

Application for ECVDI Accreditation of a STANDARD SMALL ANIMAL BIASED TRACK Residency Programme in Veterinary Diagnostic Imaging

Name and Address of Institution:

Centre of Clinical Veterinary Medicine, Veterinary Faculty
Ludwig-Maximilian-University of Munich, Germany

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Germany

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Title of Programme:

Standard small animal biased track residency Programme

Is this a SA single track centre Standard Residency programme:

No

Programme Director:

Dr. Andreas Brühschwein, Dip. ECVDI
bruehschwein@lmu.de
+49-89-2180-5870

Resident Supervisors:

Dr. Andreas Brühschwein, Dip. ECVDI

1. Introduction/Objectives

The programme is a three year small animal biased training program at the Centre of Clinical Veterinary Medicine of the Ludwig-Maximilian-University Munich. It is focused on diagnostic imaging of small animals ("small animal biased track"). The training is designed to provide skills in all aspects of diagnostic imaging, with specific focus on obtaining studies and in interpretation of radiographs, ultrasound, computed tomography and magnetic resonance imaging. Besides small animal imaging the resident will be educated in large animal imaging at the Centre of Clinical Veterinary Medicine of

the Ludwig-Maximilian-University. Based on the limited caseload in large animal diagnostic imaging and nuclear medicine the resident will have to accomplish externships in these areas under general supervision of an ECVDI diplomate or associate member. Participation on international scientific meetings and publication of research projects in peer-reviewed journals during the residency is anticipated.

The training programme aims to provide skills in diagnostic imaging in clinical, educational and scientific areas by

- specialized in-depth clinical training in veterinary diagnostic imaging and related sciences
- experience in clinical service of a diagnostic imaging unit
- development of verbal and written reporting and communication skills
- teaching veterinary students and interns in diagnostic imaging
- opportunity for clinical research in veterinary diagnostic imaging
- participation in known case conferences, journal clubs and lectures
- preparation of the resident for the ECVDI exam

2. Application and selection procedure:

The position will be advertised on the ECVDI web site

Minimum qualifications for entry into programme:

- The candidate should be a graduate of a school or college of veterinary medicine with a veterinary medical degree that has been approved by the European Association of Veterinary Education Establishments (EAVEE)
- Licence to practice as a veterinarian in Germany (“Approbation”)
- Satisfactory moral and ethical standing in the profession
- One year internship (large or small animal) or equivalent clinical experience in veterinary practice, preferable with imaging experience
- Good knowledge of German and English language (written and spoken)

Content of the application:

- English CV
- Letter of intent
- Preferably contact information of 2 referees in the field of diagnostic imaging who can judge the applicants suitability for a diagnostic imaging residency (letters of recommendation)
- Selection process will be fair and open to all suitable candidates
- The final candidate will be selected by the programme supervisor and the Head of the Clinic of Small Animal Surgery and Reproduction
- Deadline for application is January 1st, three months prior to the start of the programme.

Free residency positions will be advertised on the ECVDI website

3. Training period

Total length of programme:

3 years (36 months)

Regular 36 months residency program (30 months of supervised clinical training)

Extended on 4 years, ½y before official start, ½y after final exam)

Duration of supervised clinical training:

30 months

Maximum number of residents on programme at any given time:

Maximum 2 residents at the same time

Starting Month of Residency:

1. April (first year)

In which month of which year will the candidate have completed 15 months of supervised training?

September of second year

Which month of which year is the last month of the 36 months minimum duration of the residency?

March of fourth year

Activities and responsibilities of the resident during non-supervised portion of the programme (Year 1 – 3):

- 3 month vacation (1 month / year)
- 3 month imaging research activity (see section 9: two international peer-reviewed publications in the field of diagnostic imaging, including one first author research paper), congress attendance and ECVDI exam preparation
- Graduate degree studies are not included in this programme

4. Other specialists and programmes at the Centre of Veterinary Clinical Medicine

ACVS & ECVS, ACVIM-CA (including Cardiology, Neurology, Oncology) and ECVIM-CA, ECVN, ECAR, ECEIM, ECBHM, ECZM, ACVP, ACVM

Prof. Dr. Andrea Meyer-Lindenberg

- Full Professor for Small Animal Surgery, Radiology and Anaesthesia

- Head of the Clinic of Small Animal Surgery and Reproduction
- Programme director and supervisor of the ECVS residency programme¹
- Fachtierärztin Chirurgie (German Veterinary Surgery Diploma)
- Zusatzbezeichnung Augenheilkunde (German Veterinary Ophthalmology Diploma)
- Gutachterin für Hüftgelenksdysplasie (Official Scrutineer for canine hip and elbow dysplasia)
- Board member of the GRSK e.V. (association for radiographic detection of genetically determined skeletal diseases in small animals)
- Member of the DOK (German Panel of scrutineers for the eye scheme, acknowledged by the ECVO)

Prof. Dr. Susanne Lauer, DACVS

- Professor for Small Animal Surgery

Prof. Dr. Hartmut Gerhards

- Full Professor for Equine Surgery, Radiology and Anaesthesia
- Head of the Clinic of Equine Surgery
- Fachtierarzt für Pferde (German Equine Medicine Diploma)
- Fachtierarzt Chirurgie (German Veterinary Surgery Diploma)
- Zusatzbezeichnung Augenheilkunde (German Veterinary Ophthalmology Diploma)
- Member of the radiology-committee of the German Radiology-Guidelines (Röntgenleitfaden) for the radiological examination of horses for purchase purposes

Prof. Dr. Lutz Göhring, Ph.D., Dip. ACVIM, Dip. ECEIM

- Full Professor for Equine Internal Medicine
- Head of the Clinic of Equine Internal Medicine
- Fachtierarzt für Pferde (German Equine Medicine Diploma)

Prof. Dr. Rüdiger Korbel, Dip. ECZM (Avian)

- Full Professor for Avian Medicine
- Head of the Clinic of Birds, Exotics and Zoological Medicine
- Fachtierarzt für Geflügel (German Avian Medicine Diploma)
- Zusatzbezeichnung Augenheilkunde (German Veterinary Ophthalmology Diploma)

Dr. Beate Walter, Dip. ECAR

- Fachtierärztin für Reproduktionsmedizin (German Veterinary Diploma in Animal Reproduction Medicine)

Dr. Gerhard Wess, Dip. ECVIM-CA, Dip. ACVIM-CA

- Echocardiography and interventional radiology

Prof. Dr. Andrea Fischer, Dip. ACVIM, Dip. ECVN

- Associate Professor for Neurology
- Fachtierärztin für Innere Medizin (German Diploma for Veterinary Internal Medicine)

¹ Certification as “European Specialist in Veterinary Surgery” for the period 2016 – 2021 granted by the Board of Regents and the Recertification Committee of the ECVS (see attachment)

Prof. Dr. Katrin Hartmann, Dip. ECVIM-CA

- Prof. Dr. Katrin Hartmann, Dip. ECVIM-CA
- Full Professor for Small Animal Veterinary Internal Medicine
- Head of the Clinic for Small Animal Internal Medicine
- Fachtierärztin für Innere Medizin (German Diploma for Veterinary Internal Medicine)
- Fachtierärztin für Klinische Labordiagnostik (German Diploma for Veterinary Clinical Laboratory Diagnostics)

Dr. Roswitha Dorsch, Dip. ECVIM-CA

- Small animal nephrology

Dr. Bianca Schulz, Dip. ECVIM-CA

- Small animal pneumology
- Fachtierärztin für Innere Medizin der Kleintiere (German Small Animal Internal Medicine Diploma)

Dr. Stefan Unterer, Dip. ECVIM-CA

- Small animal gastroenterology

Dr. Astrid Wehner, Dip. ECVIM-CA

- Small animal endocrinology
- Fachtierärztin für Innere Medizin der Kleintiere (German Small Animal Internal Medicine Diploma)

Dr. Vera Geisen, Dip. ECVIM-CA

- Small animal hematology
- Fachtierärztin für Innere Medizin der Kleintiere (German Small Animal Internal Medicine Diploma)

Prof. Dr. Lutz Göhring, Ph.D., Dip. ACVIM, Dip. ECEIM

- Full Professor for Equine Internal Medicine
- Head of the Clinic of Equine Internal Medicine
- Fachtierarzt für Pferde (German Equine Medicine Diploma)

Dr. Carlos Medina-Torres, Ph.D., Dip. ACVIM-LA, Dip. ECEIM

- Full time employment

Dr. Anna May, Dip. ECEIM

- Fachtierärztin für Pferde (German Equine Medicine Diploma)
- Part-time employment

Prof. Dr. Gabriela Knubben-Schweizer, Dip. ECBHM

- Full Professor for Surgery and Medicine of Ruminants
- Head of the Clinic for Ruminants

Prof. Dr. Mathias Ritzmann, Dip. ECPHM

- Full Professor for Porcine Medicine
- Head of the Clinic for Swine

Prof. Dr. Johannes Hirschberger, Dip. ECVIM-CA, Hon. Dipl. ECVCP

- Associate Professor for Oncology
- Fachtierarzt für Innere Medizin (German Diploma for Veterinary Internal Medicine)
- Fachtierarzt für Klinische Labordiagnostik (German Diploma for Veterinary Clinical Laboratory Diagnostics)

Dr. Melanie Wergin

- Ph.D. (radiation oncology)

Jelena Palic, Ph.D., Dip. ACVP, Dip. ACVM

- Clinical Pathology and Cytology

Prof. Dr. Walter Hermanns, Dip. ECVP

- Full Professor for Pathology
- Head of the Institute for Veterinary Pathology
- Fachtierarzt für Tierpathologie (German Veterinary Pathology Diploma)

Prof. Dr. Rüdiger Wanke, Dip. ECVP

- Associate Professor for Pathology
- Fachtierarzt für Tierpathologie (German Veterinary Pathology Diploma)

Prof. Dr. Kaspar Matiasek

- Associate Professor for Neuropathology
- Associate member of the ECVN
- Founding member European Association of Veterinary Neuropathology

Prof. Dr. Joachim Braun, Dip. ECAR

- Full Professor for Animal Reproduction
- Fachtierarzt für Reproduktionsmedizin (German Veterinary Diploma in Animal Reproduction)
- Fachtierarzt für Tierzucht und Biotechnologie (German Veterinary Diploma in Stock Breeding and Biotechnology)

Dr. Christiane Otzdorff, Dip. ECAR

- Fachtierarzt für Reproduktionsmedizin (German Veterinary Diploma in Animal Reproduction)
- Full time employment

Prof. Dr. Holm Zerbe, Dip. ECBHM, Dip. ECAR

- Full Professor for Reproduction
- Head of the Clinic for Ruminants
- Full time employment

Dr. Christiane Otzdorff, Dip. ECAR

- Fachtierarzt für Reproduktionsmedizin (German Veterinary Diploma in Animal Reproduction)
- Full time employment

Dr. Korbinian Pieper, Dip. ECVAA

- Fachtierarzt für Anästhesiologie (German Veterinary Anaesthesiology Diploma)

Dr. Rene Dörfelt, Dip. ECVAA

Prof. Dr. Ralph Müller, Dip. ACVD, Dip. ECVD

- Associate Professor for Dermatology
- Fachtierarzt für Innere Medizin (German Diploma for Veterinary Internal Medicine)

5. Externship and formal affiliation with another institution

At our center all relevant modalities and species are available. Though, currently not all species can be examined in every modality. Currently there is no equine access to CT. There are two nuclear medicine units, one for small animals and one for large animals. Currently the case numbers for small animals are low and for the equine unit there is no radiation protection permission requested at the moment. Therefore we expect low case numbers especially in this field and externships should compensate for that.

There is no formal affiliation with a predefined externship center. Three externships of four weeks each will be accomplished covering a total of three months in the field of large animal diagnostic imaging with emphasis on equine imaging and nuclear medicine (scintigraphy). Externship centers will be selected to cover the required imaging modalities and caseload. The externships will be under supervision of an ECVDI diplomate, ACVR diplomate or ECVDI associate member. During the externship the resident takes part in the daily routine in diagnostic imaging with focus on equine radiography, ultrasound and nuclear medicine.

6. Facilities and Equipment

The diagnostic imaging facilities are located between the small animal and equine ambulatory clinic, next to the equine and small animal surgery operating theater on the one side and the radiation therapy linear accelerator on the other side. There is a central room with four workstations for reading and discussing the imaging cases. Examinations rooms for small animal radiography, small animal ultrasound, equine radiography, computed tomography and magnetic resonance imaging and two reading rooms with additional four workstations are directly surrounding the central room. The nuclear medicine laboratory and examination room are located in the basement. Three equine diagnostic ultrasound examination rooms (surgery, internal medicine, reproduction) are between 30 m and 100 m from the radiology unit.

The following equipment is under direct responsibility of the diagnostic imaging section at the Clinic of Small Animal Surgery and Reproduction. Imaging examinations on this equipment are performed and reported by the diagnostic imaging section. There is various other diagnostic imaging equipment (for example radiography units or ultrasound machines) at the Centre of Veterinary Clinical Medicine, which is usually used by clinicians of other specialties and only operated by the radiologists if required. There is digital access to studies of the machines used in other sections and regular case discussions/conferences on demand.

Radiographic equipment:

Radiography Unit: Siemens Axiom Luminos dRF

- direct digital radiography and digital fluoroscopy
- Fluoroscopy Compact Trixell Pixium 4343R flat panel
- DICOM connection to PACS and access to HIS

Radiography Unit: Siemens Multix Select

- direct digital radiography
- DICOM connection to PACS and access to HIS

Dental radiography:

- Digital dental radiography detector: Intra-Oral II
- Digital Film Scanner: Dürr CR-7
- DICOM connection to PACS and access to HIS

C-Arm: Siemens Siremobil Compact L

- DICOM connection to PACS and access to HIS

C-Arm: Siemens Arcadis Varic VB 13C

All standard radiation safety and small animal imaging equipment is available (lead screen and protective clothes like aprons and coats, lead thyroid collars, protective lead gloves, protective eyewear, side markers, sand bags, foam wedges, patient positioners, contrast media and application equipment, etc.).

Ultrasonographic equipment:

Ultrasound machine 1: GE Logiq E9

- Multifrequency transducers:
 - 1-5 MHz convex
 - 4-10 MHz sector
 - 9 MHz linear
 - 6-15 MHz linear
- DICOM connection to PACS, access to HIS, thermo-printer

Ultrasound machine 2: GE Logiq V2

- Multifrequency transducers:
 - 8 MHz sector
 - 12 MHz linear
- DICOM connection to PACS, access to HIS

Ultrasound machine 3: Siemens Sonoline Elegra

- Multifrequency transducers:
 - 3 MHz convex
 - 5 MHz linear
 - 7.5 MHz linear
 - 13.5 MHz linear

- DICOM connection to PACS, access to HIS, thermo-printer

The ultrasound table is suitable for cardiac ultrasound examinations. Equipment for positioning and interventional ultrasound is available including a guiding device for referencing of cross sectional diagnostic images.

CT equipment:

Siemens Somatom Definition AS

- 64slice Multi-Detector Row CT
- DICOM connection to PACS, access to HIS
- Medrad Stellant dual flow CT injection system

Various equipment for positioning including a VetMouseTrap® and equipment to create patient individual bite blocks and molds for radiation therapy are available. Positioning of radiation therapy patients is performed in close collaboration with oncologists.

MRI equipment:

Siemens Magnetom Symphony

- High-field (1.5 Tesla) superconductive tunnel shaped magnet
- Access for small and large animals (additional dedicated equine table)
- DICOM connection to PACS, access to HIS

Various equipment for positioning of small animals, as well as a movable antiferromagnetic table for the positioning of recumbent horses. Multiple coils for examination of different body parts.

Nuclear medicine equipment:

Siemens Diacam

- Single head nuclear gamma camera
- LEAP-collimator
- Diagnostic nuclear medicine laboratory
- Tc-99m generator ordered on demand

Other:

HIS (Hospital Information System):

Vetera® (Version Campus, GP.Software)

- contains all owner, animal data and medical records
- history, clinical examination results, surgical findings, laboratory work, cytology, histology and necropsy
- database for radiology reports
- available on every Workstation
- currently approximately 90 workstations with HIS-access

RIS (Radiology Information System):

- Covered by bidirectional (BDT) interface between HIS (Vetera®) and PACS (dicomPACS)
- Creation of worklist entries from HIS
- Crosslink to open patient/study in DICOM-viewer

PACS (Patient Archiving and Communication System)

dicomPACS (Oehm&Rehbein)

- DICOM Worklist Service Class Provider
- DICOM Storage Service Class Provider
- 12 Terrabyte RAID-Storage
- Contains digital medical images since 2007

Dicom-Viewer

dicomPACS (Oehm&Rehbein)

- veterinary edition with multiple veterinary measuring tools
- digital template library for surgery planning
- Import and storage of images from referring veterinarians

Radiology workstations

Radiology Unit/Reading Rooms

- 6 Dual-Monitor Workstations with DICOM-viewer connected to PACS for image interpretation and reporting
- 3 Dual-Monitor Workstations with DICOM-viewer connected to PACS for student education
- 5 Single-Monitor Workstations with DICOM-viewer connected to PACS for clinicians, image presentation

Office Rooms

- Personal Workstation for every radiologist with DICOM-Viewer connected to PACS

Several workstations in consultation rooms and operating theatre. Currently approximately 45 workstations with PACS access. Several Presentation rooms with workstations and PACS access, as well as Full HD beamer for imaging rounds, case conferences, lectures and presentations.

Filming and hardcopy environment

Illuminators in diagnostic imaging section, conference and meeting rooms, consultation rooms, offices and several mobile light boxes. A DICOM-Printer (Direct-Thermo-Film-Printer) for hardcopy film prints (Agfa Drystar 3000).

Various equipment

- 3D-Printer for surgery planning from CT datasets
- PACS-Archive with web-based upload function for receiving of referral imaging studies

7. Clinical resources

Number of clinical cases seen at the Clinic of Small Animal Surgery and Reproduction in 2015:

Number of clinical cases seen at the Clinic of Small Animal Surgery and Reproduction in 2015				
	Dogs	Cats	Other	Total Numbers
Patients	2805	894	239	3938
Cases*	11140	3753	853	15 746

* Cases derive from the practice management system (Vetera). For a single patient there can be more than one case either due to a second consultation (follow-up) in the same year or due to various coexisting medical conditions.

Number of clinical cases seen at the Clinic for Horses in 2015:

Number of equine clinical cases seen at the Clinic for Horses in 2015:			
	Surgery	Internal Medicine	Total Numbers
Patients	592	140	732

Annual imaging caseload of the programme (the calendar year before the application submission)

Imaging Discipline	Annual Caseload Number
Small animal radiology ²	4898
Small animal contrast radiographic procedures ³	266
Large animal radiology ³	236
Small animal abdominal ultrasonography ³	887
Small animal echocardiography ⁴	1220
Other small animal ultrasonographic examination ³	225
Large animal orthopaedic ultrasonography ⁴	43
Large animal echocardiography	30
Other large animal ultrasonography ⁴	182
Small animal computed tomography ³	377
Large animal computed tomography ³	4
Small animal magnetic resonance imaging ³	300
Large animal magnetic resonance imaging ³	4
Small animal nuclear medicine ³	4
Large animal nuclear medicine	not available
Exotic animal imaging caseload (incl. small mammals) ⁵	728
Total yearly imaging caseload	9404

8. Training content

The resident will spend the three years rotating through small animal diagnostic radiology including contrast procedures, small animal ultrasound, CT, MRI and nuclear medicine. From the start the resident will be exposed and trained in all imaging modalities and examinations and rotate during the entire residency on a daily basis. The majority of the training will come through daily clinics and rounds. The resident will attend and participate in daily rounds.

In the 2nd and 3rd year of the residency the resident will work more independently with increasing skills and experience and will take part in the training of veterinary students and interns. The supervisor is available for consultation at all times, if there are questions or problems during image acquisition. In the second year the residents starts to discuss the cases with the clinicians more independently.

² Radiology Section (Clinic of Small Animal Surgery and Reproduction)

³ Clinic for Horses (Department Surgery and Department Internal Medicine/Reproduction)

⁴ Cardiology Unit (Clinic of Small Animal Internal Medicine)

⁵ Clinic for Birds, Reptiles, Amphibians and Ornamental Fish

Because of the low caseload in nuclear medicine, the resident will be involved in scintigraphic examinations whenever possible.

Written reports for all modalities are generated by the residents using a modality specific reporting template. The report is added digitally to the clinic software database (Vetera®) becoming an integral part of the medical record of the patient.

The reports of the residents are marked as *preliminary* until validation by the imaging supervisor and the cases are discussed, checked and corrected by the supervisor together with the resident during the report validation process. Report validation takes place during the day between one resident and the supervisor, as far as possible. Additionally, in the afternoon at 15:00 there is the report validation conference, where all residents and the supervisor attend. At this meeting all remaining preliminary reports will be finalized and validated and interesting cases from the day are discussed. Imaging cases from the day before are presented by the resident during the morning rounds. Imaging residents, imaging supervisor, advisors and clinicians attend these obligatory rounds. The clinicians present the history and clinical findings. The imaging residents present the images, imaging findings and interpretation. Surgeons report on surgical outcome and further diagnostic tests and therapeutic plans are discussed.

Small Animal Echocardiography

The resident spends one month at the cardiology unit of the Clinic of Small Animal Medicine supervised by Dr. Gerhard Wess, Dipl. ECVIM-CA (Internal Medicine), Dipl. ECVIM-CA (Cardiology), Dipl. ACVIM-CA (Cardiology) that is part of the Centre of Veterinary Clinical Medicine of the LMU Munich, located next door (ca. 100m) to the diagnostic imaging section.

Equine Radiology

The equine radiographic examination room is immediately next to the small animal radiography room facilitating direct cooperation and knowledge exchange. Small and large animal imaging are sharing the same reading room. There is an additional dedicated DR-unit (2 flat panel detectors), ultrasound machine and PACS for equine imaging. Equine diagnostic imaging is the primary responsibility of the equine clinicians supervised by Prof. Dr. Hartmut Gerhards (surgery) and/or Prof. Dr. Lutz Göhring (internal medicine and equine reproduction). There is no fixed period dedicated to equine imaging. The diagnostic imaging resident participates in the workup of equine cases and will be involved in equine radiography and sonography. MRI and CT of equine patients are performed by the resident in collaboration with the equine clinicians. The diagnostic imaging resident generates oral and written reports for radiography, sonography, MRI- and CT-examinations. Reports will be discussed, checked and corrected by a supervisor.

Emergency service

After reasonable training and with back-up, the radiology resident takes part in the emergency service rotation of the Clinic of Small Animal Surgery and Reproduction on the weekends and is on call duty for CT, MR and Ultrasound examinations at night and on the weekends during the residency,

Anaesthesiology

Basic anaesthesiology skills and knowledge in injection and inhalation anaesthesia of small animals are required. The radiology resident has to be able to perform general anaesthesia or sedation that is necessary for hip and elbow dysplasia screening radiographs, scintigraphic examinations and emergencies with advice and support by the anaesthesiologists of the anaesthesiology service.

Table of Training Content		
	Full time equivalent months	Approximate number of cases
Small Animal Radiology	10	1800
Large Animal Radiology	0.5 (2)	100 (400)
Small Animal Abdominal Ultrasonography	6	500
Large Animal Ultrasonography	0.25 (0.5)	25 (50)
Echocardiography		
Small Animal Echocardiography	1	70
Large Animal Echocardiography	0.125	5
Computed Tomography		
Small Animal CT	4.25	145
Large Animal CT	0.125 (0.125)	5 (10)
Magnetic Resonance Imaging		
Small Animal MRI	4.25	140
Large Animal MRI	0.25 (0.125)	10 (10)
Nuclear Medicine		
Small Animal Scintigraphy	0.25	10
Large Animal Scintigraphy	0 (0.25)	0 (20)
Total	30	3300

Monthly activity diary and known case diary

The ECVDI resident is obliged to keep an up to date monthly activity diary and to submit a confirmed case diary containing details of 150 specific imaging cases seen by the resident, as listed in the portfolio.

Documentation

The programme director, supervisors, and resident have read and agree with the last version of the Policies & Procedures.

The resident agrees to take the sole responsibility of submitting portfolio updates in due time.

Submission deadlines can be found on the website and at time of this programme application in section 4.4.6 of the Policies & Procedures.

Clinical rounds/conference/seminars and other semiformal or Informal classes:

Small Animal Radiology Rounds

Monday-Friday, daily, 7.30 - 8.00 a.m. (30 min), conference room small animal surgery

Joint meeting of all radiologists and small animal clinicians: short case discussions, demonstration of all small animal imaging studies (radiography, sonography, scintigraphy, CT, MRI) by the radiologists combined with findings of the clinical exam of the previous day reported by the clinicians, planning and discussion of upcoming therapies and surgeries. Attendance of all small animal veterinarians, including interns, surgery residents, diagnostic imaging residents, imaging advisors and supervisors.

Equine Radiology Rounds

Thursday, monthly, 15.00 - 16.00 p.m (60 min), conference room small animal surgery

Joint meeting of small animal radiologists and equine clinicians: case discussions of interesting equine imaging studies (radiography, sonography, CT, MRI). Demonstration of imaging studies by the radiologists. Results of the clinical exam, history, laboratory work and surgical or arthroscopic findings reported by the clinicians. Attendance of the diagnostic imaging resident, equine residents, radiologists, at least one diagnostic imaging diplomate and/or one equine imaging advisor.

Oncology and Radiation Oncology Rounds

Thursday, monthly, 15.00 - 16.00 p.m (60 min), conference room small animal surgery

Joint meeting of small animal radiologists, oncologists and radiation oncologists: case discussions of interesting oncologic imaging studies (radiography, sonography, CT, MRI). Demonstration of imaging studies by the radiologists. Results of the clinical exam, history, laboratory work and surgical or arthroscopic findings reported by the clinicians. Attendance of the diagnostic imaging resident, radiologists, oncologists, oncology residents, radiation therapist, interns, doctorands and at least one diagnostic imaging supervisor.

Neurology and Neuroradiology Rounds

Thursday, weekly, 16.00 - 16.45 p.m (45 min), conference room small animal surgery

Joint meeting of radiologists (imaging residents and supervisors) and neurologists (neurology diplomate, residents, interns and doctorands): Review and discussion of current neuroimaging and neurology related papers. Case demonstrations and discussions of interesting neuroradiology cases.

Neuropathology Rounds

Wednesday, monthly, 14.00 - 15.00 p.m (60 min), conference room pathology

Joint meeting of neurologists (neurology diplomate, pathology residents, neurology residents and imaging residents) and neuropathologists: Training in neuropathology and review and discussion of current neurology and neuropathology related papers. Case demonstrations and discussions of cases, also with diagnostic imaging correlation, if available.

Report Validation Conference

Daily, 15.00 – 16:00 p.m. (60 min), radiology reading room

All imaging residents and supervisor: review of imaging studies and written draft reports of the resident for final approval for the ECVDI-Training caseload. The preliminary reports will be marked as validated by the imaging supervisor after the cases are discussed, checked and corrected.

Journal Club

Thursday, weekly, 6.45 - 7.30 a.m. (45 min), conference room small animal surgery

Review of the papers and literature published in journals listed in the ECVDI reading list. Attendance of imaging resident, supervisor and other radiologists. Visiting clinicians, residents and diplomates will be invited for topics that interact with other specialities and residency programmes (e.g. ophthalmology, surgery, neurology, equine medicine, etc.).

Book Reading

Friday, every second week, 16:00 – 16:30 p.m. (30 min), radiology office

Review of knowledge acquisition from the standard textbooks of the ECVDI reading list and preparation of the written part of the ECVDI board exam. Attendance of the diagnostic imaging residents and at least one supervisor. Visiting clinicians, residents and diplomates will be invited for topics that interact with other specialities and residency programmes.

Known case conference (KCC) - Hot Chair

Friday, every second week, 16:00 – 16:30 p.m. (30 min), radiology office

The resident is presented with a challenging, preferably finally confirmed diagnostic imaging case for interpretation to train for the oral part of the ECVDI board exam. Attendance of the diagnostic imaging residents and at least one supervisor.

Formal course work:

- Physics and Technology of Radiology and Clinical Diagnostic Radiology
- Radiology lectures for first, second and third year veterinary students (2nd, 3rd, 6th semester) given in the lecture hall. 42 hours/year equivalent to 1,5 ECTS Points.
 - physics and technology of diagnostic imaging modalities

- radiation protection and legislation
- basics of radiation biology and radiation therapy
- clinical radiology of horses and small animals

Timetable

	Monday	Tuesday	Wednesday	Thursday	Friday
06.45-07.30				Journal Club	
07.30-08.00	SA Radiology Rounds	SA Radiology Rounds	SA Radiology Rounds	SA Radiology Rounds	SA Radiology Rounds
08.00-08.30	Report validation	Report validation	Report validation	Report validation / Radiology lectures	Report validation / Radiology lectures
08.30-09.00					
09.00-09.30	Clinical training	Clinical training	Clinical training	Clinical training	Clinical training
09.30-10.00					
10.00-10.30					
10.30-11.00					
11.00-11.30		Radiology lectures			
11.30-12.00					
12.00-12.30		Clinical training			
12.30-13.00					
13.00-14.00	Lunch Break				
14.00-14.30	Clinical training	Clinical training	Neuropathology Rounds	Clinical training	Clinical training
14.30-15.00			Clinical training		
15.00-15.30				Oncology Rounds / Equine Rounds	
15.30-16.00				Neuro Rounds	
16.00-16.30				Book Reading / KCC	
16.30-17.00					

Courses and scientific meetings

The resident is expected to attend at least one scientific national or international meeting with focus on diagnostic imaging per year. If available during the time of the residency, the resident will be encouraged to attend the Veterinary Nuclear Medicine Short Course and regular web-meetings related to veterinary diagnostic imaging.

9. Research environment

No graduate programme is associated with the residency programme. There are eight unsupervised weeks dedicated to the research projects (equivalent to 5.5% of the total programme length) where the resident will be in-house but off-clinics.

The resident will complete at least one clinical research project under supervision of Dr. Brüschwein and Prof. Dr. A. Meyer-Lindenberg in the subject of veterinary diagnostic imaging and published as a

first author research paper in a peer-reviewed journal (preferably „Veterinary Radiology and Ultrasound“) and intended to be finished during the second year of the residency.

A second research paper (preferred) or case-report in the subject area of veterinary diagnostic imaging is expected as either a first author (preferred) or co-author, which will be published in a peer-reviewed journal during the first year of the residency. A case report is planned to be completed under supervision of Dr. Brühschwein and Prof. Dr. A. Meyer-Lindenberg in close collaboration with an involved clinician.

During the training the resident will give at least one presentation (preferably oral) at an academic meeting of the own home institution. Additionally the resident will give a presentation of one research project at a national or international scientific meeting on the subject of diagnostic imaging during the time of the residency, preferably at the annual EVDI-Meeting.

10. Educational environment

The resident will be expected to contribute to clinical education and teaching of undergraduate veterinary students by giving lectures (4h per year), seminars (4-8h per year), courses and instructions in the field of physics, law, radiation protection, radiographic positioning, radiographic anatomy and clinical radiology of all imaging modalities (2 hours during a radiation safety seminar per year). The presentation slides and supplementary course material are available.

The resident will be expected to do at least one presentation (1h) per year at in-house seminars for interns and/or clinicians.

In addition the resident will be expected to be involved in the teaching of radiological physics and technology at radiation protection and safety courses for general practitioners.

11. Resident evaluation

The resident is given an opportunity at least every six months to discuss the progress with the supervisor/programme director. The resident's performance is evaluated and documented annually by the supervisor and submitted to the credential committee using the ECVDI resident evaluation form to document aspects of performance that require improvement as well as those in which the resident excels. Faculty members of other services may contribute to the evaluation. The review is discussed with the resident in a formal meeting with the programme director to provide additional guidance. All meetings are recorded in writing and eventually a written action plan will be signed by both parties.

12. Teaching file

Digital Teaching File

There is a digital excel table with a list of didactic valuable cases that serves as a teaching file that is updated by continuous collection of cases during daily rounds. The files currently contains about 1 800 cases from 2007-2016 of all imaging modalities, mainly small animals and sporadic other

species. The teaching file is searchable and the imaging studies are immediately accessible through the PACS-archive containing digital medical images since 2007 (more than 30 000 imaging studies).

Hardcopy Teaching File

There is a collection of hardcopy films of about 300 selected and confirmed small animal cases based on surgery, cytology, histology and/or necropsy findings that are a very useful hardcopy teaching archive.

Clinical Database and Imaging Archive

A diagnostic coding system is used for 20 years included in the clinic software database (Vetera®). The digital database is available on all computers in the Clinic of Small Animal Surgery and Reproduction and its radiology unit with medical records of all patients including findings of the clinical examination, surgical findings, imaging reports, laboratory work, cytology, histology and necropsy results. Diagnoses and imaging report findings can be requested by many search criterions. The related imaging studies (radiography, CT, MRI, scintigraphy and sonography) are available in the archive as hardcopy (film/envelope) from 1983 to 2007. Easy digital access and fast retrieval of imaging studies is available via PACS for all imaging studies since 2007 on all DICOM-workstations. Imaging studies earlier than 2007 are available as hardcopy films or printouts for additional 20 years. This database could also be used to search for special cases if required.

E-Learning environment

The resident has access to the LMU university E-learning platform (moodle). This platform contains various teaching material like lecture notes, powerpoint presentations, electronic learning modules as well as videos and images for self-study and is continuously updated. These documents are mostly aimed at veterinary undergraduates for exam preparation. Currently also more challenging cases are added for resident training.

13. Literature resources

Electronic Library of the Ludwig-Maximilians-University Munich

Online access to full text articles of electronic journals including all relevant journals of veterinary medicine and veterinary diagnostic imaging on any computer in the clinic on private personal computer with internet access from home via VPN or Proxy (www.ub.uni-muenchen.de/e-medien).

Library of the Clinic of Small Animal Surgery and Reproduction

Current literature, books and journals, of veterinary surgery, radiology, anaesthesiology, neurology and ophthalmology.

Library of the Veterinary Faculty of the LMU Munich

Current literature, books and journals of veterinary medicine and related sciences.

15. Summarizing Work Chart

Residency Year	Supervised Clinical Training		Research / Congress Time in Residency Months	Exam Preparation in Residency Months	Vacation in Residency Months
	Residency Months	Supervisor			
1	10	AB	1		1
2	10	AB	1		1
3	10	AB		1	1
Total In Residency Months	30		6		