

Large Animal Candidate Boot Camp
October 12-15, 2023
Michigan State University | East Lansing, MI



| DAY 1 Thursday, October 12 | | |
|-------------------------------|--|------------------------------|
| Time (Eastern Time) | Topic | Presenter(s) |
| 7:20 am | Shuttle to MSU McPhail Center | |
| 7:45-8:00 am | Registration | |
| 8:00-8:10 am | Welcome & Introductions | <i>Dr. Hal Schott</i> |
| 8:10-8:50 am | Thoracic and Abdominal Ultrasonography <ul style="list-style-type: none"> Describe the principles of ultrasonography Identify the normal ultrasonographic anatomy of the horse's abdomen and thorax | <i>Dr. Michelle Barton</i> |
| 8:50-9:30 am | Gastric and Colonic Ulcers <ul style="list-style-type: none"> Using the background lecture recordings and material have a good understanding of the different types of EGUS, their etiology, clinical signs, treatment options and preventative strategies. The session lecture will highlight EGUS topics important to specialists such as endoscopic lesion relevance, treatment failure, herd approach to management in competition horses, surgical management of refractory EGGD and future research directions. | <i>Dr. Richard Hepburn</i> |
| 9:30-9:50 am | Break | |
| 9:50-10:40 am | Muscle Disorders – Examination <ul style="list-style-type: none"> Understand the basic physiology of skeletal muscle at rest and with exercise. Be able to develop a clinically applicable classification system for muscle disorders. Understand the application and limitations of diagnostic tools available to diagnose these muscle diseases: Palpation, serum biochemistry, ultrasonography, genetic testing, muscle biopsy, and electromyography. | <i>Dr. Stephanie Valberg</i> |



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| Time (Eastern Time) | Topic | Presenter(s) |
| 10:40-11:30 am | Muscle Disorders – Examination and Diagnostic Approach Generate differential diagnosis and choose appropriate tests for: <ul style="list-style-type: none"> • Nonexertional Rhabdomyolysis • Exertional Rhabdomyolysis • Myopathic exercise intolerance • Muscle atrophy • Muscle fasciculations | <i>Dr. Stephanie Valberg</i> |
| 11:30-12:20 pm | Neurologic Examination <ul style="list-style-type: none"> • Understand the steps involved in an equine neurologic evaluation • Localize neurologic lesions based on the clinical presentation | <i>Dr. Carrie Finno</i> |
| 12:20 – 1:00 pm | Lunch & Learn – Optimizing Ultrasound Imaging | <i>Dr. Scott Giebler</i> |



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| DAY 1 (continued) Thursday, October 12 | | |
|---|---|---|
| Time (Eastern Time) | Topic | Presenter(s) |
| 1:00-3:00 pm | <p>Labs – 60 minutes each rotation</p> <p>Lab 1: Ultrasonography</p> <ul style="list-style-type: none"> Perform an advanced ultrasonographic examination of the equine thorax and abdomen. Identify thoracic (lung, diaphragm) and abdominal (stomach, small and large intestine, liver, spleen, and kidneys) structures. <p>Lab 2: Gastroscopy</p> <ul style="list-style-type: none"> Identify normal anatomy of the equine stomach: antrum, pylorus, and proximal duodenum. Perform gastroscopy and duodenoscopy on a standing, sedated horse. Obtain gastric and/or duodenal biopsies on a standing, sedated horse. <p>Lab 3: Muscular System Exam</p> <ul style="list-style-type: none"> Perform an advanced examination of the equine muscular system. Identify muscles from which to collect biopsy samples and how to prepare samples for shipment. <p>Lab 4: Neurologic Exam</p> <ul style="list-style-type: none"> Perform an advanced examination of the equine neurologic system. Identify and localize neurologic abnormalities of patients with neurologic deficits. | <p><i>Dr. Michelle Barton, Dr. Richard Hepburn, Dr. Stephanie Valberg, Dr. Carrie Finno</i></p> |
| 3:00-3:30 pm | Break | |



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| DAY 1 (continued) Thursday, October 12 | | |
|---|---|---|
| Time (Eastern Time) | Topic | Presenter(s) |
| 3:30-5:30 pm | <p>Labs – 60 minutes each rotation</p> <p>Lab 1: Ultrasonography</p> <ul style="list-style-type: none"> Perform an advanced ultrasonographic examination of the equine thorax and abdomen. Identify thoracic (lung, diaphragm) and abdominal (stomach, small and large intestine, liver, spleen, and kidneys) structures. <p>Lab 2: Gastroscopy</p> <ul style="list-style-type: none"> Identify normal anatomy of the equine stomach: antrum, pylorus, and proximal duodenum. Perform gastroscopy and duodenoscopy on a standing, sedated horse. Obtain gastric and/or duodenal biopsies on a standing, sedated horse. <p>Lab 3: Muscular System Exam</p> <ul style="list-style-type: none"> Perform an advanced examination of the equine muscular system. Identify muscles from which to collect biopsy samples and how to prepare samples for shipment. <p>Lab 4: Neurologic Exam</p> <ul style="list-style-type: none"> Perform an advanced examination of the equine neurologic system. Identify and localize neurologic abnormalities of patients with neurologic deficits. | <p><i>Dr. Michelle Barton, Dr. Richard Hepburn, Dr. Stephanie Valberg, Dr. Carrie Finno</i></p> |
| 5:30-5:45 pm | Break | |
| 5:45-6:30 pm | Tour of MSU Large Animal Veterinary Teaching Hospital | <i>Dr. Hal Schott</i> |
| 6:30-8:30 pm | Dinner – Career Paths in Large Animal Internal Medicine | <i>All</i> |
| 8:30 pm | Shuttle to Hotel | |



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| DAY 2 Friday, October 13 | | |
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| Time (Eastern Time) | Topic | Presenter(s) |
| 7:20 am | Shuttle to MSU McPhail Center | |
| 8:00-8:40 am | Liver – Evaluation and Biopsy <ul style="list-style-type: none"> Discuss the main diagnostic approach to liver disease in the horse Be able to perform an ultrasound-guided liver biopsy | <i>Dr. Michelle Barton</i> |
| 8:40-9:20 am | CVM Neurological Disorders <ul style="list-style-type: none"> Using the background lecture recording(s) and material have a good understanding of cervical anatomy and neuroanatomy, of cervical pain/movement restriction and medication of articular process joints. The session lecture will highlight how advanced imaging has improved understanding of the anatomical causes of CVCM and how this relates to clinical presentation and decision making for cervical imaging, treatment options and the horse's future use. | <i>Dr. Richard Hepburn</i> |
| 9:20-10:00 am | C1C2/LS CSF Collection <ul style="list-style-type: none"> Describe the C1/C2 and LS CSF collection procedures and appropriate sedation protocol List the advantages, disadvantages, and complications associated with each CSF collection procedure | <i>Dr. Ana Moreira</i> |

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| DAY 2 (continued) Friday, October 13 | | |
|---|---|--|
| Time (Eastern Time) | Topic | Presenter(s) |
| 10:00-10:20 am | Break | |
| 10:20 am - 12:20 pm | <p>Labs – 60 minutes each rotation</p> <p>Lab 5: Liver Biopsy</p> <ul style="list-style-type: none"> Identify landmarks for ultrasonographic imaging of the liver on the left and right sides of the abdomen. Perform a needle biopsy of the liver on the left and right sides of the abdomen in a standing, sedated horse. <p>Lab 6: LS CSF Collection</p> <ul style="list-style-type: none"> List the materials needed for LS CSF collection in the horse. Identify the anatomical landmarks for performing a LS CSF collection. Perform LS CSF collection on a standing, sedated horse. <p>Lab 7 Muscle Biopsy – Client Horses</p> <ul style="list-style-type: none"> Be able to identify important muscle groups and assess them in various athletes. Be able to select the appropriate muscle for biopsy and appropriately process muscle for shipping Understand the principles and practice of using a percutaneous muscle biopsy needle Be able to obtain a sacrocaudalis dorsalis medialis biopsy <p>Lab 8: C1/C2 CSF Collection</p> <ul style="list-style-type: none"> List the materials needed for C1/C2 CSF collection in the horse. Identify the anatomical landmarks for performing a C1/C2 CSF collection. Using ultrasonography, identify the site for performing a C1/C2 CSF collection. Perform C1/C2 CSF collection on a standing, sedated horse. | <p><i>Dr. Michelle Barton, Dr. Richard Hepburn, Dr. Stephanie Valberg, Dr. Carrie Finno, Dr. Ana Moreira</i></p> |



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| DAY 2 (continued) Friday, October 13 | | |
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| Time (Eastern Time) | Topic | Presenter(s) |
| 12:20-1:00 pm | Lunch | |
| 1:00-1:50 pm | Non-CVM Neurological Disorders <ul style="list-style-type: none"> Understand the etiologies of equine spinal ataxia and corresponding prevalence for each disease Describe the clinical signs and histologic lesions of equine neuroaxonal dystrophy/ degenerative myeloencephalopathy Construct a diagnostic work-up to distinguish CVM from eNAD/EDM and EPM. | <i>Dr. Carrie Finno</i> |
| 1:50-2:40 pm | Vitamin E Related Disorders <ul style="list-style-type: none"> Define the neuromuscular diseases associated with vitamin E deficiency and risk factors for each Understand the role for vitamin E in optimizing neuromuscular health | <i>Dr. Carrie Finno</i> |
| 2:40-3:30 pm | Unusual Gait Deficits – Neurologic or Not? <ul style="list-style-type: none"> Be able to perform an examination to rule in or rule out a gait abnormality Differentiate Stringhalt from Shivers Differentiate Standing hyperflexion from Shivers Identify subtypes of Shivers Understand the proposed etiology of Shivers | <i>Dr. Stephanie Valberg</i> |
| 3:30-3:50 pm | Break | |



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| DAY 2 (continued) Friday, October 13 | | |
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| Time (Eastern Time) | Topic | Presenter(s) |
| 3:50-5:50 pm | <p>Labs – 60 minutes each rotation</p> <p>Lab 5: Liver Biopsy</p> <ul style="list-style-type: none"> Identify landmarks for ultrasonographic imaging of the liver on the left and right sides of the abdomen. Perform a needle biopsy of the liver on the left and right sides of the abdomen in a standing, sedated horse. <p>Lab 6: LS CSF Collection</p> <ul style="list-style-type: none"> List the materials needed for LS CSF collection in the horse. Identify the anatomical landmarks for performing a LS CSF collection. Perform LS CSF collection on a standing, sedated horse. <p>Lab 7 Muscle Biopsy – Client Horses</p> <ul style="list-style-type: none"> Be able to identify important muscle groups and assess them in various athletes. Be able to select the appropriate muscle for biopsy and appropriately process muscle for shipping Understand the principles and practice of using a percutaneous muscle biopsy needle Be able to obtain a sacrocaudalis dorsalis medialis biopsy <p>Lab 8: C1/C2 CSF Collection</p> <ul style="list-style-type: none"> List the materials needed for C1/C2 CSF collection in the horse. Identify the anatomical landmarks for performing a C1/C2 CSF collection. Using ultrasonography, identify the site for performing a C1/C2 CSF collection. Perform C1/C2 CSF collection on a standing, sedated horse. | <p><i>Dr. Michelle Barton, Dr. Richard Hepburn, Dr. Stephanie Valberg, Dr. Carrie Finno, Dr. Ana Moreira</i></p> |
| 5:50-6:00 pm | Break | |
| 6:00-8:00 pm | Dinner – Discussion: Surviving a LAIM RTP | <i>All</i> |
| 8:00 pm | Shuttle to Hotel | |



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| DAY 3 Saturday, October 14 | | |
|-------------------------------|--|----------------------------|
| Time (Eastern Time) | Topic | Presenter(s) |
| 7:20 am | Shuttle to MSU McPhail Center | |
| 8:00-8:40 am | Cervical Imaging Interpretation <ul style="list-style-type: none"> Using the background lecture recording(s) and material have a good understanding of how to acquire laterolateral and oblique lateral cervical radiographs and assess their quality, then clinically assess them in light of the horse's presenting signs. The session lecture will highlight the relevance of image quality, the relationship between laterolateral and oblique lateral radiographic pathology both as manifestations of anatomic variation and clinically relevant pathology. It will also discuss when to image further and how. | <i>Dr. Richard Hepburn</i> |
| 8:40-9:20 am | CSF Analysis and Interpretation <ul style="list-style-type: none"> Characterize the normal CSF appearance and composition Identify commonly evaluated CSF parameters and their reference intervals Relate CSF abnormalities with different disease processes | <i>Dr. Ana Moreira</i> |
| 9:20-10:00 am | Urinary Tract Imaging <ul style="list-style-type: none"> Recognize which imaging technique is most appropriate for the presenting complaint Describe the various transabdominal windows to image equine kidneys List potential ultrasonographic abnormalities to support AKI and CKD Recognize the endoscopic anatomy of the lower urinary tract in male and female horses | <i>Dr. Hal Schott</i> |
| 10:00-10:20 am | Break | |

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| DAY 3 (continued) Saturday, October 14 | | |
|---|---|---|
| Time (Eastern Time) | Topic | Presenter(s) |
| 10:20 am - 12:20 pm | <p>Labs – 60 minutes each rotation</p> <p>Lab 8: C1/C2 CSF Collection</p> <ul style="list-style-type: none"> List the materials needed for C1/C2 CSF collection in the horse. Identify the anatomical landmarks for performing a C1/C2 CSF collection. Using ultrasonography, identify the site for performing a C1/C2 CSF collection. Perform C1/C2 CSF collection on a standing, sedated horse. <p>Lab 9: Cervical Imaging</p> <ul style="list-style-type: none"> Identify normal and abnormal radiographic findings in the cervical vertebral column of the horse. Perform measurements of cervical radiographs. Compare utility of cervical radiographs to CT cervical images, including myelographic studies. <p>Lab 10: Cystoscopy</p> <ul style="list-style-type: none"> Know the materials needed for urethroscopy and cystoscopy in in the male horse. Obtain urine from the bladder of a male horse. Perform urethroscopy and cystoscopy in a gelding. <p>Lab 11: Sacrocaudalis Muscle Biopsy</p> <ul style="list-style-type: none"> Identify the anatomical landmarks for performing a sacrocaudalis dorsalis muscle biopsy. Perform muscle biopsies. | <p><i>Dr. Ana Moreira, Dr. Richard Hepburn, Dr. Hal Schott, Dr. Lauren Bookbinder</i></p> |
| 12:20-1:00 pm | Lunch | |



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| DAY 3 (continued) Saturday, October 14 | | |
|---|---|--|
| Time (Eastern Time) | Topic | Presenter(s) |
| 1:00-1:40 pm | Enterocolitis and IBD <ul style="list-style-type: none"> Using the background lecture recording and material have a good understanding of the anatomy and function of the intestinal tract. The session lecture will discuss potential manifestations of intestinal inflammation in the horse, their diagnosis and treatment | <i>Dr. Richard Hepburn</i> |
| 1:40-2:20 pm | Upper Urinary Tract Disorders – AKI and CKD <ul style="list-style-type: none"> List clinical complaints associated with AKI and CKD List common causes of AKI and CKD Describe the diagnostic and therapeutic approach to AKI Describe the diagnostic and therapeutic approach to CKD | <i>Dr. Hal Schott</i> |
| 2:20-3:00 pm | Lower Urinary Tract Disorders <ul style="list-style-type: none"> List clinical complaints associated with lower urinary tract disorders in horses List causes of pigmenturia in horses Describe the diagnostic and therapeutic approach to pigmenturia List causes of urinary incontinence in horses Describe the diagnostic and therapeutic approach to urinary incontinence | <i>Dr. Hal Schott</i> |
| 3:00-3:30 pm | Break | |
| 3:30-5:30 pm | Labs – 60 minutes each rotation Lab 8: C1/C2 CSF Collection <ul style="list-style-type: none"> List the materials needed for C1/C2 CSF collection in the horse. Identify the anatomical landmarks for performing a C1/C2 CSF collection. Using ultrasonography, identify the site for performing a C1/C2 CSF collection. Perform C1/C2 CSF collection on a standing, sedated horse. Lab 9: Cervical Imaging | <i>Dr. Ana Moreira, Dr. Richard Hepburn, Dr. Hal Schott, Dr. Lauren Bookbinder</i> |



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| | <ul style="list-style-type: none"> Identify normal and abnormal radiographic findings in the cervical vertebral column of the horse. Perform measurements of cervical radiographs. Compare utility of cervical radiographs to CT cervical images, including myelographic studies. <p>Lab 10: Cystoscopy</p> <ul style="list-style-type: none"> Know the materials needed for urethroscopy and cystoscopy in in the male horse. Obtain urine from the bladder of a male horse. Perform urethroscopy and cystoscopy in a gelding. <p>Lab 11: Sacrocaudalis Muscle Biopsy</p> <ul style="list-style-type: none"> Identify the anatomical landmarks for performing a sacrocaudalis dorsalis muscle biopsy. Perform muscle biopsies. | |
| 5:30-6:00 pm | Break | |
| 6:00-11:00 pm | Shuttle to MSU Pavilion – Michigan Great Lakes International Draft Horse Show (dinner on own at MSU Pavilion) | |

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| DAY 4 Sunday, October 15 | | |
|-----------------------------|---|--|
| Time (Eastern Time) | Topic | Presenter(s) |
| 7:20 am | Shuttle to MSU McPhail Center | |
| 8:00-8:30 am | Myelography <ul style="list-style-type: none"> Using the background lecture recording and material have a good understanding of how to perform plain radiographic and CT cervical myelography in the horse, and anatomy of the vertebral canal The session lecture will discuss when myelography is appropriate, potential complications, interpretation of images and their relation to spinal compression and intervertebral nerve compression | <i>Dr. Richard Hepburn</i> |
| 8:30-9:00 am | Alternatives to Pentobarbital Euthanasia <ul style="list-style-type: none"> Understand the circumstances that support a non-barbiturate euthanasia Describe the procedure for AVMA non-barbiturate euthanasia options Conceptualize the physiologic differences between an IV Barbiturate, IV KCl, and intrathecal lidocaine euthanasia | <i>Dr. Lauren Bookbinder</i> |
| 9:00-9:20 am | Break | |
| 9:20-11:50 am | Labs – All Attendees Participate Lab 12: Miscellaneous Procedures <ul style="list-style-type: none"> Perform AO CSF Collection/Myelogram Demonstration, IV Anesthesia, Intrathecal Lidocaine Euthanasia, IV KCl Euthanasia, Post-Mortem Renal Biopsy, Tracheotomy, Thoracotomy and Other Procedures | <i>Dr. Richard Hepburn, Dr. Hal Schott, Dr. Lauren Bookbinder, Dr. Ana Moreira</i> |
| 11:50-12:10 | Break | |
| 12:10-1:10 pm | Lunch and Course Wrap Up | |

