

**Residency in Diagnostic Imaging
Department of Clinical Studies
Ontario Veterinary College
University of Guelph**

General Program Description

The department of Clinical Studies offers a 4-year combined residency program and DVSc in Diagnostic Imaging. At this time the residency class will consist of one person. However, the possibility exists of increased the size of the resident class to two in the future.

The residency program involves clinical rotation through the different areas of diagnostic imaging (radiology, special procedures, ultrasound, nuclear medicine, and MRI) for a minimum of 34 months. Residents will also be involved in teaching the fourth year veterinary clinical rotation.

II. Objectives

1. Provide advanced training and clinical experience in diagnostic radiology, special procedures, ultrasound, MRI, and nuclear imaging.
2. Develop skills in routine diagnostic radiography, special procedures, ultrasound, MRI, CT, and nuclear imaging.
3. Provide instruction (formal and informal) in:
 - a. physics of diagnostic imaging
 - b. radiobiology and radiation safety
 - c. radiation therapy
4. Training in scientific writing, literature evaluation, and methods of clinical evaluation.
5. Gain teaching experience by providing in house continuing education lectures and participating in student film reading laboratories.
6. Provide a basis for a graduate program leading to DVSc.
7. Preparation for certification examination by the American College of Veterinary Radiology.

III. Training Period

This program is 48 months in duration with a minimum of 34 months of clinical rotation. The resident will be eligible to sit the preliminary exam in September of their third year. All of the clinical service will occur under the supervision of a board certified radiologist. The remaining time will be used for

studying, completing the requirements of the DVSc (including grant preparation, performing the research, literature review, and thesis preparation and defense), and vacation.

IV. Direction and Supervision

Resident Director – Stephanie Nykamp, DVM, Dipl. ACVR

- 50% of time devoted to clinical service and resident training

Roentgen diagnosis:

Faculty: Stephanie Nykamp

Percentage clinical service: 50

Diagnostic ultrasound:

Faculty: Heather Chalmers

Percentage clinical service: 50

Computed Tomography

Faculty: Heather Chalmers

Percentage clinical service 50:

Magnetic Resonance Imaging:

Faculty: Stephanie Nykamp

Percentage clinical service: 50

Nuclear Medicine:

Faculty: Stephanie Nykamp

Percentage clinical service: 50

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

Dana Allen, DVM, MSc
Steven Kruth, DVM
Anthony Abrams-Ogg, DVM, DVSc
Paul Woods, DVM
Michael O’Grady (cardiology)
Lynn O’Sullivan (cardiology)

ACVS

Kelly McLellan, DVM
Don Trout, DVM PhD
Antonio Cruz, DVM
David Holmberg, DVM, MVSc
Noel Moens, DVM
Tom Gibson, DVM
Brigitte Brisson, DVM, DVSc

ACVP

Darren Wood, DVM, DVSc
Robert A. Foster, BVSc, PhD, MACVS
Margaret Stalker, DVM, PhD

V External Affiliations

None

VI Facilities

1. Three small animal x-ray rooms
 - a. *Room 1*: Digital diagnostic radiology/fluoroscopy – GE Precision 500D
 - b. *Room 2*: General diagnostic radiology/fluoroscopy – Philips Duo Diagnost
 - c. *Room 3*: General diagnostic radiology – Summit Innovet Select radiographic unit
2. Computed Radiography
 - AGFA CR 30-X Plate reader
3. Large animal radiography:
 - a. General diagnostic radiography/fluoroscopy – Philips Super 100 CP radiographic and fluoroscopic unit
 - b. Minxray-300 Inc. portable radiographic unit (high-frequency generator)

- c. Xi Scan 1000 mini C-arm radiographic and fluoroscopic unit
- d. GE AMX-4 mobile radiographic unit
- e. Eklin Digital Radiography
- 4. Ultrasound
 - a. ATL Ultrasound HDI 3000 –2D, M-mode, pulsed and color Doppler, 3-D imaging
 - b. GE Vivid 9 – cardiology units (2)
- 5. Nuclear Medicine
 - Technicare gamma camera model 438
 - camera is floor mounted with the Omega equistand
 - PC based nuclear medicine software (Mirage) for dynamic and static imaging
 - small animal isolation ward
 - designated large animal isolation stalls
- 6. Magnetic resonance imaging - GE Sigma Infinity Echospeed Plus with Excite 1.5 Tesla magnet
- 7. Computed Tomography
 - GE Lightspeed 4 slice scanner (currently on site, installation complete by January 2008)
 - AW 4.2 image processing workstation
- 8. Radiation Therapy
 - a. Colbalt 60 Theratron
 - b. Strontium 90 Beta probe

VII Clinical Resources

Indicate the approximate number of patients seen annually by the home institution? 14,628
What is the annual imaging caseload? 10,317

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

Small animals (canine, feline)	11,999
Large animals (equine and food animals)	2084
Exotic animals	1033

What is the approximate annual imaging caseload of the program in:

Small Animal Radiology: 6553
Large Animal Radiology: 1244
Abdominal Ultrasound: 1726
Computed Tomography: estimated 182
Nuclear Medicine: 91
Magnetic Resonance Imaging: 427
Other (specify): Large animal ultrasound 276

VIII. Training content:

<p>What percentage of imaging reports are typically available within 48 hours after the examination is conducted in typewritten or electronic form?</p> <p>90</p>
<p>Of the preliminary reports generated from the imaging caseload what percentage are initially produced by the resident?</p> <p>The resident generates all of the reports for the service areas that they are assigned to for that week (i.e. if they are on the ultrasound, CT, MRI service they will generate 100% of those reports but no radiology or nuclear medicine reports and visa versa when they are on the radiology and nuclear medicine service).</p>
<p>What percentage of resident reports are reviewed by the imaging faculty prior to finalization of the report?</p> <p>100%</p>
<p>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?</p> <p>75%</p>

Please complete the table below

	Approximate number of cases in the 30
--	---------------------------------------

	months clinical experience
Small Animal Radiology:	10,000
Large Animal Radiology:	1,900
Abdominal Ultrasound:	1,700
Computed Tomography:	200
Nuclear Medicine:	130
Magnetic Resonance Imaging:	450
Elective (any of above)	
Required elective (specify):	
Total	14,180

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:

Topic	Course number	Units
Radiobiology:	CLIN 6330 Advanced Principles of Diagnostic Imaging	Radiation safety Interactions of radiation and cells

The Physics of:

Diagnostic Radiology:	CLIN 6350 Advanced Radiology I	Production of x-rays Properties of x-rays Technique chart formation Film screen imaging Darkroom processes CR and DR
Nuclear Medicine:	CLIN 6330 Advanced Principles of Diagnostic Imaging	Physics of nuclear medicine Quality control in

		nuclear medicine
Ultrasonography:	CLIN 6330 Advanced Principles of Diagnostic Imaging	Physics of ultrasound
CT:	CLIN 6370 Neuroimaging	CT physics CT imaging protocols
MRI:	CLIN 6370 Neuroimaging	MRI physics MRI imaging protocols
<p>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.</p>		

IX. Research Environment:

<p>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?</p> <p>Average # = 20 papers/all persons/5 years</p>
<p>What is the number of publications/submissions expected of a resident completing the program?</p> <p>A minimum of one paper from the thesis and one case report</p>
<p>If this is an established program, what percentage of residents have made formal research presentations at the annual ACVR or equivalent national meeting?</p> <p>The one and only resident thus far will present at the ACVR conference in 2009</p>
<p>Is an advanced degree a requirement of the training program?</p> <p>Yes</p>

X. Educational Environment:

<p>How many lectures or scientific presentations are expected of each resident during the course of their training?</p> <p>The resident is expected to give two presentations per year as part of the hospital grand rounds. In addition the resident is expected to present their research at the ACVR conference.</p>

XI. Evaluation:

The resident will have daily subjective evaluation when involved in film reading with the faculty. During the first year, formal written evaluations by the faculty will occur at 6 and 12 months. An annual written evaluation will occur at the end of each of the subsequent years. The radiology faculty will provide an analysis of the resident's abilities, capabilities, and productivity. The results of these evaluations will be discussed with the resident by the section chief, residency program director, and the resident's advisor.

Every six months during the first two years of the residency there will be mock written examinations based on the written exam objectives that are not covered in the formal courses. At the end of the second year of the residency there will be a summative examination of the core knowledge. Mock oral exams will occur on a bi-weekly basis throughout the residency program.

XII. Teaching File:

What is the nature and scope of the teaching file available to residents?
There is a film based teaching file that is cataloged by systems. A digital teaching file will be developed following the completion of the PACs installation in January 2008
How is it maintained/updated?
The teaching file is updated based on interesting case material presented during imaging rounds.

XIII. Conferences:

A minimum of 12 Known case conferences are conducted annually with the number and frequency increasing the final year of the program.

Weekly rounds with the pathology, oncology, surgery, medicine and cardiology services are available for the resident to participate in. Residents are required to attend the cardiology rounds and strongly encouraged to attend the other service rounds.

XIV. Literature resources:

The Ontario Veterinary College Library provides access to all the journals held by the Canadian Institute for Scientific and Technical Information (approximately 17,000 journals). A library of relevant textbooks and journal articles is also maintained in the radiology department.

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
Passed prelim exam 2 nd time					
Passed prelim after 2 nd time					
Passed certifying exam 1 st time					1
Passed certifying exam 2 nd time					
Passed certifying exam after 2 nd time					
Unsuccessful in all attempts					

(b) Provide a clinical schedule for your resident(s).

Summary of Resident Time

Activity	% Total time	Year 1	Year 2	Year 3	Year 4
Clinical service		37 weeks	34 weeks	35 weeks	30 weeks
Research		13 weeks	12 weeks	15 weeks	14 weeks
Vacation		2 weeks	2 weeks	2 weeks	2 weeks
Comprehensive			4 weeks		

Exam Study time
 Qualifying Exam
 Study time

6 wks

Detailed Yearly Schedule

Residency Schedule

Month	Week #	Year 1	Year 2	Year 3	Year 4	
Mid July	44	R	O	O	U	R = radiology, NM US = ultrasound, CT, MRI O = Off
	45	R	R	R	R	
	46	R	R	R	R	
	47	R	U	U	O	
	48	R	U	U	O	
	49	R	U	O	O	
	50	R	R	O	O	
	51	R	R	R	O	
Sept	52	R	R	R	O	
	1	R	U	U	O	
	2	R	U	U	O	
	3	R	O	O	R	
	4	R	O	O	R	
	5	O	R	R	U	
	6	O	R	R	U	
	7	O	U	U	O	
	8	O	U	U	O	
	9	R	O	O	R	
	10	R	O	O	R	
	11	R	R	R	U	
	12	R	R	R	U	
	13	O	U	U	O	
	14	O	U	U	O	
Jan	15	R	O	O	R	
	16	R	O	O	R	
	17	U	R	R	U	
	18	U	R	R	U	
	19	O	U	U	O	
	20	O	U	U	O	
	21	R	O	O	R	
	22	R	O	O	R	
	23	U	R	R	U	
	24	U	R	R	U	
	25	O	U	U	O	
	26	O	U	U	O	
	27	R	O	O	R	
	28	R	O	O	R	
	29	U	R	R	U	
	30	U	R	R	U	

	31	O	U	U	O
	32	O	U	U	O
	33	R	O	O	R
May	34	R	O	O	R
	35	U	R	R	O
	36	U	R	R	O
	37	O	U	U	O
	38	O	U	U	O
	39	R	O	O	R
	40	R	O	O	R
	41	U	O	R	U
	42	U	O	R	U
End of year	43	O	O	U	R

Rad	27	17	18	17	Total	79
US	10	17	17	13		57
Off	15	18	17	22		72