



LIAM
GmbH

Laboratory for innovation, application and medical education in image-guided interventions and surgery

exclusive training programmes

interdisciplinary teaching

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

preclinical research

consulting

2026/27

www.liam-lab.com



heart surgery



tumorboard
simulation



SIRT



animal lab



Brachy



online workshop



MRI



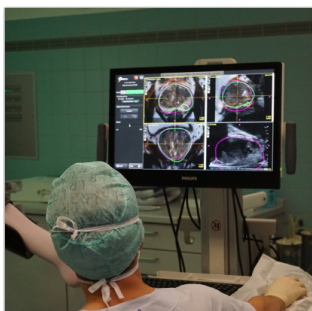
microcatheter
embolisation



referrer
symposium



Artis Zee



Focal One



hybrid surgery

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exclusive training programmes

interdisciplinary teaching

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

preclinical research

consulting

Founded in 2015 as a laboratory for innovation, application and medical education in image-guided interventions and surgery LIAM aims to improve medical treatments.

And this is how we do it:

Medical Trainings

We offer exclusive training programmes that are led by specialists of all disciplines of image-guided interventions and surgery.

Our diverse courses allow to try new medical devices and to learn modern interventions. The hands-on and work shadowing parts are ideal conditions for improving treatment skills whereas theoretical knowledge will be deepened in detailed academic sections.

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!

Furthermore, LIAM provides extensive support to course participants and partners.

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!



Preclinical Research

The challenge of releasing own developments on the market is immense, even for research and development departments of major medical manufacturers. That is why we run your development process from the lab stage through practical validation supported by professors excelling in interventional and surgical disciplines.

LIAM has modern equipment and access to a large animal laboratory, meaning it is well set up for pre-clinical 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.

Consulting

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.

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

Embolisation 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 radioembolisation 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 40000 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



>> 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

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

Infrapopliteal 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 revascularized?
- Medication
- Follow-up

Infrapopliteal 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

Infrapopliteal 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

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

>> 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)

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

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 metastatic 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

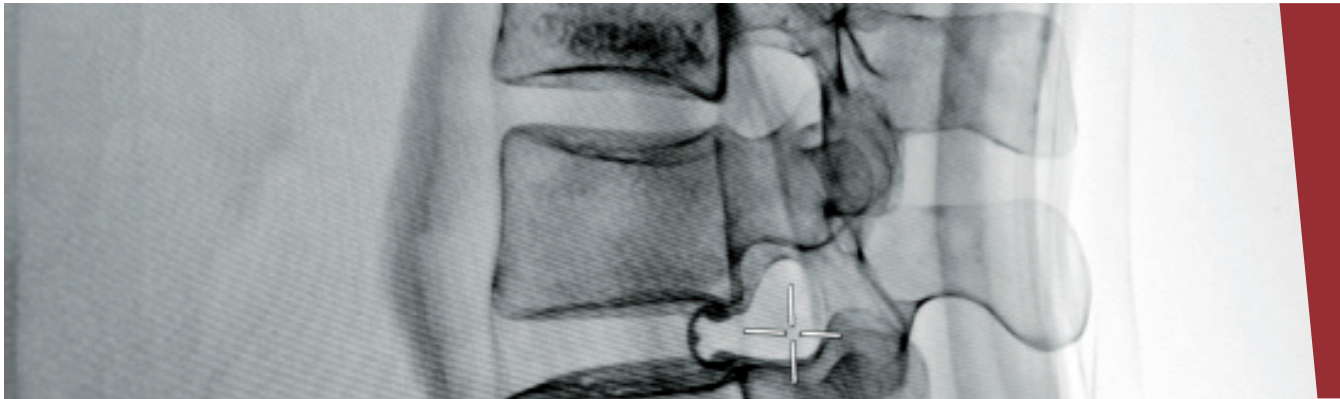
System operation

- 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
- Peristeping 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

Day 1

Practical section

Venue: Experimental Factory, Magdeburg

Working on a phantom

- implementation of rotational angiography on the phantom (Flow model)

- Puncture simulation using means of i-Guide on the phantom (spine)
- Coclear illustration on the phantom (temporal bone)
- Practical exercises for postprocessing at the workstation
- DYNA-CT
- 3D reconstructions using MIP, MPR and SSD reformats
- Temporal bone reconstruction

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

1 Interdisciplinary courses

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

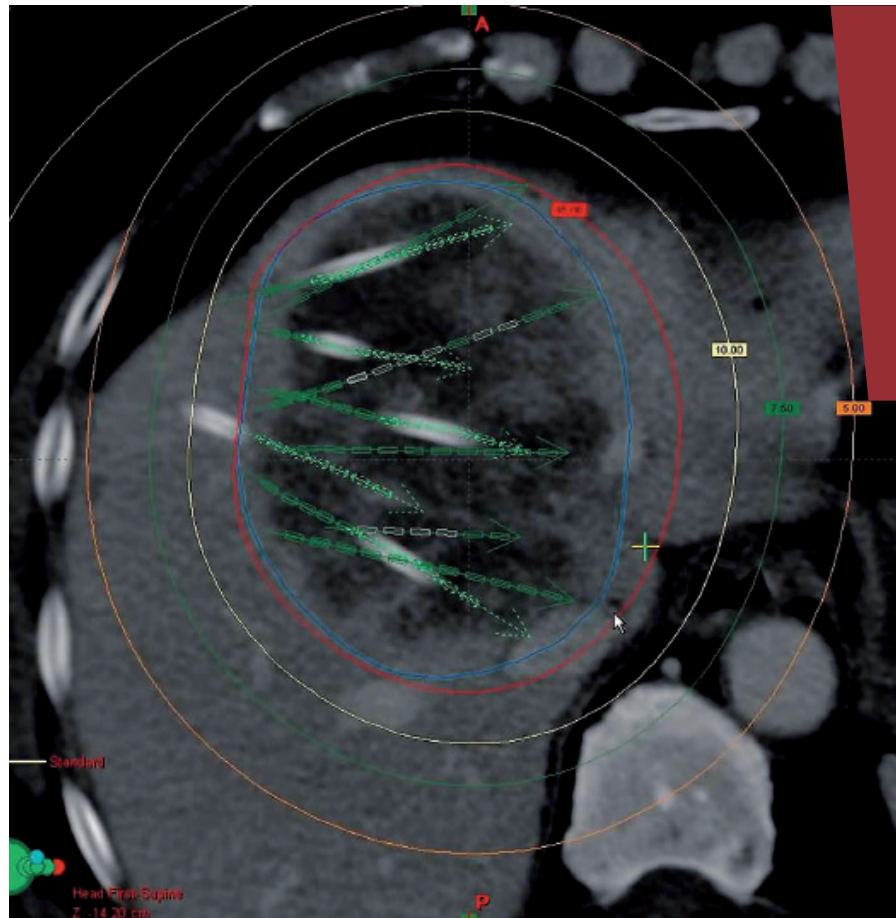
- Evidence base and indications for CT brachytherapy
- Patient management
- Preparation, sedation, periinterventional management
- Follow-up

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



1 Interdisciplinary courses

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.

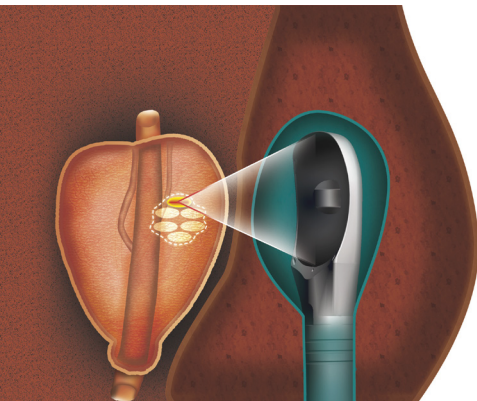


Theoretical section

- 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



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

Day 2

Hands-on:

- MRT-TRUS-fusion

Live case:

- Focal One HIFU-therapy

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.

1 Interdisciplinary courses

HCC Master Class Training Course in Magdeburg

Instructors:

Prof. C. Bruns, Prof. J. Rieke, 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

Resumée



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, symptomatic 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 to 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.



1 Interdisciplinary courses

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)

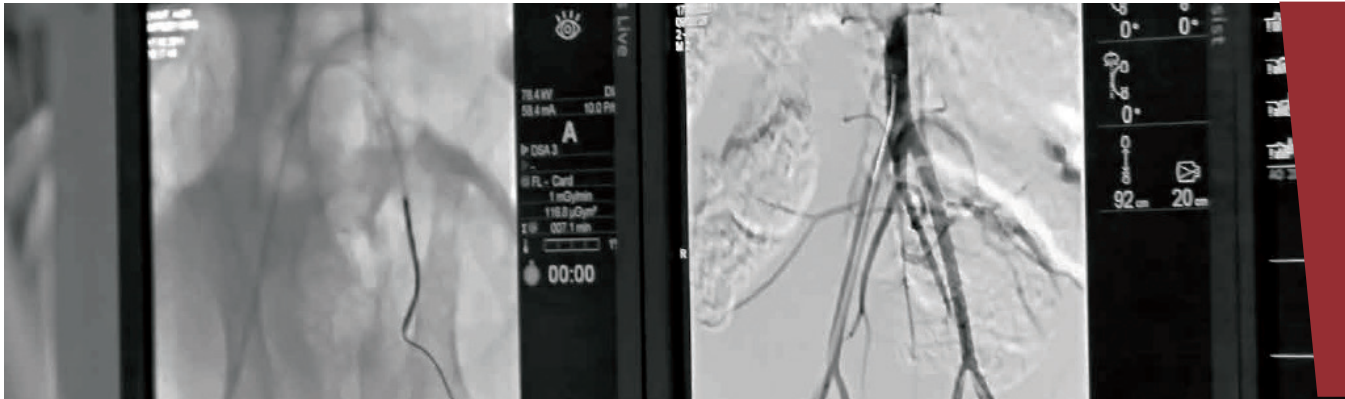
Vascular board conference simulation

- 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 angiology 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 trans-arterial 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/
Embolisation 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 and tricks, pitfalls, 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 and tricks, pitfalls
- Summary

Day 2 – Practical section

Lab exercises with large animal model

- Material demonstration - micro-catheter catheterisation 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

- Transcardial 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)



2 Interventional radiology courses

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)



2 Interventional radiology courses



SIRT workshop

Instructors:

Dr. O. Großer, Chemical engineer M. Klopffleisch, 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

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, pre-ventions 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

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.

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

2 Interventional radiology courses

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 cannulation 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



3



Endoscopy course: Gastrointestinal bleeding

Instructors:

Dr. J. Weigt

Maximum number of participants: 10

Duration: 1 day

Course fee: on request

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)

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/endoscopic nurses.

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

Stent course: Gastrointestinal stents

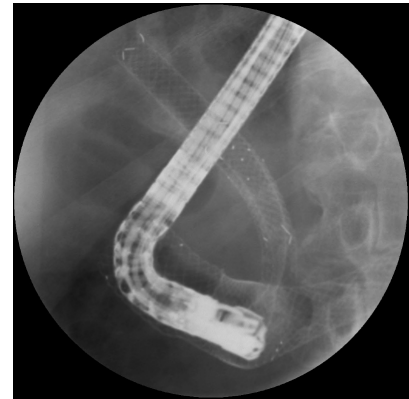
Instructor:

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.

4 Laparoscopic/surgical courses

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 practise 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 carcinosis

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

4 Laparoscopic/surgical courses

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

4 Laparoscopic/surgical courses



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
- Peristeping 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/kypheoplasty

Day 1

Practical section

Venue: Experimental Factory, Magdeburg

Working on a phantom

- implementation of rotational angiography on the phantom (Flow model)

- Puncture simulation using means of i-Guide on the phantom (spine)
- Coclear illustration on the phantom (temporal bone)
- Practical exercises for postprocessing at the workstation
- DYNA-CT
- 3D reconstructions using MIP, MPR and SSD reformats
- Temporal bone reconstruction

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



5 Teaching of company representatives



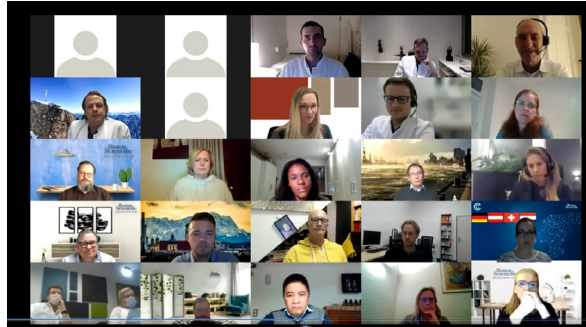
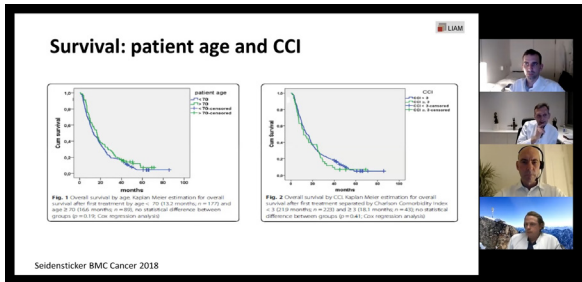
LIAM offers training courses for manufacturers of catheters and major equipment. These courses provide relevant insight into clinical practice in a highly specialised interventional centre. They are as well suitable for employees who are new to the interventional area. This insight into the daily routines of a hospital and how to handle this special equipment helps to shorten the training period drastically.

We have organised a variety of such training courses for different manufacturers 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.





6

The implementation of workshops in digital form is also part of the daily routine at LIAM.

All our courses can be designed to convey the key points in the form of tutorials and video conferences. Like our work shadowing courses, our online workshops also have an exclusive and personal character due to their subject-specific and interdisciplinary orientation as well as limited numbers of participants, so that every course participant can benefit from participating in the best possible way.

In addition, our online workshops have significant advantages:

- participants can easily dial into the course from anywhere in the world
- no long journey is necessary
- flexible knowledge transfer in the form of flipped chart lessons, interactive discussions or classic frontal teaching
- tutorials can be accessed at any time, from any location from any device
- discussion of any targeted questions in the live conferences
- speakers from a wide variety of disciplines from various hospitals around the world contribute a high diversity of expert origin and opinion to the course content

Please do not hesitate to contact us for any further information.

7 Preclinical Research

7



You are planning a preclinical in vivo study? We will give you the advice and support needed with our expertise and the highest technical standards in interventional procedures. Our team consisting of radiologists, surgeons, scientists and qualified supporting personnel will guide the course of your study in a competent and professional way – from initiation until finalization.

We offer:

- **Basic Research**

We will support you and your team during your research processes - together we will find answers and solutions!

- **Feasibility and Proof of Concept**

If you are planning to proof the practicality of your proposed idea or to develop a prototype of a medical device, we will be happy to validate your prototype using animal models.

- **Efficacy and Safety**

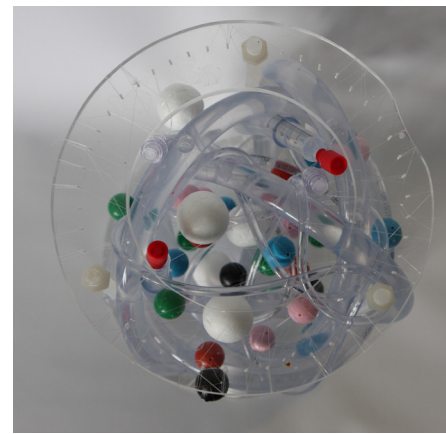
We will be pleased to evaluate the therapeutic effects and safety aspects of your medical devices or surgical procedures as well as supporting you up until certification and during clinical validation studies.

- **Biocompatibility**

The clinical success of a medical device critically depends on the host response to the biomaterial composition. We can test the biocompatibility of your device in chronic long-term in vivo studies.

- **Phase 1 study**

Once your prototype is certified, we can start a trial phase in clinical environments.





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 at its disposal. The system supports our students, for example, in vascular interventions, the implantation of stents or ablations in electrophysiology.

University Hospital of Magdeburg

LIAM 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 minimally invasive treatments. Furthermore, part of the courses is conducted using the most modern medical equipment at the University Hospital of Magdeburg, such as the hybrid operation room.



8 Technical equipment / Cooperation partners



Research Campus STIMULATE

Solution Centre for Image Guided Local Therapies

The Magdeburg Research Campus STIMULATE is a project within the initiative „Forschungscampus – Public-Private Partnership for Innovation“ funded by the Federal Ministry of Education and Research (BMBF).

The focus of STIMULATE are technologies for image guided minimally invasive methods in medicine. The aim is to improve medical treatments as well as to help contain of exploding health care costs. In particular, age-related common diseases in the areas of oncology, neurology and vascular diseases are considered. In the long term, the project aims to become the „German Centre for Image-guided Medicine“.

Structurally, the project is a public-private partnership between the Otto-von-Guericke-University Magdeburg, Siemens Healthcare GmbH and the STIMULATE Association, a series of leading regional and international SMEs.

STIMULATE MRI Laboratory

The MRI Laboratory is equipped with a clinical Siemens MAGNETOM Skyra 3T MRI with a bore of 70 cm (big bore) and a short magnet and is therefore ideally suited for image-guided interventions

STIMULATE Angio Laboratory

The angiography laboratory is equipped with a robot-mounted biplane angiography system of the latest generation of the type Siemens ARTIS icono biplane, offers unique opportunities for the development and evaluation of minimally invasive medical technology under conditions close to the clinic as well as for training and education of physicians and MTAs. With the two C-arms integrated into one system, the angiography system offers an enormously wide range of applications. The patient-free operation enables reliable planning of studies and experiments - from the basics to phantoms to animal models. The possibilities of using this combined X-ray/CT system of the latest design are unique in Germany.

Stimulate CT Laboratory

In combination with myExam Companion, the single source scanner SOMATOM® X.cite opens up the age of intelligent imaging. myExam Companion guides users intuitively through each examination and adapts the most important parameters to the individual patients. In this way, users of all skill levels can use the full potential of this new high-end system including its Vectron™ X-ray tube.

Further Information

<http://www.forschungscampus-stimulate.de>

LIAM thanks the following companies and institutions for their generous support of continuing education courses and research and development projects:



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