



RESIDENCY PROGRAM IN VETERINARY DIAGNOSTIC IMAGING

I. Introduction

The University of Illinois, College of Veterinary Medicine, offers a 3 year clinical residency training program in veterinary diagnostic imaging. This program is designed to prepare the resident for the ACVR board examination and subsequent academic appointment or private specialty practice. Based on the ACVR requirements of 30 months of supervised clinical training in a 36 month residency, supervised training includes 12 months in diagnostic radiology, 9 months in diagnostic ultrasound including echocardiology, 3 months in computed tomography and 3 months in Magnetic Resonance Imaging. The above training will be completed on site at the Veterinary Teaching Hospital. The program also includes unprescribed 1-3 months of concentrated training opportunities in nuclear imaging and additional training in echocardiography or other aforementioned areas of interest at “sites of excellence” at the consensus of the resident and resident director. The program requires completion of a Master’s degree prior to, or as part of, the residency and submission of at least 2 scientific manuscripts prior to completion of the 36 month-long program. Included in the remaining 6 months of the 36 month program is training in research, scholarly writing and vacation.

Residents must attend sufficient classes for the Master’s Degree each semester, if a M.S. is part of the program. Additional required training includes daily clinical case review rounds, weekly journal clubs, weekly “known case conferences” and attendance at all faculty presentations throughout the DVM years 1-4 didactic lectures, at least once during the residency. Participation in clinical research is required. At the end of the program, a residency certificate will be presented following successful completion of the residency program. If the candidate already has a Master’s degree in veterinary medicine or a related field, the degree requirement is waived, but a research project (clinical or basic science) is still required. The resident will have the opportunity to attend professional and scientific meetings.

Continuation of the program into the second and third year is contingent upon satisfactory performance in both clinical and graduate programs during each year and the desire of the candidate. Vacation/sick leave time will be accrued on a monthly basis. All vacation time accrued must be used by the end of the program. The University of Illinois offers a complete benefits package. Additional information about the College of Veterinary Medicine is available at <http://www.cvm.illinois.edu>. The UIUC is an AA-EOE.

APPLICATION AND SELECTION

For consideration in the matching program, applicants must complete the following prerequisites:

1. Be a graduate of an accredited College of Veterinary Medicine or foreign equivalent.
2. Have completed an internship program or equivalent practice experience
3. Submit a letter indicating the reasons for seeking this program
4. Complete and submit an application form to Dr. Robert O'Brien, University of Illinois, Veterinary College of Medicine, Imaging Section, 1008 W. Hazelwood, Urbana, IL 61802
5. Submit college transcripts including G.P.A. and class ranking
6. Submit 3 letters of recommendation from instructors, service chiefs, or other veterinarians with professional collaboration experiences, including at least one board-certified (diplomat of ECVDI or ACVR) radiologist.

II. Objectives

This program is designed to prepare the resident for the ACVR board examination and subsequent academic appointment or private specialty practice. Postdoctoral educational experience based on the clinical resources and training periods dictated by the requirements of the ACVR will be provided in small (dog and cat), large (horse and cow), exotic (non-traditional privately-owned) and zoological animals. In addition, experience in designing and performing scientific research and submitting manuscripts for publication in peer reviewed journals will be provided.

III. Training Period

The program will be 36 months in length. During this period, 30 months of supervised clinical experience will be documented. The additional 6 months will provide research opportunities and manuscript preparation.

IV. Direction and Supervision

The Director of Residency training is Robert T. O'Brien, DVM, MS, ACVR. Dr. O'Brien has a 50% clinical appointment and will be responsible for supervising and administering the training program.

ACVR Diplomates:

1. Dr. Robert O'Brien (50% clinical appointment)
2. Dr. Jodi Matheson (70% clinical appointment)

Primary faculty responsible for the 5 core areas are:

1. Diagnostic radiology: Dr. Robert O'Brien
2. Diagnostic Ultrasound: Dr. Jodi Matheson
3. Computed Tomography: Dr. Robert O'Brien
4. Magnetic Resonance Imaging: Dr. Jodi Matheson
5. Diagnostic Nuclear Medicine: Dr. Jodi Matheson

Additional Diplomates:

1. American College of Veterinary Pathology
 - a. Dr. Anne Barger, ACVP
 - b. Dr. Amy MacNeill, ACVP
2. American College of Veterinary Internal Medicine
 - a. Dr. Julie Byron, ACVIM
 - b. Dr. Tom Graves, ACVIM
3. American College of Veterinary Surgery
 - a. Dr. Avery Bennett, ACVS
 - b. Dr. Cathy Greenfield, ACVS

V. Affiliation Agreement

All required clinical training will take place at the University of Illinois Veterinary Teaching Hospital.

VI. Facilities

The Imaging Section of the Veterinary Teaching Hospital is equipped with the following modalities:

1. Small Animal Radiography:
 1. GE Advantax 80KW radiography room with video fluoroscopy equipped with an Eklin EDR6 DR system
 2. GE Proteus 64KW radiography room equipped with an Eklin EDR6 DR system
 3. GE 850 Computerized Radiology system
 4. GE C-arm mobile fluoroscopy
 5. (2) Min-X 15mA 80KW portable x-ray units
2. Large Animal Radiography:
 1. GE 100KW ceiling mounted overhead tube
 2. Eklin EDR 3 14x17 DR panel
 3. Eklin EDR 5 8x11 DR panel
3. Ultrasound;
 1. Biosound MyLab 70 Ultrasound with Spatial Compounding, Doppler and Contrast capabilities. Transducers include 3-11 MHz linear and 6-18

MHz linear contrast capable, and 3-9 MHz micro convex and 1-8 MHz convex array grey-scale and Doppler probes.

2. Biosound MyLab Megas with B-mode capability and a 6-9 MHz curvilinear probe
 3. Philips HDI Ultrasound with B-mode capability. Includes 2-5 MHz curved array, 5-8 MHz curvilinear and 5-12 MHz linear probes
 4. GE Logibook portable system with 8 MHz curvilinear and 10 MHz linear (rectilinear) and 10 MHz linear (small parts) probes.
 5. GE Vivid 7 echocardiographic system with harmonic advanced Doppler capabilities and 3 MHz, 5 MHz, 7.5 MHz and 10 MHz phased linear array probes.
 6. All ultrasound systems store images in the institutional PACS system.
4. GE Lightspeed 16 slice CT scanner
1. 0.5 sec rotation speed
 2. 0.625mm-10mm slice thickness
 3. Post-processing capability including MIP, MIN, Surface rendering 3D, volume analysis
 4. Off-line Advantage workstation for research functions, including image analysis, 3D and vessel analysis
 5. VetMouseTrap™ device for awake small animal scanning
5. MRI:
1. Esaote Vet-Grande 0.3T permanent MRI for small animal and equine
 - a. Coils:
 1. Linear solenoid shoulder/spine coil
 2. Linear solenoid flexible coil
 3. Dual phased array brain/equine/knee coil
 4. Dual phased array brain/foot/ankle coil
 - b. T1, T2, PD, FLAIR, STIR, 3D
 2. Siemens 3T Allegra head scanner located on campus at BIC
 3. Siemens 3T Trio whole body scanner located on campus at BIC
 4. All MRI systems are available for clinical and research cases
6. Mirage Nuclear Imaging with NuCam gamma camera
1. Veterinary planar acquisition and processing system
 2. Motion Correction Software
 3. Shine Image Filtering Software
 4. Iodine 131 Thyroid treatments
7. Theratron 780 Cobalt 60 Radiation Therapy Unit
1. Radiation treatment planning provided by ACVR(RO) diplomate
8. Carestream Health PACS
1. Version 10.2
 2. Additional digital images stored include:

- a. Dentistry
- b. endoscopy
- c. arthroscopy
- 3. Network includes
 - a. Chicago Center (Furnetics)
 - b. Brookfield Zoo
 - c. Beckman Imaging Center (BIC) of the Beckman Institute for Advanced Science and Technology on the campus of UIUC

VII. Clinical Resources

The University of Illinois Veterinary Teaching Hospital admits 16,715 patients annually. Approximately 8800 imaging studies are accessible annually.

The approximate annual imaging caseload distribution for the residency program is:

- 1) Small Animal Radiology: 4755
 - a) Canine/Feline: 4091
 - b) Exotic: 306
 - c) Zoological: 358
- 2) Large Animal Radiology: 851
 - a) Equine: 783
 - b) Bovine: 41
 - c) Other (llama, pig, goat): 27
- 3) Ultrasound: 1627
 - a) Abdominal: 1484
 - b) Non-abdominal site: 44
 - c) Interventional: 99
- 4) Echo Cardiology: 175
- 5) CT: 382
- 6) Nuclear Medicine: 586
- 7) MRI: 152
- 8) Radiation Therapy: 113
- 9) Contrast Studies: 144

VIII. Training Content

- A. What percentage of imaging reports are typically available within 48 hours after the examination is conducted in typewritten or electronic form? 80
- B. Of the preliminary reports generated from the imaging caseload, what percentage is initially produced by the resident? 75
- C. What percentage of resident reports is reviewed by the imaging faculty prior to finalization of the report? 100
- D. 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? 50

Estimated number of cases for each resident during the 30 month clinical assignment:

- 1) Small Animal Radiology: 8916
 - a) Canine/Feline: 7671
 - b) Exotic: 574
 - c) Zoological: 671
- 2) Large Animal Radiology: 1596
 - d) Equine: 1468
 - e) Bovine: 77
 - f) Other (llama, pig, goat): 51
- 3) Ultrasound: 3052
 - g) Abdominal: 2783
 - h) Other: 83
 - i) Interventional: 186
- 4) Echo Cardiology: 328
- 5) CT: 716
- 6) Nuclear Medicine: 1099
- 7) MRI: 285
- 8) Radiation Therapy: 212
- 9) Contrast Studies: 270

To meet the educational objectives for formal instruction, the following self study modules are always available for review and progressively required reading during the 3 year program:

- A. Radiobiology
- B. Physics of
 1. Diagnostic Radiology
 2. Nuclear Medicine
 3. Ultrasonography
 4. CT
 5. MRI

Mock written examinations are scheduled throughout the residency covering each of these topics.

Additionally, course work is provided in all the aforementioned areas in formal didactic lectures presented in the DVM curriculum, attendance, at which, is required for all residents.

Supervised practical experiences are provided in basic patterns of disease and principles of interpretation of disease in:

1. Diagnostic Radiology
 - a. Routine

- b. Contrast studies
 - c. Video fluoroscopic (Dynamic) studies
- 2. Nuclear Medicine
- 3. Ultrasonography
 - a. Grey-scale
 - b. Doppler
 - c. Contrast
 - d. Interventional
- 4. CT
 - a. Routine
 - b. Angiographic
 - c. Interventional
- 5. MRI

As part of the M.S. requirement of the residency, the following courses are required:

VCM 500

Difficult Case Conference

VCM 502-Issues in Clinical Research

VCM 506-Topics in Pathophysiology

VCM 548-Veterinary Cytopathology

VCM 585-Current Lit Sm Anim Medicine

VCM 590-Seminar

VCM 591-Advances in Vet Internal Med

VCM 592-Special Problems

VCM 593-Adv Topics Vet Clin Med

VCM 598-Non-Thesis Research

VCM 599-Thesis Research

VCM 603-Imaging Therapy/Radiology (=4th year DVM clinical training)

VCM 667-Radiology and Radiobiology (=3rd year didactic DVM course)

VCM 685-Advanced Diagnostic Imaging (elective didactic course for 1st and 2nd year DVM students)

PATH 591-Design/Analysis Biomed Exper

PATH 524-Biostatistics

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?

Jodi Matheson: 6

Robert O'Brien: 17

What is the number of publications/submissions expected of a resident completing the program? 2

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

Is an advanced degree a requirement of the training program? Yes, M.S. (unless the resident already has an M.S.)

X Educational Environment

Each resident is expected to present 10 lectures or scientific presentations during the course of their training

XI Evaluation:

Each resident will be evaluated at the following times:

1. 3 months
2. 6 months
3. annually thereafter (1,2,3 yr)

XII Teaching File:

1. Hard copy image files are available, indexed and coded by species and body site.
2. All imaging modalities in the VTH are DICOM and stored on the PACS. Electronic images on the PACS may be filtered by breed/species, anatomy, modality or pathology. This includes dental images (small and large animal), arthroscopic and endoscopic images. An additional electronic exotic animal file is available to review images from the Brookfield Zoo.
3. PACS images of interest are identified within the custom worklist function for body site, modality, and disease.
4. Files of lectures are kept electronically on a shared drive accessible to faculty and residents.

XIII Conferences:

On average, each resident will conduct at least 100 Known Case Conferences.

XIV Literature resources:

1. A general veterinary medical library is located in the Basic Science Building immediately adjacent to the Veterinary Teaching Hospital.
2. An additional imaging library is maintained in the Imaging Section of the hospital.

CURRICULUM VITAE

Robert T. O'Brien

LAC 273

Department of Veterinary Clinical Medicine
College of Veterinary Medicine
University of Illinois Champaign-Urbana
Urbana, IL

November 6, 2009

Education:

<u>Date</u>	<u>Institution</u>	<u>Degree</u>
1973-77	University of Maine	B.S. (High Distinction)
1975-76	University of New Brunswick	Junior Year in Canada Program
1977-79	University of Cincinnati	M.S.
1983-87	The Ohio State University	D.V.M. (Honors)

Diplomate:

1992 American College of Veterinary Radiology

Professional Experience:

<u>Date</u>	<u>Position/Title</u>	<u>Institution</u>
1987-1988	Internship	University of Pennsylvania
1988 - 1991	Resident, Radiology	University of Pennsylvania
1991 - 1993	Clinical Instructor	University of Wisconsin-Madison
1993 - 1998	Clinical Assistant Professor	University of Wisconsin-Madison
1998 - 2003	Clinical Associate Professor	University of Wisconsin-Madison
1998 to 2003	Chief of Staff Small Animal Services	University of Wisconsin-Madison
2003	Clinical Professor	University of Wisconsin-Madison
2003 - 2004	Head of Imaging Center	Michigan Veterinary Specialists
2005	Associate	VetMed Consultants
2006 - 2008	Associate Professor	Kansas State University
2008 - 2010	Board Reviewer	AJVR Board of Scientific Reviewers
2008 – present	Professor	University of Illinois
2008 – present	Head of Imaging Services	University of Illinois

Published Per-Reviewed Manuscripts 58

Published Abstracts 60

Books Editor/Published 4

Book Chapters 7

Residents Trained to completion of ACVR Diplomate status 13

Professional Organizations/Activities (current)

Member, ACVIM Forum Subcommittee

Director, International Veterinary Ultrasound Society

Reviewer for American Journal of Veterinary Research

CURRICULUM VITAE

Jodi Suzanne Matheson

LAC 271

Department of Veterinary Clinical Medicine
College of Veterinary Medicine
University of Illinois Champaign-Urbana
Urbana, IL

November 6, 2009

Education:

<u>Date</u>	<u>Institution</u>	<u>Degree</u>
2000	University of Missouri—Columbia	D.V.M.
1996	University of Wisconsin—Stevens Point	B.S. (Honors)

Diplomate:

2009 American College of Veterinary Radiology

Professional Experience:

<u>Date</u>	<u>Position/Title</u>	<u>Institution</u>
2000-2001	Internship in Small Animal	Kansas State University
2001-2003	Reserch Radiology Intern	University of Wisconsin-Madison
2003–2007	Residency, Radiology	University of Wisconsin-Madison
2007- 2008	Clinical Outreach Instructor	University of Wisconsin-Madison
2009-present	Clinical Assistant Professor	University of Illinois

Published Per-Reviewed Manuscripts:

- 1) **Matheson JS**, Paul-Murphy J, O'Brien RT Quantitative Ultrasound analysis and MRI Analysis as Diagnostic Tools for Iron Accumulation in the Liver of Birds. *Journal of Zoo and Wildlife Medicine*. 2007. 38:222–230.
- 2) Kumbalek SL, Hanley CS, **Matheson JS**, Schutten MM, Gonzalez OD. What is your diagnosis? Ovarian adenocarcinoma. *J Am Vet Med Assoc*. 2006. 22:1567-8.
- 3) Salwei, RM, O'Brien, RT, **Matheson, JS**. Characterization of vascular and perfusion patterns of lymphomatous lymph nodes using contrast harmonic ultrasound. *Vet Radiol Ultrasound*. 2005. 46:411-6.
- 4) O'Brien RT, Iani M, **Matheson J**, Delaney F, Young K. Contrast harmonic ultrasound of spontaneous liver nodules in 32 dogs. *Vet Radiol Ultrasound*. 2004. 45:547-53.
- 5) Salwei RM, O'Brien RT, **Matheson JS**. Use of contrast harmonic ultrasound for the diagnosis of congenital portosystemic shunts in three dogs. *Vet Radiol Ultrasound*. 2003. 44:301-5.
- 6) **Matheson JS**, O'Brien RT, Delaney F. Tissue harmonic ultrasound for imaging normal abdominal organs in dogs and cats. *Vet Radiol Ultrasound*. 2003. 44:205-8.

Published Abstracts

4

Residents Trained to completion of ACVR Diplomate status

2

1st yr													
	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	41-44	45-48	49-52
Clinic	rad	rad	rad	rad	US	research	US	US	rads	research	ct/mr	rad	elective
Teaching lectures						VCM 667	VCM 667	VCM 667	VCM 667	VCM 667			
						Path 603	Path 603	Path 603	Path 603	Path 603			
						VCM 690	VCM 690	VCM 690	VCM 690	VCM 690			
Teaching labs						VCM 667	VCM 667	VCM 667	VCM 667	VCM 667			
2nd yr													
	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	41-44	45-48	49-52
Clinic	US	ct/mr	US	elective	rad	US	research	rad	research	elective	US	ct/mr	NM
Teaching lectures						VCM 667	VCM 667	VCM 667	VCM 667	VCM 667			
						Path 603	Path 603	Path 603	Path 603	Path 603			
						VCM 690	VCM 690	VCM 690	VCM 690	VCM 690			
Teaching labs						VCM 667	VCM 667	VCM 667	VCM 667	VCM 667			
3rd yr													
	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	41-44	45-48	49-52
Clinic	elective	off	preliminary exam	US	rad	rad	elective	elective	US	echo	rad	elective	rad
Teaching lectures						VCM 667	VCM 667	VCM 667	VCM 667	VCM 667			
						Path 603	Path 603	Path 603	Path 603	Path 603			
						VCM 690	VCM 690	VCM 690	VCM 690	VCM 690			
Teaching labs						VCM 667	VCM 667	VCM 667	VCM 667	VCM 667			

Rad	12		
US	9		
CT/MR	3		
Elective	9		
Off/Research	6		
Total	39	x4 weeks	=156 weeks