

**Advanced Large Animal Cardiology: Delving into the Heart of the Matter**  
**October 23-25, 2025**  
**Penn Vet's New Bolton Center | Kennett Square, PA**

| DAY 1<br>October 23, 2025               |  |                              |
|---|--|------------------------------|
| Time<br>(Eastern Time)                  | Topic  | Presenter(s)                 |
| 7:30-8:00 am<br>Lobby                   | <b>Registration</b>  |                              |
| 8:00-8:15 am<br>Woerner<br>Amphitheater | <b>Welcome and Introductions</b>   | <i>Dr. Virginia Reef</i>     |
| 8:15-8:45 am<br>Woerner<br>Amphitheater | <b>Lecture: Importance of Echo Image Standardization: Report from the ASE Equine Standards Committee Co-Chair</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand importance of standardization of echocardiographic images</li> <li>• Learn the accepted image orientation for right and left parasternal echocardiographic images.</li> <li>• Learn the M-mode, 2D, and Doppler echocardiographic measurements that should be obtained in a standard examination.</li> <li>• Learn the M-mode, 2D, and Doppler echocardiographic measurements that should be obtained in an animal with the common cardiac abnormalities.</li> </ul> | <i>Dr. Claire Underwood</i>  |
| 8:45-9:15 am<br>Woerner<br>Amphitheater | <b>Lecture: : Cardiac Implications of Sedation &amp; Anesthesia</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand the cardiovascular effects of sedatives</li> <li>• Understand the cardiovascular effects of anesthetic agents</li> <li>• Learn the effects of sedation on echocardiographic parameters</li> <li>• Assess cardiac specific risk factors for anesthesia-related mortality and morbidity</li> </ul>   | <i>Dr. Charlotte Iversen</i> |
| 9:15-9:45 am<br>Woerner<br>Amphitheater | <b>Lecture: Determining Severity of Valvular Regurgitation: Implications for Treatment, Performance, Safety and Longevity</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand pressure half-time and how to use it to estimate AR severity</li> <li>• Understand how the aortic root diameter changes between early and late systole in AR</li> <li>• Understand proximal isovelocity surface area (PISA) and how to use it to assess MR severity</li> <li>• Understand vena contracta (VC) and its use to assess MR severity</li> </ul>   | <i>Dr. Virginia Reef</i>     |

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| 9:45-10:15 am                                       | <b>Lecture: Diastology for the Internal Medicine Specialist</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Learn the 4 phases of diastole</li> <li>• Learn the 3 determinants of diastolic function</li> <li>• Understand the types of diastolic dysfunction</li> <li>• Understand the effect of age on diastolic function</li> </ul>  | <i>Dr. Virginia Reef</i> |
|---|--|--------------------------|
| 10:15-10:30 am<br>Lobby outside<br>Woerner          | <b>Break</b>   |                          |
| <b>DAY 1 (continued)</b><br><b>October 23, 2025</b> |  |                          |
| Time<br>(Eastern Time)                              | Topic  | Presenter(s)             |
| 10:30-11:00 am<br>Woerner<br>Amphitheater           | <b>Lecture: Echocardiography in the Emergency Patient</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Learn which cardiac conditions are likely to present as emergencies</li> <li>• Prioritise standard echocardiographic techniques for emergency patients</li> <li>• Understand how hypovolaemia may impact echocardiographic variables</li> <li>• Learn which echocardiographic images are important for diagnosis of acute cardiac conditions</li> <li>• Learn how to integrate echocardiographic findings with treatment choices</li> </ul>   | <i>Dr. Celia Marr</i>    |
| 11:00-11:30 am<br>Woerner<br>Amphitheater           | <b>Lecture: Sepsis and the Heart: Myocardial Depression and Myocarditis</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Learn which patients and presentations are likely to involve myocardial depression and myocarditis</li> <li>• Prioritise standard echocardiographic techniques which help identify myocardial depression and myocarditis</li> <li>• Understand how advanced echo techniques may add diagnostic information in cases with myocardial depression and myocarditis</li> <li>• Understand how to integrate echo data with other diagnostic findings</li> <li>• Learn how to integrate echocardiographic findings with treatment choices</li> </ul> | <i>Dr. Celia Marr</i>    |

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| 11:30 am-12:00 pm<br>Woerner<br>Amphitheater  | <b>Lecture: Sepsis and the Heart: Endocarditis</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Identify risk factors for endocarditis</li> <li>• Understand the pathogenesis of infective endocarditis in horses</li> <li>• Learn how to diagnose endocarditis and differentiate suspected from confirmed cases</li> <li>• List treatment goals and understand how to deliver these</li> <li>• Be familiar with likely clinical progression and how to monitor horses with infective endocarditis</li> </ul>  | <i>Dr. Celia Marr</i>  |
| 12:00-1:00 pm<br>Alumni Hall  | <b>Lunch</b>   |  |
| 1:00-6:00 pm<br><br>Scott building –<br>Stations 1-5<br>Treadmill stall East<br>– Station 6 | <b>Echocardiography Labs</b> – 1. hour per station with 30-minute break in the middle; rotate through 4 of 6 stations<br>Horses with a variety of cardiac abnormalities will be echoed with assistance from the instructors. Stations will focus on right parasternal imaging planes and measurements, left parasternal imaging planes and measurements, color flow and continuous wave Doppler evaluation of jets and shunts, color and pulsed wave tissue Doppler imaging, obtaining images for speckle tracking and 4D echocardiography. <ul style="list-style-type: none"> <li>• Obtain the standard right and left parasternal views for 2D and M-mode echocardiography.</li> <li>• Apply color flow Doppler echocardiography appropriately to find regurgitant jets and shunts.</li> <li>• Apply tissue Doppler to the atrial and ventricular myocardium for evaluation of myocardial contractility and obtain appropriate images for speckle tracking.</li> </ul> | <i>Dr. Virginia Reef</i><br><i>Dr. JoAnn Slack</i><br><i>Dr. Cris Navas de Solis</i><br><i>Dr. Gunther van Loon</i><br><i>Dr. Celia Marr</i><br><i>Dr. Charlotte Iversen</i> |
| 6:00 – 7:30 pm<br>Allam House   | <b>Welcome Reception</b>   |  |

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| DAY 2<br>October 24, 2025   |   |  |
|---|---|--|
| Time<br>(Eastern Time)  | Topic   | Presenter(s)   |
| 8:00-10:00 am<br>Scott building –<br>Stations 1-5, East<br>Treadmill Stall –<br>Station 6 | <b>Echocardiography Lab (continued)</b> – 1 hour per station; rotate through remaining 2 stations   | <i>Dr. Virginia Reef<br/>Dr. JoAnn Slack<br/>Dr. Cris Navas de Solis<br/>Dr. Gunther van Loon<br/>Dr. Celia Marr<br/>Dr. Charlotte Iversen</i> |
| 10:00-10:30 am<br>Lobby outside<br>Woerner  | <b>Break</b>  |  |
| 10:30-11:00 am<br>Woerner<br>Amphitheater   | <b>Lecture: Paroxysmal Atrial Fibrillation and Complex Arrhythmias: A Common Cause for Poor Performance?</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Learn the common types of complex arrhythmias during exercise.</li> <li>• Learn the prevalence of paroxysmal atrial fibrillation and complex arrhythmias in horses of different disciplines</li> <li>• Describe the association of paroxysmal atrial fibrillation and complex arrhythmias with performance</li> <li>• Describe the association of paroxysmal atrial fibrillation and complex arrhythmias with safety</li> </ul> | <i>Dr Cris Navas de Solis</i>  |
| 11:00-11:30<br>Woerner<br>Amphitheater  | <b>Lecture: Underlying Heart Disease in Horses with Atrial Fibrillation: Lessons from Copenhagen</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand the effects of atrial fibrillation on the heart</li> <li>• Learn about the athlete's heart and the association with atrial fibrillation</li> <li>• Learn about the electrical, functional, and structural remodeling in AF</li> <li>• Learn about omics and the association with atrial fibrillation</li> </ul>  | <i>Dr. Charlotte Iversen</i>   |
| 11:30-12:00 pm<br>Woerner<br>Amphitheater   | <b>Lecture: Ablation of Equine Arrhythmias: Where are we?</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand the basic principles and technique of mapping and ablation in horses</li> <li>• Understand the indications for mapping and ablation in horses</li> <li>• Recognize the limitations for mapping and ablation in horses</li> <li>• Understand mechanisms of common arrhythmias</li> </ul>   | <i>Dr. Gunther van Loon</i>  |
| 12:00-1:00 pm<br>Alumni Hall  | <b>Lunch</b>  |  |

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| 1:00 pm-1:30 pm<br>Woerner<br>Amphitheater | <b>Lecture: Antiarrhythmic Drugs for Ventricular Arrhythmias: When to Treat and How to Choose?</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand mechanisms of ventricular arrhythmias</li> <li>• Risk assessment of ventricular arrhythmias</li> <li>• Work-up of a horse with ventricular arrhythmias</li> <li>• Recognize the different case-dependent treatment approaches</li> </ul>  | <i>Dr. Gunther van Loon</i>    |
| 1:30-2:00 pm<br>Woerner<br>Amphitheater    | <b>Lecture: Remote cardiac monitoring by an implantable device: the holy grail?"</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand the principles of remote monitoring</li> <li>• Practicalities for implantation of a device</li> <li>• Indications for remote monitoring</li> <li>• Appreciate the limitations of remote monitoring by an implantable device</li> </ul>  | <i>Dr. Gunther van Loon</i>    |
| 2:00-2:30 pm<br>Woerner<br>Amphitheater    | <b>Lecture: Incorporating Wearables in Your Practice</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Learn the current wearables that provide clinically useful information for cardiovascular assessment</li> <li>• Learn the relevant variables to monitor using wearables</li> <li>• Learn the associations between variables measured by current wearables and relevant clinical outcomes</li> <li>• Discuss approaches to implement the use of wearables in clinical practice</li> </ul> | <i>Dr. Cris Navas de Solis</i> |
| 2:30-2:45 pm<br>Lobby outside<br>Woerner   | <b>Break</b>   |                                |

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| Time<br>(Eastern Time)  | Topic<br>Day 2 October 24, 2025  | Presenter(s) |
|---|--|--------------|
| <p>Scott building,<br/>Woerner<br/>amphitheater,<br/>Widener conference<br/>room, Moelis<br/>conference room,<br/>cardiology office,<br/>cardiology small<br/>exam room 2:45-<br/>6:00 pm</p> | <p><b>Interactive Sessions</b> – 50 min per station; rotate through 3 of 6 stations<br/> ECG Challenge, Reading exercising ECGs, Improve your echocardiographic<br/> anatomical insights, Echocardiographic measurements, Case reviews, and<br/> Echopac work station.<br/> Learning objectives:</p> |              |

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| DAY 3<br>October 25, 2025   |  |   |
|---|--|---|
| Time<br>(Eastern Time)  | Topic  | Presenter(s)  |
| 8:00-11:00 am,<br>including break<br>Scott building,<br>Woerner<br>amphitheater,<br>Widener & Moelis<br>conference room,<br>cardiology office,<br>cardiology small<br>exam room | <b>Interactive Sessions</b> – 50 min per station; rotate through 3 of 6 stations<br>ECG Challenge, Reading exercising ECGs, Improve your echocardiographic anatomical insights, Echocardiographic measurements, Case reviews, and Echopac work station.<br>Learning objectives:  | <i>Dr. Virginia Reef/Claire Underwood<br/>Dr. JoAnn Slack<br/>Dr. Cris Navas de Solis<br/>Dr. Gunther von Loon<br/>Dr. Charlotte Iversen<br/>Dr. Celia Marr</i> |
| 11:00 am -11:30 am  | <b>Lecture: Goats are the new dog: Client demand vs realities of caprine cardiology</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Appreciate knowledge and gaps in our understanding of caprine cardiology</li> <li>• Understand the challenges of managing congenital and acquired heart disease in goats</li> </ul> | <i>Dr. Jo Slack</i>   |
| Alumni Hall 11:30<br>am -12:15 pm   | <b>Lunch (Catering by Occasion)</b>  |   |
| 12:15-12:45 pm<br>Woerner<br>Amphitheater   | <b>Lecture: Spit happens! The joys of camelid cardiology</b><br>Learning objectives: <ul style="list-style-type: none"> <li>• Understand normal basic echocardiography of llamas and alpacas</li> <li>• Understand normal cardiac rhythms of llamas and alpacas</li> </ul>   | <i>Dr. Jo Slack</i>   |
| 12:45-1:15 pm<br>Woerner<br>Amphitheater  | <b>Stump the Experts: Case Presentations by Participants: Panel Discussion (10-15 minute case presentation; 15-20 minute discussion)</b>   | <i>Dr. Emilie Setlawke and Panel</i>  |
| 1:15 -1:45 pm<br>Woerner<br>Amphitheater  | <b>Stump the Experts: Case Presentations by Participants: Panel Discussion (10-15 minute case presentation; 15-20 minute discussion)</b>   | <i>Dr. Meg MillerTurpin and Panel</i>   |

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| 1:45-2:15 pm<br>Woerner<br>Amphitheater | <b>Stump the Experts: Case Presentations by Participants: Panel Discussion (10-15 minute case presentation; 15-20 minute discussion)</b> | <i>Dr. Amy Polkes and Panel</i>  |
| 2:15-2:45 pm<br>Woerner<br>Amphitheater | <b>Stump the Experts: Case Presentations by Participants: Panel Discussion (10-15 minute case presentation; 15-20 minute discussion)</b> | <i>Dr. Carol Clark and Panel</i> |
| 2:45 pm                                 | <b>Course concludes</b>  |                                  |