

**ACVR Residency Training Program Application Form:**

# Auburn University

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:**

Succinctly state the objectives of the training program.

1. To develop clinical skills in diagnostic radiology and ultrasound in both large and small animals using both routine and special procedures and alternate imaging.
2. To develop basic understanding and basic clinical skills in performing and interpreting computed tomography and magnetic resonance images
3. To develop practical and theoretical exposure to the application of nuclear medicine, both in clinical veterinary medicine and in clinical research.
4. To provide instruction in the basic principles of radiobiology, radiation physics, radiation protection, radiation dosimetry, radiation safety, radiological anatomy and physiology, and pathologic physiology.
5. To provide basic experience in teaching radiological sciences to veterinary students and practitioners.
6. To serve as basis for a graduate program, leading to MS or PhD
7. To provide a structured program of instruction and experience providing a qualified candidate the skills necessary to achieve certification by the ACVR.

**III. Training period:**

What is the total length of the training program in months?	<b>36 months</b>
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.	
What is the total duration of supervised clinical training in the program?	<b>31 months</b>
What are the responsibilities of the resident in the remaining non-clinical portion of the program? <b>Non clinical portion of training includes resident research project, written board preparation, vacation.</b>	

**IV. Direction and Supervision:****Program Director:**

Who is the Director of Residency training? <b>John T. Hathcock</b>
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What percentage of this individual's time is committed to clinical service and teaching of residents? <b>85 % clinical service and shares teaching of residents with 5 other ACVR diplomates.</b>
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**Faculty:**

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

## Roentgen diagnosis:

Faculty: <b>John T. Hathcock, DVM, MS, DACVR, Professor</b>
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Percentage clinical service: <b>85% (20% of Roentgen Diagnosis)</b>
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## Diagnostic ultrasound:

Faculty: <b>Robert Cole, DVM, DACVR, Assistant Professor</b>
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Percentage clinical service: <b>60% (33% of Diagnostic Ultrasound)</b>
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## Computed Tomography

Faculty: <b>John T. Hathcock, DVM, MS, DACVR, Professor</b>
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Percentage clinical service: <b>85% (25% of CT)</b>
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## Magnetic Resonance Imaging:

Faculty: <b>John T. Hathcock, DVM, MS, DACVR, Professor</b>
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Percentage clinical service: <b>85% (25% of MRI)</b>
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## Nuclear Medicine:

Faculty: <b>Robert Cole, DVM, DACVR, Assistant Professor</b>
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Percentage clinical service: <b>60% (50% of NM)</b>
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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.

**Merrilee Holland, DVM, MS, DACVR, Associate Professor – 70% clinical service (33% of ultrasonography and 20% of diagnostic radiology and 25% of computed tomography and magnetic resonance imaging)**

**Greg T. Almond, DVM, DACVR (Rad and RO), Assistant Clinical Professor – 80% clinical service (20% of diagnostic radiology and 50% of nuclear medicine)**

**Rachel Moon, DVM, DACVR, Assistant Clinical Professor – 80% clinical service (20% diagnostic radiology, 33% ultrasound, 25% computed tomography and magnetic resonance imaging)**

**William R. Brawner, DVM, PhD, DACVR (Rad and RO) – 70% clinical service (25% nuclear medicine, 10% diagnostic radiology)**

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

<b>Ellen Behrend</b>
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<b>Tekla Lee-Fowler</b>
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ACVS

<b>Mike Tillson</b>
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<b>Harry Boothe</b>
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ACVP

<b>Joe Newton</b>
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<b>Kellye Joiner</b>
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**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. **NA**

**VI. Facilities:**

Briefly describe how the program meets the facility requirements.

**1. Four small animal x ray rooms**

- a. **Room number 1: General Radiology/Fluoroscopy – Siemens Agile wireless flat panel detector for general diagnostic radiology and flat panel digital fluoroscopic panel for fluoroscopic studies – Overhead tube crane – 1000mA and 140kVp generator**
- b. **Room number 2: General Diagnostic Radiology – Siemens Ysio with overhead tube crane and wireless flat panel digital detector with image stitching and tomosynthesis – 800mA and 145kVp generator**
- c. **Room number 3: General diagnostic radiology– Summit Innovet retrofitted with Canon flat panel detector DR - 300mA generator and 125kVp**
- b. **Room number 4: Sedecal Vet DX-C system retrofitted with Canon flat panel detector DR – 400mA generator, 125kVp**

**2. Large animal x ray room:**

- a. **Eklin Digital Radiology System for extremities - CPI Indico 100HF generator with 2 ceiling mounted tube supports (one for extremity exams and one for chest exams) and ceiling mounted receptor support tube with grid cabinet**

- b. Portable - MinX-ray HF 15 mA generator and 80kVp**
- 3. Ultrasound room**
- a. Philips iE 33** with M-mode, pulsed and color Doppler imaging, color Power Angio, Sono CT real time compound imaging, harmonic imaging, Pure Wave Crystal technology, freehand 3D, XRES imaging, and live 3D echo. Transducers include curvilinear array (C5-2, C8-5), linear (L11-3, L9-3), and sector array (S5-1, S12-4) broadband transducers.
- b. Philips HD 11 XE** with anatomic M-mode, pulsed and color Doppler imaging, Sono CT real time compound imaging, harmonic imaging, XRES imaging, live 3D imaging, and biopsy capability. This machine also uses the C5-2, C8-5, S12-4, and L9-3 transducers listed above.
- c.** These ultrasound machines are used for abdominal imaging, musculoskeletal imaging, neuroimaging, intraoperative imaging, biopsies and aspirates, imaging of small parts (e.g., thyroid, parathyroid), and echocardiology.
- 4. Nuclear Medicine - Enhanced Technologies digital gamma camera** with large rectangular detector and Ultra-Scan Gantry system. Dedicated scanning room with adjacent control room separated by lead glass shielded windows. Suite designed to accommodate large and small animals. PC based Mirage software by Segami for static and dynamic image acquisition, motion correction and processing with connection to College-wide PACS. Fully equipped radioisotope laboratory. Dedicated isolation ward for small animals.
- 5. Linear Accelerator Laboratory** Free standing building housing accelerator vault (accessible for small and large animals), control room, treatment planning room and small animal ward. Siemens Primus linear accelerator with 6 and 10 MV photons, 6-14 MeV electrons, and multileaf collimator for conformal therapy and IMRT. Prowess 3-D computerized treatment planning system coupled with Prowess record and verify system. Also Sr-90, Ir-192 and I-131 therapy.
- 6. Licensed for  $^{192}\text{Ir}$  brachytherapy.**
- 7. Ware Imaging Building – Free standing building housing:**
- a. Computed tomography suite** –GE VCT 64 slice Scanner and Large Animal CT table
- b. Magnetic Resonance Imaging** – Philips Infinion 1.5T with Large animal MRI compatible table
- 8. Dent.X Image X-70**
- 9. Siemens Compac C-Arm** for intraoperative small animal use

**VII. Clinical resources:**

Indicate the approximate number of patients seen annually by the home institution? <b>22,334 (for 2015)</b>
What is the annual imaging caseload? <b>11,492 (for 2015)</b>

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

Small animals (canine, feline)	<b>89%</b>
Large animals (equine and food animals)	<b>10%</b>
Exotic animals	<b>&lt;1%</b>

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

Small Animal Radiology: <b>6954 (for 2015)</b>
Large Animal Radiology: <b>865 (for 2015)</b>
Abdominal Ultrasound: <b>2474 (for 2015)</b>
Computed Tomography: <b>463 (for 2015)</b>
Nuclear Medicine: <b>57 (for 2015)</b>
Magnetic Resonance Imaging: <b>514 (for 2015)</b>
Other (specify): <b>150 (mostly raptors for 2015)</b>

**VIII. Training content:**

What percentage of imaging reports are typically available within 48 hours after the examination is conducted in typewritten or electronic form? <b>95%</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.
Of the preliminary reports generated from the imaging caseload what percentage are initially produced by the resident? <b>Once they begin dictating reports, all of the cases that are seen on that service are dictated by the resident. There are some services that do not have a resident and residents do not begin dictating reports in first few</b>

**months of program, so the overall percentage will be close to 75-85% of the total number of reports. But when a resident is on a service and is dictating, then all of those cases are reported by the resident.**

What percentage of resident reports are reviewed by the imaging faculty prior to finalization of the report? **95% When the 3<sup>rd</sup> year resident is in last half of the their 3<sup>rd</sup> year, some cases may be reviewed orally with radiologist and report is finalized by resident.**

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? **Less than 10%. The reason the percentage is not higher can be attributed to multiple factors. The primary factor being that, while multiple inputs concerning resident individual reports are valuable, we have 6 ACVR diplomates that review and help the residents edit their reports throughout their program. The residents are on duty with these 6 ACVR diplomates on many rotations and thus the different diplomates are providing their guidance on reporting on many different occasions. So the residents are getting the benefit of 6 ACVR diplomates providing their guidance, just not usually on the same report. Additionally, timeliness in reviewing the reports is another important factor, and the other faculty duties such as committee meetings, lectures, rounds, research, etc tend to limit the times a review with multiple faculty members can take place.**

Please complete the table below

	Approximate number of cases in the 30 months clinical experience
Small Animal Radiology:	<b>6954 (12 months)</b>
Large Animal Radiology:	<b>865 (seen during 12 months on diagnostic radiology or on CT/MRI)</b>
Abdominal Ultrasound:	<b>2060 (10 months)</b>
Computed Tomography:	<b>312 (8 months)</b>
Nuclear Medicine:	Because minimum time is not specified in Essentials and due to relative low caseload, every attempt is made to have each resident to participate in each NM case as it is presented. Flexibility exists in other supervised rotations to allow participation in these supervised procedures. Estimated participation is <b>200 cases.</b>
Magnetic Resonance Imaging:	<b>346 (8 months)</b>
Elective (any of above): <b>CT and MRI</b>	<b>120 (1.5 months)</b>
Required elective (specify):	
<b>Total</b>	<b>10,657</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:	<b>VBMS 7210, VBMS 7260</b>	<b>3-5</b>
The Physics of:		
Diagnostic Radiology:	<b>VBMS 7260, VBMS 7270, VBMS 7250</b>	<b>9-12</b>

Nuclear Medicine:	<b>VBMS 7260</b>	<b>3-5</b>
Ultrasonography:	<b>VBMS 7260, VBMS 7130, VBMS 7280</b>	<b>9-12</b>
CT:	<b>VBMS 7260, VBMS 7280</b>	<b>6-10</b>
MRI:	<b>VBMS 7260, VBMS 7280</b>	<b>6-10</b>
<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.  <b>In addition to formal courses listed above, Special Problems Courses (VBMS 7980) are taught covering topics of radiation therapy physics, treatment planning and dose calculation. Also more informal instruction is also provided to residents early in their program providing chapter by chapter review of physics of radiology, computed tomography and ultrasound of textbooks such as Christensen’s Physics of Radiology and Hall’s Radiobiology</b></p>		

**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 <b>IV</b> above, are included as authors? <b>4-5</b>
What is the number of publications/submissions expected of a resident completing the program? <b>1-2</b>
If this is an established program, what percentage of residents have made formal research presentations at the annual ACVR or equivalent national meeting? <b>&lt;50%</b>
Is an advanced degree a requirement of the training program? <b>Yes. We feel the graduate courses that are part of the graduate degree program provide a structure and/or framework for review and discussion of many, if not most, of the published exam objectives. The degree requirement does necessitate extra effort on the part of the resident, but much of the work directly relates to board preparation. The research project that is part of the degree program is usually related to an area of intense interest to the resident (as well as imaging related) allowing more focused study and better understanding of the specific imaging modality.</b>

**X. Educational Environment:**

How many lectures or scientific presentations are expected of each resident during the course of their training? <b>3-5 physics lectures to students, 2-3 resident seminars, 1 ACVR presentation , 1 graduate program presentation</b>
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**XI. Evaluation: 'Evaluation of residents and protection mechanisms'**

- At the 6 months reviews did your resident(s) successfully complete their residency training or did any of your resident(s) not adequately complete the last 6 months of training? **All successfully completed.**
- List the current members of the residents' review committee. **Dr. John Hathcock, Dr. William Brawner, Dr. Robert Cole, Dr. Rachel Moon, Dr. Greg Almond and Dr. Merrilee Holland**
- List the internal mechanisms in place to protect your resident if conflicts arise. **Resident should contact radiology residency director and has the option to contact any of the radiology faculty who will then contact radiology residency director. The resident may also contact chief resident of the hospital who is a member of the Department of Clinical Sciences Internship/Residency Committee and who can bring forth issues to this committee. Our Head of the Department of Clinical Sciences also has an open door policy to residents if needed.**

**XII. Teaching File:**

What is the nature and scope of the teaching file available to residents? **Traditional film based known case file collected over many years. In addition each faculty maintains personal known case file available to residents. These are both film based and digital cases.**

How is it maintained/updated? **Periodically added to by all faculty**

**XIII. Conferences:**

On average how many Known Case Conferences are conducted annually? **Approximately 45. This is done for 1 hour each week for each resident (there are occasional conflicts which is why the number is about 45 rather than 52). At the end of the program before certifying exam, a mock board is prepared and administered to the residents to try and simulate the intensity of the certifying boards over a 2 day period.**

**XIV. Literature resources:**

What is the geographic relationship between the nearest medical library and the training program? **The Cary Veterinary Medical Library (a branch of the main Auburn University Library) is in basic science building adjacent to teaching hospital. Many, if not most, journals are also available online through the library.**

**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 (2010)	Year 4 (2012)	Year 3 (2013)	Year 2 (2014)	Year 1 (2015)
Passed preliminary exam 1st time	Resident 1 and Resident 2 (100%)	Resident 1 (100%)	Resident 1, (50%)	Resident 1 (100%)	Resident 1 (100%)
Passed prelim exam 2 <sup>nd</sup> time			Resident 2		
Passed prelim after 2 <sup>nd</sup> time					
Passed certifying exam 1 <sup>st</sup> time	Resident 1 and Resident 2 (100%)		Resident 1		Resident 1 (100%)
Passed certifying exam 2 <sup>nd</sup> time		Resident 1	Resident 2 not yet passed the certifying	Resident 1 not yet passed certifying	
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.

Rot #	Dates	Small An Diag Rad	Lg An Diag Rad	US	Rad Th/Nuc Med	CT/MRI
22	Jan 4	RM/DK	AS/JTH	KC/RCC	GTA	JTH
23	Jan 19	KC/GTA	RM	MH/DK	WRB	AS/RM
24	Feb 1	AS/WRB	KC/WRB	RM	WRB	KC/MH/DK
25	Feb 15	AS/MH	JTH	RCC/DK	GTA	KC/JTH
1	Feb 29	KC/JTH	MH	AS/RCC	WRB	DK/MH
2	Mar 28	DK/RCC	AS/MH	KC/RM	GTA	AS/MH
3	Apr 18	KC/GTA	AS/RM	DK/MH	WRB	RM
4	May 9	AS/MH	DK/JTH	KC/RCC	WRB	DK/JTH
5	May 31	DK/JTH	RCC	KC/RM	WRB	AS/RCC
6	June 20	AS/RM	JTH	DK/RCC	GTA	KC/JTH

**AS – 3<sup>rd</sup> year residents**

**KC – 2<sup>nd</sup> year resident**

**DK - 1<sup>st</sup> year resident**

**GTA, RM, WRB, MH, JTH, RCC – radiology faculty**

This is the projected radiology faculty and resident duty schedule for first 6 months of 2016 (previous schedules are similar and specific faculty assigned may be different than listed)). Rotations 22-25 are 2 weeks long, rotation 1 is 4 weeks long, rotations 2-6 are 3 weeks long. Residents are assigned to a rotation with a radiology faculty member. The 3<sup>rd</sup> year residents (AS) are in charge of the rotations with the faculty member (GTA, RM, WRB, MH, RCC or JTH) backup. The resident will have primary interaction with students, interns, residents and/or clinicians of cases they are reviewing and will be responsible for dictating the reports of the cases (and which will be reviewed with the radiology faculty on that rotation). The 3<sup>rd</sup> residents also hold rounds with the senior students on the Sm An Diag Rad rotation. The 2<sup>nd</sup> year resident (KC) is taking on more responsibilities and dictating most, if not all, of the cases on the rotations they are on. The first year resident (DK) is still participating closely with the 3<sup>rd</sup> year resident and/or radiology faculty on the rotation and is dictating up to 50% of the cases on that rotation. Again the 1<sup>st</sup> and 2<sup>nd</sup> year residents work closely with the radiologist assigned to that rotation and all the reports generated by the residents are reviewed by that radiologist.

**Small Animal Diagnostic Radiology – all small animal radiology cases**

**Large Animal Diagnostic Radiology – all large animal radiology cases**

**Ultrasound – all small animal ultrasound cases (and any large animal cases requested)**

**CT/MRI – all small animal and large animal CT or MRI cases**

**Radiation Therapy/Nuclear Medicine – All residents are informed of nuclear medicine cases and participate in those cases as available**