

## **ACVR Residency Training Program Application Form:**

### **University of Minnesota**

This document is to act as a guide for institutions desiring ACVR accreditation of their residency training program. It should be used in concert with the requirements set out in the ACVR Essentials of Residency Training document and it follows the headings of that document. It is intended to streamline the application process and help define what information the RSEC needs to evaluate the program. All terms used in this application have same definitions as defined in the Essentials.

### **II. Objectives:**

The U of MN radiology residency program has the following objectives:

- To train residents in order to successfully achieve board certification
- To offer a varied program in order that the resident be exposed to all aspects of medical imaging, be allowed more in-depth study of an area of interest, and be given experience in teaching, research, and service
- To provide the opportunity for interested residents to pursue a graduate degree should they have an interest in an academic future
- To train residents to serve the veterinary profession as an imaging specialist with sufficient insight to be able to apply their skills either in an academic or private practice environment

### **III. Training period:**

#### **What is the total length of the training program in months?**

The total length of the clinical training program is 36 months. Depending on the inclination of a resident, there may be options for further studies and degrees of Master of Science or Doctor of Philosophy (decision based on compatibility of the resident with the program, and the availability of funding for the research).

#### **If this is a 4 year program, during what year will the resident be eligible to take the ACVR Preliminary Exam? If the resident is not eligible to take the exam during the beginning of the 3<sup>rd</sup> year (September), please state the reason.**

The clinical residency is a three year program. However, if the training program includes a Master of Science, the resident will be eligible to take the ACVR Preliminary Exam during the beginning of the 4<sup>th</sup> year (September). The timing of the preliminary exam is because the mid-portion of the training program will be used for graduate courses and research.

**What is the total duration of supervised clinical training in the program?**

The total duration of supervised clinical training will be at least 30 months (taking into account time-off for vacation, research, study). A senior radiologist is always on service with the resident and will review cases prior to or after dictation. During the end of the third year of the program, the resident may be on primary duty with a back-up senior clinician. This time is not included in the 30 months, as there may or may not be direct clinical supervision, depending upon the skills of the resident.

**What are the responsibilities of the resident in the remaining non-clinical portion of the program?**

The resident is expected to accomplish a variety of activities during the non-clinical portion of the residency. The resident is expected to prepare for and lead monthly board review rounds with the radiologists. The board review rounds are based upon the ACVR exam objectives, as well as other topics deemed important by the radiologists. The resident is expected to participate in biweekly radiology journal club, biweekly known clinical case conference, weekly small animal Grand Rounds, and monthly morbidity and mortality rounds. The resident will prepare and present one seminar yearly in the VMC small animal Grand Rounds series. The resident will prepare and present approximately two didactic lectures and one laboratory yearly as part of the DVM didactic radiology curriculum. The resident is expected to complete a research project, submit a manuscript from the project for publication in a peer-reviewed journal, and present the results at the annual scientific meeting of the ACVR. The resident is also encouraged to prepare and submit other publications such as case reports, *What is Your Diagnosis*, etc., during the three-year residency. Non-clinical time will also be used for self-study and for vacation.

**IV. Direction and Supervision:**

**Program Director:**

**Christopher P. Ober, DVM, PhD, Dipl ACVR**

**What percentage of this individual's time is committed to clinical service and teaching of residents?**

80% clinical service: this includes teaching of radiology residents, other house officers, and fourth-year DVM students. Of the remaining 20% of time commitment, a portion is dedicated to mentoring of residents' research.

**Faculty:**

Please list the faculty member of the program accepting PRIMARY responsibility for training in each of the following core areas:

Roentgen diagnosis:

Faculty: **Kari L. Anderson, DVM, Dipl ACVR**

Percentage clinical service: **80%**

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Diagnostic ultrasound:

Faculty: <b>Kari L. Anderson, DVM, Dipl ACVR</b>
Percentage clinical service: <b>80%</b>

Computed Tomography

Faculty: <b>Christopher P. Ober, DVM, PhD, Dipl ACVR</b>
Percentage clinical service: <b>80%</b>

Magnetic Resonance Imaging:

Faculty: <b>Dan A. Feeney, DVM, MS, Dipl ACVR</b>
Percentage clinical service: <b>50%</b>

Nuclear Medicine:

Faculty: <b>Kari L. Anderson, DVM, Dipl ACVR</b>
Percentage clinical service: <b>80%</b>

List the names and percentage clinical commitment of additional imaging faculty in the program, and their area(s) of instructional responsibility. For each imaging faculty in the program please provide a one page CV documenting their expertise in the area(s) of assigned responsibility.

**There will be no other faculty with primary instructional responsibility in any area.**

For each of the specialty colleges listed below please list at least two Diplomates of these colleges who can be expected to regularly interact with radiology residents:

**ACVIM**

P. Jane Armstrong, DVM, MS, Dipl ACVIM (small animal internal medicine)
Antonella Borgatti, DVM, Dipl ACVIM (oncology)
Michael Henson, DVM, PhD, Dipl ACVIM (oncology)
Jody Lulich, DVM, PhD, Dipl ACVIM (small animal internal medicine)
Alistair McVey, DVM, Dipl ACVIM (neurology)
David Polzin, DVM, Dipl ACVIM (small animal internal medicine)
Michelle Ritt, DVM, Dipl ACVIM (small animal internal medicine)
Christopher Stauthammer, DVM, Dipl ACVIM (cardiology)
Anthony Tobias, BVSc, PhD, Dipl ACVIM (cardiology)
Christie Ward, MVSc, DVM, Dipl ACVIM (large animal internal medicine)

**ACVS**

Gregory Anderson, DVM, Dipl ACVS
Nicholas Ernst, DVM, MS, Dipl ACVS
Betty Kramek, DVM, MS, Dipl ACVS
Elizabeth LaFond, DVM, Dipl ACVS
Erin Malone, DVM, PhD, Dipl ACVS

**ACVP**

Anibal Armién, DVM, MSc, DrVetMed, Dipl ACVP
Cathy S. Carlson, DVM, PhD, Dipl ACVP

Timothy O'Brien, DVM, PhD, Dipl ACVP
Erik Olson, DVM, PhD, Dipl ACVP
Jed Overmann, DVM, Dipl ACVP
Leslie Sharkey, DVM, PhD, Dipl ACVP
Arno Wunschmann, Dr.med.vet., Dipl ACVP

#### V. Affiliation agreement:

If all of the training will not be accomplished on-site, please attach a copy of the affiliations agreement(s). Include the scope of the training and amount of time the resident will be away from the home institution.

**There will be no specific need for training at an additional site. If the resident has an interest for in-depth training in a particular area, they may choose to attend a rotation elsewhere; however, this will not be necessary for core training.**

#### VI. Facilities:

##### Radiology suites:

- Kodak CR in all small animal and large animal radiographic suites
- Summit InnoVet Select all purpose small animal radiographic room (300 mA, 125 kVp)
- Infinity XMA all purpose small animal radiographic room (300 mA, 125 kVp)
- Shimadzu Platinum One digital small animal radiographic/fluoroscopic high-voltage generator room
- Acoma Overhead Tube Crane system in combination with a TransWorld machine (two tube heads) all purpose large animal radiographic room
- MinXray portable unit for use in small animal imaging (ICU cases)
- MinXray HF80+ portable units for use in large animal imaging
- Leatherdale Equine Center:
  - Varian Rad 92 x-ray tube with Sedecal SHF-835 generator (800 mA, 150 kVp) with MT Dual Overhead Tube Crane with Master and Slave configuration
  - Eklin EDR3 Mark II portable digital radiography

##### Special Procedures:

- Shimadzu Platinum One digital radiographic/fluoroscopic system with overhead tube with spot film as well as digital capture
- GE OEC C-arm fluoroscopic unit

##### Ultrasound:

- GE Logiq 9 with triplex Doppler, harmonics, contrast imaging, and 3D capabilities
- Siemens Acuson Sequoia with triplex Doppler, harmonics, contrast imaging, 3D capabilities and cardiac package
- Toshiba EccOcee portable ultrasound unit with pulsed wave and color Doppler capabilities

<ul style="list-style-type: none"> <li>▪ ATL HDI 5000CV echocardiographic unit available for radiology resident training</li> </ul> <p>Computed Tomography:</p> <ul style="list-style-type: none"> <li>▪ GE CT/e spiral single-slice scanner</li> </ul> <p>Magnetic Resonance Imaging</p> <ul style="list-style-type: none"> <li>▪ GE Signa HDx 3T with imaging table for equine patients</li> </ul> <p>Nuclear Medicine:</p> <ul style="list-style-type: none"> <li>▪ NuCam gamma camera on Equistand II and Mirage computer system</li> </ul> <p>Radiation Therapy</p> <ul style="list-style-type: none"> <li>▪ Varian linear accelerator dual energy photon and multiple energy electron external beam radiotherapy unit</li> <li>▪ Multileaf collimator</li> <li>▪ Pinnacle planning software (Phillips) and MU Check planning software (Oncology Data Systems)</li> </ul> <p>Positron Emission Tomography / Computed Tomography</p> <ul style="list-style-type: none"> <li>▪ PET/CT available at Center for Magnetic Resonance Research on Minneapolis campus beginning early February 2011</li> </ul> <p>Kodak Carestream PACS eFilm</p>
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**VII. Clinical resources:**

<p>Indicate the approximate number of patients seen annually by the home institution?  <b>35, 800 patient visits</b> representing 14,100 distinct patients in fiscal year 2010</p>
<p>What is the annual imaging caseload? <b>10,565</b> (calendar year 2010)</p>

Indicate the approximate breakdown of the patient population according to species.

Small animals (canine, feline)	<b>91%</b> (for imaging purposes)
Large animals (equine and food animals)	<b>8%</b> (for imaging purposes)
Exotic animals	<b>1%</b> (for imaging purposes); although this number is low, the resident will also be exposed to radiographic studies made at the raptor center (both raptors and psittacines, 1185 cases in calendar year 2010) as well as radiographic studies on

	exotic patients sent for consultation
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What is the approximate annual imaging caseload of the program in:

Small Animal Radiology: <b>6665</b>
Large Animal Radiology: <b>710</b>
Abdominal Ultrasound: <b>1525 (total ultrasound: 1710 sm anim, 240 lg anim)</b>
Computed Tomography: <b>270</b>
Nuclear Medicine: <b>35</b>
Magnetic Resonance Imaging: <b>695</b>
Other (specify): <b>Special Procedures: 240 (large and small animal)</b>

**VIII. Training content:**

<p><b>What percentage of imaging reports are typically available within 48 hours after the examination is conducted in typewritten or electronic form?</b></p> <p>100% of reports are available on the day of examination (excluding weekends) as a preliminary report using the sticky note functionality of the Carestream PACS. All final reports are subsequently entered into the hospital information system (UVIS) directly and verified online by the radiologist. Currently, a bid for Nuance integrated voice recognition software has been accepted and the contract is in negotiation.</p>
<p><b>If your answer is less than 75% please explain how reports are generated and how long it takes for the report to be available for review in typewritten form.</b></p> <p>N/A</p>
<p><b>Of the preliminary reports generated from the imaging caseload what percentage are initially produced by the resident?</b></p> <p>Early in the residency (first couple months), the resident does not produce the imaging reports. The percentage of reports produced will increase throughout the program. The resident will begin dictation within the first few months of the residency. At that time, it would be anticipated that the resident will produce 15-25% of the initial reports. Prior to the written exam, the resident will be producing approximately 50-75% of the imaging reports when on duty. The senior radiologist will be producing the remainder of the reports. After the written exam, the resident may have primary duty, and would therefore produce 100% of the reports.</p>

**What percentage of resident reports are reviewed by the imaging faculty prior to finalization of the report?**

During the majority of the residency, 100% of resident reports are reviewed by the imaging faculty prior to finalization of the report. Earlier in the residency, cases are reviewed and discussed prior to the resident dictating the cases. Often the resident is dictating while the senior radiologist is present and listening, with cases discussed at the time of report generation. Resident case review rounds are held daily for the purpose of reviewing preliminary radiology reports. During the last year of the residency, when deemed clinically competent (generally after preliminary exam), the resident reports may not be reviewed prior to finalization, unless the resident requests such review for certain cases.

**When preliminary resident reports are reviewed and edited by the imaging faculty responsible for training, what percentage of the time are two or more faculty present?**

< 5%; the nature of our service (including teaching and research), especially in light of the fact that we are short-staffed, does not generally allow time for more than one radiologist to be present for preliminary report review.

**Please complete the table below**

	Approximate number of cases in the 30 months clinical experience
Small Animal Radiology:	<b>7550</b> (includes special procedures)
Large Animal Radiology:	<b>800</b> (includes special procedures)
Abdominal Ultrasound:	<b>1050</b> (total small animal ultrasound: <b>1180</b> )
Computed Tomography:	<b>120</b>
Nuclear Medicine:	<b>25</b>
Magnetic Resonance Imaging:	<b>320</b>
Elective (any of above)	This is dependent upon the resident
Required elective (specify):	<b>SA Cardiology: 20</b>
<b>Total</b>	<b>Approximately 9900 imaging studies</b>

Please indicate the course number and unit assignment residents are required to take to meet the educational objectives for formal instruction as outlined in the Essentials in the following:

<b>Topic</b>	<b>Course number</b>	<b>Units</b>
Radiobiology:	N/A	N/A

The Physics of:

Diagnostic Radiology:	N/A	N/A
Nuclear Medicine:	N/A	N/A
Ultrasonography:	N/A	N/A
CT:	N/A	N/A
MRI:	N/A	N/A

**If your program does not offer formal courses in any or all of these topics please indicate how these educational objectives for each are met. Use attached sheets if necessary.**

If the resident chooses to pursue a graduate degree, formal graduate courses are available.

If the resident chooses to pursue a clinical residency only, formal courses are not available. The radiologists meet with the resident monthly for board review rounds. Each didactic area as specified in the ACVR board objectives is studied by the resident under direction of a lead radiologist. Study may include self-study and presentation by the resident, textbook chapter and/or literature assigned readings, formal lecture by a radiologist, or invited presentation. Both classic and current material is used. Material is selected by the responsible faculty and assigned to the resident; however, it is expected that the resident will also perform literature searches as needed.

The following is an example schedule for board review rounds:

<b>Date</b>	<b>Topic</b>	<b>Responsible Faculty</b>
Fall 2010	Special Procedures	Ober
Spring 2011	Alternate Imaging: Ultrasound	Anderson
	Alternate Imaging: Nuclear Medicine	Anderson
	Alternate Imaging: Computed Tomography	Ober
	Alternate Imaging: Magnetic Resonance Imaging	Feeney
Summer 2011	Radiation Biology	Feeney

	Radiation Protection	Feeney
Summ/Fall 2011	Anatomy	Feeney
Fall 2011 and Spring 2012	Physics: Diagnostic Radiology	Anderson
	Physics: Ultrasound	Anderson
	Physics: Nuclear Medicine	Anderson
	Physics: Computed Tomography	Ober
Summer 2012	Pathophysiology	Feeney

At the end of each section, a written exam will be administered to the resident.

**IX. Research Environment:**

**Over the last 5 years, what is the average number of peer reviewed publications, on which the IMAGING faculty listed under Direction and Supervision in IV above, are included as authors?**

In the past five years, the three imaging faculty listed under Section IV have been included as authors on 22 different peer-reviewed publications – an average of 4.4 publications per year.

**What is the number of publications/submissions expected of a resident completing the program?**

The resident is expected to submit and publish at least one paper, pertaining to a project designed and implemented by the resident, to a peer-reviewed journal. The resident is encouraged to submit one other publication, case report, *What is Your Diagnosis?*, etc. annually.

**If this is an established program, what percentage of residents have made formal research presentations at the annual ACVR or equivalent national meeting?**

100%

**Is an advanced degree a requirement of the training program?**

An advanced degree is not a requirement of the training program. The successful candidate may have an opportunity to pursue an advanced degree as interest and funding permit.

**X. Educational Environment:**

**How many lectures or scientific presentations are expected of each resident during the course of their training?**

The resident will prepare and present one seminar yearly in the VCS Department Grand

Rounds series. The resident will prepare and present 2-3 didactic lectures and one laboratory yearly as part of the CVM didactic radiology curriculum.

#### **XI. Evaluation:**

##### **During the program how often is resident performance evaluated in writing?**

The radiology faculty complete an electronic evaluation of the resident's performance every six months. The residency program director compiles the evaluation information, discusses it with the radiology faculty, and then discusses it with the resident.

Throughout the residency the resident will be administered written examinations based upon the ACVR board objectives. The examinations will be scored and returned to the resident. Additionally, at the end of the residency, the resident will be administered several mock oral board examinations. These will be scored and discussed with the resident.

#### **XII. Teaching File:**

##### **What is the nature and scope of the teaching file available to residents?**

There are several types of teaching files available to residents. There are teaching files that are used for teaching DVM students in both the didactic courses as well as senior rotations. Files are both electronic (digital) and film. These are indexed and coded. There is also a medical imaging server that houses digitized interesting cases that are indexed and coded. The Kodak Carestream PACS supports a digital teaching file of interesting cases that are identified by the radiologists (beginning March 2005). Finally, the hospital information system (UVIS) can be searched for specific cases via the radiology reports with a link to the digital images.

##### **How is it maintained/updated?**

The teaching files (including the Kodak Carestream PACS digital teaching file) are maintained and updated by the faculty. The resident has access to all radiology reports through UVIS when searching for other interesting cases.

#### **XIII. Conferences:**

##### **On average how many Known Case Conferences are conducted annually?**

22 (generally Known Case Conferences are held biweekly, less holidays, for 1.5 hours). Additionally, several oral mock board exams will be administered at the end of the residency.

#### **XIV. Literature resources:**

**What is the geographic relationship between the nearest medical library and the training program?**

The College of Veterinary Medicine houses a veterinary medical library with extensive veterinary and medical journals, publications, and textbooks. The CVM library also offers significant online journal access to faculty, house officers, students, and staff. The CVM library is on the St. Paul campus in a separate building from the teaching hospital that is reached via a skywalk. There are a large number of physician-oriented journals that are carried in the Veterinary Library including *Radiology*, *Investigative Radiology*, *Seminars in Roentgenology*, *Seminars in Ultrasound, CT, and Nuclear Medicine*, *Radiologic Clinics of North America*, *American Journal of Roentgenology*, *Ultrasound in Medicine and Biology*, *Clinics in Diagnostic Ultrasound*, *International Journal of Radiation Oncology Therapy and Biology*, and *The Journal of Clinical Ultrasound*.

The University of Minnesota also has an extensive Biomedical library at the School of Medicine housed on the east bank of the Minneapolis campus (the CVM is on the St. Paul campus). If faculty and staff do not have time to make the easy bus ride to the other bank of the campus, there is an inter-library loan that allows delivery of books and journals generally within 48 hours. Additionally, there is on-line access to all journals that are electronically available at the University of Minnesota.

The Medical Imaging section of the Veterinary Medical Center also maintains a small library in Medical Imaging that covers basic references on radiation therapy, nuclear medicine, diagnostic radiology, physics, radiation safety, and radiographic anatomy, as well as some species-specific textbooks.

**XV. Appendix:**

- (a) Provide the pass rate for first time, second time, etc for both the preliminary and certifying exams for your residents for the past 5 years. For example, for all residents finishing your program 5 years ago (Year 5), check the appropriate box. Complete the table for residents finishing 4 years ago (Year 4), 3 years ago (Year 3), etc.

	Year 5	Year 4	Year 3	Year 2	Year 1
Passed preliminary exam 1st time			1 resident (2008)		1 resident (2010)
Passed prelim exam 2 <sup>nd</sup> time		1 resident (2007)			
Passed prelim after 2 <sup>nd</sup> time					
Passed certifying exam 1 <sup>st</sup> time		1 resident (2007)	1 resident (2008)		1 resident (2010)
Passed certifying exam 2 <sup>nd</sup> time					
Passed certifying exam after 2 <sup>nd</sup> time					
Unsuccessful in all attempts					

- (b) Provide a clinical schedule for your resident(s). This schedule should provide a weekly or monthly outline of the resident's clinical responsibilities. This may be in the form of a master schedule or duty roster for your entire radiology section if desired.

**See Attached Excel spreadsheet**