators and probes as well as patient care pre-interventional, during the procedure, and follow-up. We hope to give all the participants the necessary knowledge to set up a successful RFA programme in their own clinic.

Major target group: Interventional radiologists; surgeons and internal medicine specialists with experience in image-guided interstitial interventions.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

Theoretical section
Clinical context
Evidence base for local tumour treatment
- Hepatocellular carcinoma
- Metastatic colorectal carcinoma
- Local tumour ablation with other or rare malignancies

Clinical context
Indication for the surgical resection
- Liver resection for metastases of different tumours
- Surgical management of HCC
- Possibilities and limitations of thoracic surgery
- Kidney surgery and current guidelines for the treatment of renal cell carcinoma

Technical basics
Radio frequency generators and applicators
- Monopolar and bipolar systems, screens and probes
- Ways to target: Measurement of impedance or temperature?
Technical basics

Image guidance

- Sonography, computed tomography and open MRI

Patient management

- Preparation, sedation, periinterventional management
- Follow-up

Practical section

Using a phantom and a large animal model

- Positioning of applicators in the phantom by means of sonography, computed tomography or magnetic resonance imaging
- Positioning and tumour ablation under sonographic, computed tomography and/or magnetic resonance imaging
- Image management using a large animal model (liver, lung, kidney; artificial tumour imaging by injection)
SIRT workshop

**Instructors:**
Dr. O. Großer, Chemical engineer M. Klopfeisch, Prof. M. Pech, Prof. J. Ricke, Prof. M. Seidensticker, PD Dr. M. Powerski

**Maximum number of participants:** 10

**Duration:** 1.5 days

**Course fee:** on request

**Course objective:** Minimally invasive oncology is on the rise due to significant improvements in radioembolisation (SIRT) techniques. Results from SIRT are particularly favourable in HCC, metastatic colorectal carcinoma, and hepatic metastatic breast cancer. SIRT is technically demanding for both the nuclear medicine specialist and the interventionalist - in addition, a cooperative team that includes hepatologists, oncologists and surgeons is desirable for the successful development of a SIRT programme.

**Major target group:** Interventional radiologists with experience in microcatheter techniques, nuclear medicine specialists.

This course can be adapted to individual needs of e.g. hospitals and practitioners.

---

**Day 1**
**Practical section**
Hospitation Live Interventions
- SIRT Evaluation
- SIRT

**Day 2**
**Theoretical section**
Weekly interdisciplinary SIRT Conference

**Lectures**
- Indications for SIRT (HCC, mCRC), secondary resection after SIRT
- Reild - complications, prevention and management
- Tc-99m-MAA perfusion Scintigraphy, dosimetry and treatment validation
  on request
- Evaluation Angiography
- Dosimetry
- Technical aspects of coiling
- Delivery of Y90
- Controversies in SIRT
- Educative examples
MRI of the liver with hepatocyte-specific contrast agents

Instructors:
Prof. F. Fischbach, PD Dr. K. Fischbach, Dr. R. Seidensticker
Prof. M. Seidensticker
Maximum number of participants: 18
Duration: 1 day
Course fee: on request

Course objective: Hepatobiliary contrast agents represent a real revolution for liver imaging. At the beginning of the MRI era, an improvement of the detection rate of focal liver lesions was hailed. Today, hepatobiliary contrast agents are not only the key to high detection rates: we also obtain valuable additional information about the dignity of a lesion. Most striking are the advances that have been reached with hepatobiliary contrast agents in the diagnosis of HCC: a complete hepatobiliary MRI allows conclusions to be drawn about the differentiation grade of tumours or precancerous lesions, meaning that such an MRI is not only highly valuable to clinicians, but also to pathologists.

Major target group: Radiologists, hepatologists, gastroenterologists, surgeons specialised in liver surgery. This course can be adapted to individual needs of e.g. hospitals and practitioners.

Theoretical section
- Fundamentals of hepatobiliary contrast agent
- Technical basis of liver MRI
- Differential diagnosis of focal liver lesions
- MRI of hepatocellular cancer

Practical section
- Live demonstration:
  - MRI liver using hepatobiliary contrast agent (examination preparation, planning and implementation)
- Development of diagnostic criteria and findings
- Independent and interactive case analysis
PICC Line
(Peripherally Inserted Central Catheter)

Instructor:
Prof. M. Pech, Prof. M. Seidensticker

Maximum number of participants: 8
Duration: 1 day
Course fee: on request

Course objective: This workshop aims to provide participants with a sound knowledge of different PICC line types, indications, insertion techniques, nursing as well as possible complications and how to handle these.

The core objective of the theoretical section is to identify the important indications for PICC lines as well as to clarify the advantages and disadvantages of the PICC line as compared to other venous or central venous accesses. In addition, various image-guided access paths and different PICC line types are discussed. Participants will receive information on proper care of PICC lines as well as on possible complications and how to manage these. In a subsequent practical session ultrasound-guided peripheral vessel puncture and canulation will be practised using a phantom. Afterwards, the PICC line system is demonstrated on multiple live cases.

Major target group: Technologists with a sound knowledge of angiography who have so far little or no experience with the insertion and use of PICC lines.

This course can be adapted to individual needs of e.g. hospitals and practitioners.

Theoretical section
- Overview of indications for PICC lines
- Overview of various PICC line types
- Comparison PICC line to CVC and cannule, advantages and disadvantages
- Anatomy of the veins
- Image-guided placement of different PICC line systems
- Change and correction of PICC lines
- Maintenance and correct use of PICC lines
- Possible complications and their management
Practical section

- Training of ultrasound-guided venipuncture using a phantom
- Demonstration of the various PICC-line systems
- Image-guided placement of PICC lines
- Live cases
Interventions using the high-field open MRI (Panorama HFO)

Instructors:
Prof. F. Fischbach, PD K. Fischbach

Maximum number of participants: 8, of which max. 4 interventionists, max. 4 radiographers

Duration: 2 days

Course fee: on request

Day 1

Theoretical section
- Interactive platform Panorama HFO – hard- and software

Practical sessions Panorama HFO
I. Live cases
- Case 1 brachytherapy of the liver
- Case 2 direct arthroscopy of the shoulder
- Case 3 free-hand biopsy of the breast

II. Hands-on interventions in teams (interventionalist+technician)
- parallel -
  Teaching: MR-guided interventions: indications and procedure
  - Team 1/2 non-anatomic phantom
  - Team 3/4 anatomic phantom

Day 2

Theoretical section
- MR physics for the interventionalist,
- MR-compatible devices

Practical sessions Panorama HFO
Hands-on interventions in teams (interventionalist and technician)
- parallel -
  Teaching: MR-guided interventions: indications and procedure using dedicated anatomical phantoms

Course objective: This workshop aims to provide participants with a sound knowledge of different PICC line types, indications, insertion techniques, nursing as well as possible complications and how to handle these. The core objective of the theoretical section is to identify the important indications for PICC lines as well as to clarify the advantages and disadvantages of the PICC line as compared to other venous or central venous accesses. In addition, various image-guided access paths and different PICC line types are discussed. Participants will receive information on proper care of PICC lines as well as on possible complications and how to manage these. In a subsequent practical session ultrasound-guided peripheral vessel puncture and canulation will be practised using a phantom. Afterwards, the PICC line system is demonstrated on multiple live cases.

Major target group: Technogists with a sound knowledge of angiography who have so far little or no experience with the insertion and use of PICC lines.

This course can be adapted to individual needs of e.g. hospitals and practitioners.
Endoscopy course: Gastrointestinal bleeding

Instructors:
Dr. J. Weigt

Maximum number of participants: 10
Duration: 1 day
Course fee: on request

Course objective: Targeting a visceral bleeding can represent a challenge for endoscopists. Usually, endoscopy is the first approach used for patients with an obscure blood loss from the gastrointestinal tract in order to identify the bleeding site and ideally to achieve adequate haemostasis at the same time. The aim of this course is to prepare endoscopists for such clinical situations and to train them in achieving sufficient haemostasis. In vitro models using pig stomachs have proven to be very practical for such purposes. Accordingly, this course not only offers the theory on the recommended approach to gastrointestinal bleeding through lectures, but also practical sessions using pig stomachs.

Target group: Endoscopists/endoptic nurses.
This course can be adapted to individual needs of e.g. hospitals and practitioners.

Theoretical section
- Risk stratification and staging
- Treatment guidelines: ulcer bleeding, portal hypertension, lower GI bleeding
- Conservative therapy in portal hypertension
- Technical fundamentals for endoscopic hemostasis
- Material: clips, injections, sclerotherapy, ligation, APC, electrocoagulation
- Endoscopic therapy in portal hypertension
- ICU management

Practical section
- Hands-on model (Pig stomach)
Stent course: Gastrointestinal stents

Instructor:
Dr. J. Weigt

Maximum number of participants: 8-12
Duration: 1 day
Course fee: on request

Course objective: The application of self expanding metal stents has become a standard method in the medical field. The course will deal with the indications, complications and techniques of gastrointestinal stents. Special emphasis is placed on different stent designs and especially the endoscopic application, and stent removal. Participants will have the chance to place various stents under expert supervision during the course.

Target group: Endoscopically active doctors and nurses (participation in a team is preferred). This course can be adapted to individual needs of e.g. hospitals and practitioners.
Minimally invasive pancreatic surgery

Instructor: Prof. C. Bruns
Maximum number of participants: 8
Duration: 1.5 days
Course fee: on request

Course objective: Laparoscopic techniques are increasingly being used in pancreas surgery. The participants of this course will acquire the necessary theoretical knowledge for the indication for laparoscopic pancreatic surgery, including up-to-date imaging of the pancreas. The practical part provides the opportunity to participate in an open, laparoscopic pancreatic resection.

Target group: Advanced hepatobiliary surgeons. This course can be adapted to individual needs of hospitals.

Day 1
Theoretical Section
- Up to date pancreatic imaging
- Pancreatic NETs
- Cystic pancreatic lesion
- Indication for IPMN operations

Day 2
Practical Section
- Pylorus-preserving pancreas head resection
- Laparoscopic spleen-preserving left-sided pancreatic resection
Tumour conference simulation for surgeons

Instructors:
Prof. Dr. C. Bruns, Prof. Dr. J. Ricke, Prof. Dr. D. Modest

Maximum number of participants: 12

Duration: 1.5 days

Course fee: on request

**Theoretical section**
- Principles, indications, techniques

**Practical section**
- Practical exercises using a large animal model; cholecystectomy, splenectomy, sigma resection

**Course objective:** Fundamental positioning of surgery in tumour conferences. Treating solid tumours increasingly includes multimodal treatment concepts consisting of surgery, chemotherapy and locoregional tumour ablation.

In this course, evidential treatment options for hepato-pancreatobiliary tumours are examined. Moreover, different approaches for personal, individual treatment methods will be discussed. The acquired know-how and skills will be trained with interdisciplinary experts during interactive tumour board simulations using selected case examples.

**Major target group:** Oncological surgeons.

This course can be adapted to individual needs of hospitals.
Hyperthermic Intraperitoneal Chemotherapy (HIPEC)

Instructor: Prof. Dr. C. Bruns, PD Dr. F. Popp

Maximum number of participants: 12
Duration: 2 days
Course fee: on request

Course objective: The objective of this course is to impart theoretical and practical aspects regarding the treatment of peritoneal carcinomatosis of different entities. The current state-of-the-art practice is discussed. Both cytoreductive details and procedures of HIPEC procedures are conveyed in the form of presentations and videos. The participants learn different techniques for cytoreductive surgical procedures using a large animal model and discuss their advantages and disadvantages with experts. Case presentations highlight the interdisciplinary nature of the procedures and an interactive interdisciplinary collaborative approach is presented.

Target group: Surgeons with abdominal and oncological focus. This course can be adapted to individual needs of e.g. hospitals and practitioners.

Day 1
Theoretical section
Introduction
- Multidisciplinary treatment regime in peritoneal carcinoma

Basics
- Surgical cytoreduction (CRS) and hyperthermic intraperitoneal chemotherapy
- Multivisceral resection - splenectomy, cholecystectomy, omentectomy
- Timing of HIPEC
- Patient selection based on peritoneal carcinomatosis index (PCI)
- Preparation for day 2
- Macroscopic anatomy of a large animal model (pig)
Treatment Methods
- Colorectal cancer
- Stomach cancer
- Ovarian cancer
- Mesothelioma
- Pseudomyxoma peritonei, peritoneal mucinous carcinomatosis

Perioperative procedures
- Local intra-abdominal Chemotherapy and immunotherapy
- Hyperthermic treatment (temperature, duration, interval)
- Fast track and perioperative management
- Complications and management
- aftercare

Health and safety regulations
- Dealing with chemotherapeutic agents in the operating room

Day 2
Practical section
Using a large animal model
- Video of technical execution
- Bedding
- Implementation of the CRS using electrocoagulation, ultracision, manual, etc.
- Resection in the area of the diaphragm and application of various medical devices
- Operation site mesentery of the small and large intestine
- Operation site pelvic area
- Abdominal wall
- Crura
- Hepatoduodenal ligament
- Omental bursa
- Liver resection
- Liver capsule resection
- Stomach and partial gastric resection
- Small and large bowel resection
- Resection of serosal intestinal surface
- Resection of peritoneal coating of the bladder
- Lymph nodes detection and extirpation of the mesentery
- Cholecystectomy
- Splenectomy
- Omentectomy
- HIPEC as a closed procedure
- HIPEC as an open procedure
Hands-on workshop:  
Single Incision Laparoscopy (SILS)

Instructors:  
PD Dr. Pawel Mroczkowski, Dr. A. Schorcht  
Maximum number of participants: 12  
Duration: 1 day  
Course fee: on request

Course objective: Operations using only a single access port have become much more common over the past two decades. Single-port surgery is a useful alternative to NOTES techniques which represent the more variable procedure. This technique utilises the belly button as the surgical access point, enabling scar-free results with only minor abdominal trauma. The procedure is technically demanding. This course offers intensive coaching in theory and in practice to prepare the participants optimally to perform single-port surgery individually.

Target group: Surgeons with experience in laparoscopic surgery. This course can be adapted to individual needs of e.g. hospitals and practitioners.

Theoretical section  
- Principles  
- indications  
- techniques

Practical section  
Practical exercises using a large animal model  
- cholecystectomy  
- splenectomy  
- sigma resection
Hybrid-Operation: Rotation angiography using Artis Zee/Zeego for surgeons

**Instructors:**
Prof. J. Ricke, Prof. Z. Halloul

**Maximum number of participants:** 8

**Duration:** 1 or 2 days, second practical day can be booked additionally, Practical section optionally using phantom or a large animal model

**Course fee:** on request

**Course objective:** Modern angiographic equipment is increasingly gaining importance and enables the combination of up-to-date diagnostics with minimally invasive and endovascular treatment therapies in operation rooms. The angiographic equipment Artis Zee/Zeego (Siemens) introduced in this course is a central element in many hybrid operation rooms.

The objective of this course is how to implement the Artis Zee/Zeego in the most professional, effective way for complex and demanding surgical approaches, such as the endovascular treatment of aortic aneurysm (EVAR), as well as image-guided laparoscopic interventions. Thanks to the intense, practical training by experienced radiologists using the most modern equipment and phantoms or large animal models, this course is an excellent preparation for implementing this most effective equipment in a real-life setting.

**Major target group:** Surgeons with access to such equipment or planning to implement such equipment.

This course can be adapted to the individual needs of hospitals and practitioners.

---

**Day 1**

**Theoretical section**

**System operation**
- Presentation of the key functions of the console operation
- Examination: screening, recording, reference images, roadmap, overlay
- Presentation of the main functions for image and scene post-processing

**Console operation**

**(MultiModality Workplace)**
- Introduction to the terminology: InSpace 3D, DynaCT, DR Dynavision (3D DR), (DSA) Dynavision (3D DSA), i-Dentify, i-Guide, i-Pilot, PBV
- Presentation of the core applications:
  - Syngo patients list, syngo viewing, loading 3D volume
  - Technique for reconstruction of a 3D data set (InSpace reconstruction), DYNA-CT illustrations, syngo 3D Basic -MIP, MPR and SSD reformats, syngo 3D VRT – Volume Rendering, advanced 3D processing and bone removal
  - Archiving: exporting/saving reconstructions
Advanced rotational angiography studies
- Preparations (patient/device/KM injector)
- DR DynaVision (3D DR): examination process, reconstruction, clinical applications
- (DSA) DynaVision (3D DSA): examination process, reconstruction, clinical applications
- Syngo i-Guide Needle Guidance:
  - Examination process, reconstruction, clinical applications
- Syngo i-Pilot (3D overlay): examination process, reconstruction, clinical applications

Peripheral angiography
- Quantitative vessel analysis:
- Analytical procedure, course, analysis, clinical application
- Peristepping and perivision:
- Examination process, reconstruction, clinical applications

Clinical applications
Head/neck
- Embolisation of AV malformations
- Coil embolisation of aneurysms at the base of the brain
- Inner ear and temporal bone representation before and after CI implantation
- PBV calculation at ischemic stroke

Body
- pre-, peri- and post-interventional imaging in the context of a TACE
- radioembolisation in primary and secondary liver tumours
- Embolisation of visceral aneurysms
- Percutaneous embolisation of aortic endoleaks
- Illustration of cement distribution after vertebroplasty/kyphoplasty

Day 1
Practical section
Venue: Experimental Factory, Magdeburg
Working on a phantom
- implementation of rotational angiography on the phantom (Flow model)

Extra Day
Can be booked alternatively or in addition to day 1
Practical section
Venue: Experimental Factory, Magdeburg
Using a large animal model
- Implementation of rotational angiography by standard acquisition protocol for head/neck and body using a large animal model (pig)
- Puncture simulation using i-Guide (renal pelvis)
- Catheter navigation using i-Pilot (hepatic arteries)
- Cerebral PBV measurements
- Practical exercises for postprocessing at the workstation
The Deutsche Akademie für Mikrotherapie offers training courses for manufacturers of catheters and major equipment. These courses provide relevant insight into clinical practice in a highly specialised interventional centre. They are as well suitable for employees who are new to the interventional area. This insight into the daily routines of a hospital and how to handle this special equipment helps to shorten the training period drastically.

The academy has organised a variety of such training courses for different manufactureres of catheters and major equipment which gives us the experience you can use for your needs.

Our portfolio basically contains training courses about imaging, minimally invasive oncology as well as the treatment of vascular diseases. There is however the possibility to design individual courses according to your needs.

Please do not hesitate to contact us for any further information.
Prof. Holger Amthauer  
specialist in nuclear medicine

PD Dr. Ivayla Apostolova  
specialist in nuclear medicine

Dr. Hassina Baraki  
heart and thoracic surgeon

PD Dr. Christoph Benckert  
radiologist

PD Dr. Frank Benedix  
radiologist

PD Dr. Alexander Berth  
orthopaedic surgeon

Dr. Oliver Beuing  
neuroradiologist

Prof. Christiane Bruns  
surgeon

Dr. Lars Büntjen  
neurosurgeon

Prof. Frank Fischbach  
radiologist

PD Dr. Katharina Fischbach  
radiologist

Dr. Benjamin Garlipp  
surgeon

Dr. Oliver Großer  
Medical Physicist, Radiation Protection Officer

Dr. Johannes Hadem  
heart and thoracic surgeon

Prof. Zuhir Halloul  
vascular surgeon

Dr. Peter Hass  
radiotherapist

PD Dr. Jörg Herold  
cardiologist

Dr. Julian Jürgens  
radiologist

Dipl.-Chem. Maurice Klopflisch  
chemical engineer

Dr. Anja Lenz  
neuroradiologist

PD Dr. Uwe-Bernd Liehr  
urologist

PD Dr. Alexander Link  
gastroenterologist

Prof. Rüdiger Linke  
anatomist

Dr. Rüdiger Lohmann  
Lohmann & Birkner, Health Care Consulting GmbH

Prof. Peter Malferttheiner  
gastroenterologist

Prof. Peter Mertens  
nephrologist

PD Dr. Dominik Modest  
oncologist

Dr. Konrad Mohnike  
radiologist

Prof. Maciej Pech  
radiologist

PD Dr. Maciej Powerski  
radiologist

PD Dr. Pawel Mroczkowski  
surgeon

Prof. Jens Ricke  
radiologist

Prof. Georg Rose  
medical technician

PD Dr. Thomas Roskoden  
anatomist

Dr. Cordula Scherlach  
neuroradiologist

Dr. Alexander Schorcht  
surgeon

Dr. Christian Schulz  
gastroenterologist

PD Dr. Kerstin Schütte  
gastroenterologist

Dr. Steffen Serowy  
physicist

Prof. Oliver Speck  
Department Biomedical Magnetic Resonance

Prof. Max Seidensticker  
radiologist

PD Dr. Ricarda Seidensticker  
radiologist

Dr. Jan Smid  
cardiologist

Prof. Jürgen Voges  
neurosurgeon (stereotactic)

Dr. Anne-Kathrin Wagner  
specialist in internal medicine

Dr. Jochen Weigt  
gastroenterologist

Prof. Stefanie Wolff  
surgeon

Prof. Walter Wohlgemuth  
radiologist

Prof. Walter Wohlgemuth  
radiologist

Dr. Christian Wybranski  
radiologist
The Deutsche Akademie für Mikrotherapie provides a comprehensive and differentiated range of courses and provides extensive support to course participants.

This wide range of additional services aims to produce a high degree of satisfaction among the course participants and sponsors. Our staff not only organise the courses, but also take care of all the logistics including smooth arrival and departure as well as ensuring a pleasant stay. The individual attention paid to participants and sponsors by our team ensures an effective learning outcome and maximum convenience. All of our courses include comprehensive teaching materials for later study.

In addition to our versatile spectrum of interdisciplinary courses, we offer individually constructed courses to meet the special needs of hospitals, practitioners and industry.

Feel free to get in touch!

Teaching and imparting knowledge about the field of microtherapy is not the only goal of the academy. The invention and development of new therapeutic microtherapeutic devices and methods is also a major objective. The Deutsche Akademie für Mikrotherapie has modern equipment and access to a large animal laboratory, meaning it is well set up for preclinical studies with a scientific focus on the development and evaluation of new therapeutic microsurgical instruments and techniques. This includes close collaboration with industrial partners, meaning that requests from end users and their requirements can flow directly into prototype development. The facility is able to conduct systematic animal experiments under the most modern technical conditions. Furthermore, initial results from patients can be gathered in clinical settings in cooperation with the Faculty of Medicine of the University of Magdeburg.
Technical equipment

Institute of Medical Technology and Research (IMTR) Rottmersleben
The IMTR in Rottmersleben near Magdeburg has a state-of-the-art equipment that allows course participants a very authentic learning experience using large animal models. The institute has a ground-mounted Siemens Artis Zee system. The outstanding image quality, smooth workflow and highly flexible positioning of the C-arm during an intervention make this appliance the teaching tool of choice. Furthermore, the IMTR has a hemodynamic and electrophysiological registration and information system as its disposal. The system supports our students, for example, in vascular interventions, the implantation of stents or ablations in electrophysiology.

University Hospital of Magdeburg
The Center for Radiology at the University Hospital of Magdeburg has an open high-field MRI with a field strength of 1.0 Tesla (Panorama, Philips) that offers excellent access to the patient during a variety of fluoroscopic MR-based interstitial interventions. Modern multi-slice devices from Siemens and Toshiba are available for CT-guided interventions. For vascular interventions, an Artis Zeego and biplanar Artis Q (Siemens) are used. State-of-the-art MRI diagnosis is possible at 1.5 and 3 Tesla.

The Department of General, Visceral and Vascular Surgery has four operating rooms. It is designed as an operating theatre with an interactive, endoscopic operating room. The OR1 system from Karl Storz is used. There are three 24’’ HDTV monitors available. The image and video documentation is realised with an Aida system. This allows video transfer via a data cable or via the internet. All of the common dissection techniques (Ultracision®, LigSure®, Cusa®, SonoSurg®) are available for minimally invasive and conventional surgical preparation.

The Department of Gastroenterology, Hepatology and Infectious Diseases has gastroscopes from Olympus (GIF Q180, GIF H180Q, GIFQ160Z with zoom magnification), the Olympus duodenoscopes V-series, an endoscopic ultrasound from Aloka Company/Olympus with a radial and longitudinal scanner and a double balloon endoscopy from Fujifilm. The participants can use these devices in the hands-on sessions for the endoscopic treatment of gastrointestinal bleeding.
Experimental Factory of the Otto-von-Guericke University Magdeburg
Since 1 June 2008, the junior scientist group at the Otto-von-Guericke-University Magdeburg, led by Prof. Georg Rose (Chair for Medical Telemetric and Medical Engineering) and Prof. Bertram Schmidt (Chair for Microsystems Technology) at the faculty for Electrical Engineering and Information Technology, has been working on the development of an intelligent catheter for conservative operating techniques.

The novel research project has been supported by 4.5m euro in funding over five years as part of the InnoProf.ile-Initiative “Unternehmen Region” from the Federal Ministry of Education and Research. The interdisciplinary working junior scientist group carries out research using their own equipment in their own laboratories.

The innovative medical technology being developed here enables minimally invasive, catheter-supported interventions in neurology, tumour therapy and orthopaedics.

The catheter technologies are developed after an exact analysis of the medical requirements and workflows in close collaboration with the university hospital in Magdeburg. Local SMEs are involved in turning the scientific results into finished products.

Background
The demand for innovations in minimally invasive surgery is very high. Minimally invasive operating techniques, micro-technology as well as imaging and image processing systems will be the key to advance in the next 5 years.

Aims
The aim is to develop an intelligent catheter that is navigated within the human body to the focus of disease for medical diagnostic procedures and therapy treatment. These catheters should deliver significant information for medical diagnoses and enable therapy to be started immediately with the aid of micro tools, with sensors at the tip of the catheter ensuring minimal radiation exposure. The intervention is made using a special x-ray-system or with a magnetic resonance tomography (MRT), allowing the position and movement of the catheter to be observed and controlled constantly.

Results
The novel functionality of the catheter expedites the operation, improves the results and decreases radiation exposure for the patient. Additionally, the costs of the intervention are lower.

Further Information
http://www.inke-md.de
Cooperations

The Deutsche Akademie für Mikrotherapie (DAfMT) works closely with numerous organisations. The most important of these is the collaboration with the University Hospital of Magdeburg, which provides mutual support for medical and student education, as well as in research and development in the field of microtherapy. Furthermore, part of the courses is conducted using the most modern medical equipment at the University Hospital of Magdeburg.

The Federal Ministry of Education and Research (BMBF) also supports the Deutsche Akademie für Mikrotherapie via the research grant “STIMULATE”, provided by the University of Magdeburg. The DAfMT offers training courses for engineers and medical technicians since 2013. These courses aim to provide doctors working in the field of research and development insights into the field of engineering. Likewise, engineers will get to know the clinical and medical point of view. STIMULATE is part of the funding initiative of the Federal Ministry of Education and Research for a time frame of 15 years.

The DAfMT is proud to be an exclusive technology partner of the renowned company Siemens in the fields of computed tomography and digital subtraction angiography. Siemens and the Deutsche Akademie für Mikrotherapie have engaged in diverse collaborative projects which range from training programmes to research and development. This is an asset of utmost importance to the DAfMT as this helps to guarantee the most up-to-date imaging techniques and innovative image guided interventions.

Another important collaboration is with the Experimental Factory of the technical faculty of the University of Magdeburg. The faculty carries out intensive research in the field of catheter development as well as image guidance. The equipment made by the Experimental Factory, which includes an ultra-modern angiography unit and a high-field magnetic resonance imaging system, is also used in our programmes. Our cooperation with the large animal laboratory IMTR in Rottmersleben is also invaluable. This is where the majority of the practical training on large animals takes place.

partner of

Official technology partner for CT and DSA of the DAfMT

partner of the research campus STIMULATE
The challenge of releasing own developments on the market is immense, even for research and development departments of major medical manufacturers. The LIAM Ltd. runs your development process from the lab stage through practical validation supported by professors excelling in interventional and surgical disciplines at the University Hospital Magdeburg. LIAM offers medical and pharmaceutical company counselling and preclinical validation of applications, particularly in the field of image-guided interventions. The cooperation with experts from image-guided interventions and surgery provides the interdisciplinary consultation needed to optimise development and marketing while minimising the time-to-market.

Exclusive training programmes are offered in cooperation with the Deutsche Akademie für Mikrotherapie led by specialists of all disciplines of image-guided interventions and surgery. LIAM’s combination of expertise, modern imaging devices (DSA, MRI, CT, ultrasound, PET-CT, MR-PET) and authentic training simulations using animal models offers an extraordinary infrastructure for your ideas!
Team

Prof. Dr. med. Jens Ricke  
Chairman of the board

PD Dr. med. Christoph Benckert  
Development - surgical courses

Prof. Dr. med. Christiane Bruns  
Vice Chairmann of the board

Annika Kral  
Training course management & Controlling

Prof. Dr. med. Max Seidensticker  
Scientific director

Madeleine Beneke  
Training course management
Directions and maps

Deutsche Akademie für Mikrotherapie
Leipziger Strasse 44
39120 Magdeburg
Germany

in-house:

House 60a:
Department of Radiology and Nuclear Medicine
Medical Faculty
Otto-von-Guericke University Magdeburg
Leipziger Str. 44 / Basement – Level -1
39120 Magdeburg
If you require additional information or assistance when organising your journey, we would be delighted to help you at any time.
Information

Deutsche Akademie für Mikrotherapie e. V.
International School of Image-Guided Interventions
Leipziger Str. 44
39120 Magdeburg, Germany

Phone: +49 (0)391 67 15561
Fax:     +49 (0)391 67 13383

info@dafmt.de
www.dafmt.com

Authorised Board
Prof. Jens Ricke
Prof. Christiane Bruns

Register of Associations Stendal
Registered association number: VR 2810

Responsible in the sense of RStV
Prof. Jens Ricke
Leipziger Straße 44
39120 Magdeburg, Germany

Copyright and Trademark Law
On our pages you will find material that may be subject to the copyrights of others. Our general copyright notice only applies to our works, not that of third party materials. This is meant as a warning that there are copyrights, which must be considered by visitors. We strive to respect the copyrights of the images, graphics, sound files, video sequences and texts of others and to use pictures, graphics, sound files, video sequences and texts made by us or on our behalf. All brandnames and trademarks mentioned in this brochure may be protected by patents and as such protected by the applicable trademark law and the rights of the copyright owner. The mere mention does not imply that trademarks are not protected by law. The copyright for published objects created by the provider remain with the sole provider of these pages. Any reproduction or use of such graphics, sound files, video sequences and texts in other electronic or printed publications without the express consent of the provider is prohibited.

Photo rights:
Page 2, 3, 4, 5, 11, 13, 15, 18, 19, 23, 25, 27, 28, 31, 33, 35, 36, 37, 41, 42, 43, 46, 50, 53, 54, 56, 58, 59, 60, 66 ©Anke Hirsch
Page 8 ©istockPhoto
Page 21 ©Focal One, edap TMS
Page 17, 39, 45 ©Department of Radiology and Nuclear medicine, University Hospital Magdeburg, Germany
The Deutsche Akademie für Mikrotherapie
thanks the following companies and institutions
for their generous support of continuing education courses:

**SIEMENS**
Official technology partner
for CT and DSA of the DAfMT

**LIAM**
Laboratory for innovation, application and medical education in image-guided interventions and surgery
Cooperation with the Innovating- and
Research Center LIAM

**Federal Ministry of Education and Research**
partner of the
research campus STIMULATE

**DeGIR**

**STIMULATE**

**Abbott**
A Promise for Life
Now a part of St. Jude Medical

**BARD**
DAVOL INC.

**COOK**
MEDICAL

**Guerbet**
Contrast for Life

**Medtronic**

**Covidien**

**Leufen**
Your Vision, Our Future

**Olympus**

**Penumbra**

**Philips**

**SIRTeX**

**Storz**
Karl Storz – Endoskopi

**Soramic**
Deutsche Akademie für Mikrotherapie e. V.  
(DAfMT)  
*International School of Image-Guided Interventions*  
Leipziger Str. 44  
39120 Magdeburg  
Germany  

Tel +49 (0)391 67 15561  
Fax +49 (0)391 67 13383  

info@dafmt.de  
www.dafmt.com