26th Symposium of the Equine Science Society

June 3–6, 2019
Asheville, North Carolina

PROGRAM

Hosted by North Carolina State University
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2017–2019 Equine Science Society

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Vice President – W. Burton Staniar, The Pennsylvania State University
Secretary/Treasurer – Patricia Harris, WALTHAM Centre for Pet Nutrition
Past President – Lori K. Warren, University of Florida
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Kimberly Cole, The Ohio State University
Mary Beth Gordon, Purina Animal Nutrition
Jessica Suagee-Bedore, Sam Houston State University
Amanda Adams, University of Kentucky
Amy Biddle, University of Delaware

Exercise Science
Jennie Ivey (Chair), University of Tennessee
David Marlin, David Marlin Consulting
Danielle Smarsh, The Pennsylvania State University
Sarah White, Texas A&M University

Production and Management
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Bridgett McIntosh, MARS Equestrian
Marcia Hathaway, University of Minnesota

Carissa Wickens, University of Florida
Emily Glunk Meccage, Montana State University

Nutrition
Holly Spooner (Chair), Middle Tennessee State University
James Lattimer, Kansas State University
Kristine Urschel, University of Kentucky
Debra Powell, Saint Mary-of-the-Woods College
Veronique Julliand, Agrosup Dijon

Genetics
Stephen Coleman (Chair), Colorado State University
Samantha Brooks, University of Florida
Rebecca Bellone, University of California–Davis
Jessica Petersen, University of Nebraska–Lincoln
Cypriana “Chipper” Swiderski, Mississippi State University

Reproductive Physiology
Gary Webb (Chair), Missouri State University
Robert Jacobs, Purina Animal Nutrition
Kristin Klohonatz, Select Breeders Services
William Day, SUNY Morrisville
Erin Oberhaus, Louisiana State University
Joann Kouba, Kansas State University

Teaching and Extension
Betsy Greene (Chair), University of Arizona
Karen Waite, Michigan State University
Dean Jousan, Mississippi State University
Colleen Brady, Purdue University
Sara Mastellar, The Ohio State University
Carey Williams, Rutgers, The State University of New Jersey

Kathleen Anderson, University of Nebraska–Lincoln
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Tania Cubitt, Performance Horse Nutrition
Dennis Sigler, Texas A&M University
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Jason Brummer, Colorado State University
Ginger Rich, Rich Equine Nutritional Consulting
Kathleen Anderson, University of Nebraska–Lincoln

Student Competition
C. A. Shea Porr (Chair), Murray State University
Karen Wimbush, The Ohio State University–ATI
Janice Holland, Midway University
Jessica Leatherwood, Texas A&M University
Presentation Information

Oral Presentations

The scheduled time for oral presentation of each abstract is 12 minutes, followed by 3 minutes for questions, discussion, and speaker transition.

Presentations should be prepared in Microsoft PowerPoint (version 2010 or later) and be PC compatible. Presentations should be saved on a USB drive for uploading to a conference computer.

Each session room will be equipped with a laptop computer (PC), LCD projector, and podium. Most rooms will also have fixed microphones. With the exception of invited speakers, the use of personal computers is not permitted in session rooms.

Two rooms are available for presenter practice: Magnolia and Swannanoa. Rooms are equipped with an LCD projector, but you will need to provide your own laptop computer.

On-Site Upload

Presentation upload will take place in the Dogwood room. Presentations can be uploaded on Monday, June 3, from 2:00 to 8:00 pm or on Tuesday, June 4, or Wednesday, June 5, between 7:00 am and 5:00 pm.

Presentation files must be uploaded to a conference computer at least one day prior to the scheduled presentation. See the schedule below for upload deadlines:

<table>
<thead>
<tr>
<th>Date of Scheduled Presentation:</th>
<th>Deadline for Presentation Upload:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, June 4</td>
<td>Monday, June 3, by 8:00 pm</td>
</tr>
<tr>
<td>Thursday, June 6</td>
<td>Wednesday, June 5, by 12:00 pm</td>
</tr>
</tbody>
</table>

Please note that presentations will not be accepted, nor can they be modified, in the session rooms. Additionally, no presentations will be loaded while the session is in progress, between presentations, or during breaks.

Poster Presentations

Posters will be displayed in the Expo Center. Each poster will have an assigned board and will be sharing the board with another poster; please look for the poster number (same as the abstract number) as noted in this program to locate your board. Pushpins will be provided.

At the 2019 symposium, there will be two poster sessions divided by section:

<table>
<thead>
<tr>
<th>Session</th>
<th>Sections Presenting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, June 4, 1:30–3:00 pm</td>
<td>Exercise Science, Nutrition, Teaching and Extension</td>
</tr>
<tr>
<td>Thursday, June 6, 9:00–10:30 am</td>
<td>Equine Biosciences, Genetics, Production and Management, Reproductive Physiology</td>
</tr>
</tbody>
</table>

Refer to the program listing to confirm which session your poster was assigned to. An author must be present at the poster during the assigned session.

Posters presented on TUESDAY should be posted by 5:00 pm on Monday, June 3, and removed by 6:00 pm Tuesday evening to allow the next set of posters to be posted. Posters presented on THURSDAY should be posted by 5:00 pm on Wednesday, June 5, and removed by noon on Thursday, June 6. Any left behind will be discarded.
Wi-Fi Password

Complimentary access to the internet is available in the meeting rooms. To access the internet while in any of the hotel or meeting rooms, the case-sensitive password for the symposium is **AVLSS**.

Announcement Board

An announcement board has been placed near the meeting registration desk. A portion of the announcement board has been reserved for posting of official communications. The remainder of the board can be used by ESS members to post job advertisements, meeting announcements, and other communications and queries.

Several documents that will be discussed at the 2019 ESS General Business Meeting will be available on the announcement board, as well as on the society website (www.equinescience.org), symposium website (www.equinescience.org/2019), or both. Voting members should review these documents before the 2019 ESS Business Meeting on June 6. The following documents will be available on the announcement board for public viewing:

1. Minutes of the 2017 General Business Meeting
2. Proposed revisions to the Equine Science Society Constitution and By-Laws
3. Biographies of Board of Director nominees

Extra Meeting Rooms Are Available

Several small rooms are available to ESS members for external meetings or presentation practice during the symposium. Groups can check on room availability and reserve a room using the sign-up sheet posted to the announcement board located near the registration desk.

Magnolia and Swannanoa are small rooms and will be set up for meetings or presentation practice. These rooms will have a projector available, but you will need to bring a computer. The larger Dogwood, Foxfire, and Blue Ridge rooms are available for meetings when not in use for the conference but may not have a projector. Room usage is free of charge; however, any costs incurred to alter room set-up must be paid by the user.
**Event Schedule**

**Monday, June 3**

2:00–5:00 pm  ESS Board of Directors meeting .............................. Foxfire
2:00–8:00 pm  Conference registration open .............................. Laurel
2:00–5:00 pm  Hang Poster Session 1 (*must be hung by 5:00 pm on Mon.*)  . Expo Center
2:00–8:00 pm  Presentation upload (*Tues. or Thurs. presentations)  . Dogwood
2:00–8:00 pm  Presenter practice rooms available .......................... Magnolia and Swannanoa
5:00–7:00 pm  **Opening Reception**  . Expo Center
7:00 pm  Welcome  . Expo Center
7:15–8:30 pm  **Invited Speaker: Nutrition**
Anthony Blikslager, PhD—*Colic Prevention to Avoid Colic Surgery: A Surgeon’s Perspective*  . Expo Center

**Tuesday, June 4**

6:30–8:00 am  Breakfast (*optional ticketed event*)  . Laurel
7:00 am–5:00 pm  Conference registration open  . Laurel
7:00 am–5:00 pm  Presentation upload (*Thurs. presentations must be loaded by 12:00 pm on Wed.*)  . Dogwood
7:00 am–8:00 pm  Presenter practice rooms available  . Magnolia and Swannanoa
8:00–9:30 am  Equine Biosciences: Graduate Student Competition  . Foxfire
8:00–9:45 am  Exercise Science: Graduate Student Competition  . Mitchel
8:00–9:45 am  Nutrition: Graduate Student Competition  . Pilot and Pisgah
8:00–9:30 am  Production and Management: Graduate Student Competition  . Roan
9:45–10:15 am  Refreshment Break  . Biltmore Foyer
10:15–11:45 am  Equine Biosciences: Graduate Student Competition  . Foxfire
10:15–11:45 am  Exercise Science: Graduate Student Competition  . Mitchel
10:15 am–12:00 pm  Nutrition: Graduate Student Competition  . Pilot and Pisgah
10:15–11:45 am  Production and Management: Graduate Student Competition  . Roan
10:15 am–12:00 pm  Undergraduate Student Competition  . Blue Ridge
12:00–1:30 pm  **Invited Speaker Luncheon: Reproductive Physiology**
Jan Roser, PhD—*Enhancing Fertility in Mares: Recombinant Equine Gonadotropins*  . Expo Center
1:30–3:00 pm  **Poster Session 1**  . Expo Center
Exercise Science
Nutrition
Teaching and Extension
3:00–4:00 pm  Nutrition: Graduate Student Competition  . Pilot and Pisgah
3:00–4:00 pm  Reproductive Physiology: Graduate Student Competition  . Roan
3:00–4:00 pm  Genetics: Graduate Student Competition  . Foxfire
3:00–4:00 pm  Teaching and Extension: Graduate Student Competition  . Mitchel
3:00–4:00 pm  Undergraduate Student Competition  . Blue Ridge
4:00–4:30 pm  Refreshment Break  . Biltmore Foyer
4:30–5:30 pm  Nutrition: Graduate Student Competition  . Pilot and Pisgah
4:30–5:15 pm  Teaching and Extension: Graduate Student Competition  . Mitchel
4:30–5:45 pm  Undergraduate Student Competition  . Blue Ridge
6:00–7:00 pm  Graduate Student Professional Development Session  . Expo Center
7:00–10:00 pm  Student Social .................................................. Salvage Station

**Wednesday, June 5**

6:00–7:00 am  **5K Fun Run/Walk** ............................................. Start in front of Asheville Adventure Center

6:30–8:00 am  Breakfast (*optional ticketed event) ......................... Laurel
7:00 am–12:00 pm  Registration open ........................................... Laurel
7:00 am–5:00 pm  Presenter practice rooms available ....................... Magnolia and Swannanoa

8:00–9:50 am  **Workshop Session 1**
A unique ESS-wide session led by Tom Lenz, PhD, and Jason Bruemmer, PhD—*The Fate of Wild and/or Unwanted Horses and Burros; How Do We Make a Difference?* ............ Expo Center

10:00 am–5:00 pm  **Workshop Session 2**
(1) *Future Application of Models to Predict Nutrient Requirements: Outlook on Equids* ......................... Pilot and Pisgah
(2) *Are You Ready to Publish? Understanding the Publishing Process* ........................................... Roan
(3) *Development and Incorporation of Equine Hospice, Euthanasia, and Grief Recognition/Support into the Undergraduate Curriculum* .......................... Mitchel
(4) *Hands-On Podcasting for Equine Teaching and Extension* ........................................ Foxfire

12:00–8:00 pm  **North Carolina Industry Tours** (*optional ticketed event—includes dinner*)
Busses depart at 12:15 pm; busses will begin returning to the hotel at 7:00 pm. ........................................... Hotel Lobby (load busses)

**Thursday, June 6**

6:00–8:00 am  **ARPAS Exam** ........................................ Mitchel

6:30–8:00 am  Breakfast (*optional ticketed event) ......................... Laurel
7:00 am–4:30 pm  Presenter practice rooms available ....................... Magnolia and Swannanoa
7:00 am–5:00 pm  Registration open ........................................... Laurel

8:00–9:00 am  **Invited Speaker: Equine Biosciences**
Barbara Murphy, PhD—*Chronobiology and the Horse: Internal Timing in an Elite Athlete* .......................... Expo Center

9:00–10:30 am  **Poster Session 2** ........................................... Expo Center
Equine Biosciences
Genetics
Production and Management
Reproductive Physiology

10:30 am–12:15 pm  **Exercise Science: General Session** ................ Mitchel
10:30 am–12:15 pm  **Nutrition: General Session** ............................ Pilot and Pisgah
10:30 am–12:15 pm  **Teaching and Extension: General Session** .......... Roan
10:30–11:15 am  **Reproductive Physiology and Genetics: General Session**  .. Foxfire

12:15–1:45 pm  **Invited Speaker Luncheon: Exercise Science**
Hilary Clayton, PhD—*Ground Reaction Forces: The Sine Qua Non of Terrestrial Locomotion* .......................... Expo Center
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<td>3:30–4:00 pm</td>
<td><strong>Refreshment Break.</strong></td>
<td>Biltmore Foyer</td>
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<td>Exercise Science: General Session</td>
<td>Mitchel</td>
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<tr>
<td>5:00–6:00 pm</td>
<td><strong>ESS General Business Meeting</strong></td>
<td>Pilot and Pisgah</td>
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<tr>
<td>6:30–9:00 pm</td>
<td><strong>ESS Awards Banquet</strong></td>
<td>Expo Center</td>
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<td>6:30 pm</td>
<td>Cocktails</td>
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<tr>
<td>7:00 pm</td>
<td>Dinner</td>
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Scientific Sessions

Monday, June 3

Opening Reception
5:00–7:00 pm
Location: Expo Center

Invited Speaker—Nutrition
Sponsored by McCauley Bros.
Moderator: Shannon Pratt-Phillips
Location: Expo Center

7:00 pm  Welcome
Ken McKeever, ESS President; Burt Staniar, Program Chair; and Shannon Pratt-Phillips, Host Committee Chair.

7:15 pm  Colic Prevention to Avoid Colic Surgery: A Surgeon’s Perspective.
Anthony Blikslager, DVM, PhD, Diplomate ACVS, Professor of Equine Surgery and Gastroenterology, Assistant Department Head, Clinical Sciences, North Carolina State University Veterinary Medicine.

Tuesday, June 4

ORAL PRESENTATIONS

ESS thanks the North American Equine Ranching Information Council (NAERIC) for their support of the Graduate Student Competition Awards.

Equine Biosciences: Graduate Student Competition
Moderators: Kim Cole, The Ohio State University, and Mary Beth Gordon, Purina Animal Nutrition
Location: Foxfire

8:00 am  1  Administration of sulpiride in sucrose acetate isobutyrate (SAIB) to geldings: Duration of response and evaluation of conjugated estradiol preparations.

8:15 am  2  Effects of epinephrine, detomidine, or a combination of detomidine and butorphanol on glucose metabolism in mares.
L. E. Kerrigan*, D. L. Thompson Jr., A. M. Chapman*, and E. L. Oberhaus*, Louisiana State University Agricultural Center, Baton Rouge, LA, USA, Louisiana State University School of Veterinary Medicine, Baton Rouge, LA, USA.

8:30 am  3  Interferon-γ aids in protection against equine protozoal myeloencephalitis.
A. N. Hay*, A. Potter*, J. Zhu*, S. G. Witonsky*, D. S. Lindsay*, and C. M. Leeth*, Virginia Tech University, Blacksburg, VA, USA, Virginia - Maryland College of Veterinary Medicine, Blacksburg, VA, USA.

8:45 am  4  The effect of omega-3 fatty acid supplementation and a controlled-release intramuscular thyroxine injection on serum insulin concentrations in horses.
<table>
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<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 9:00 am | 5  | Investigating the impact of a novel equine dietary nutraceutical on gastric smooth muscle using an *in vitro* organ bath.  
J. MacNicol*, C. Murrant, and W. Pearson, *University of Guelph.* |
| 9:15 am | 6  | Insulin dysregulated and healthy horses’ seasonal insulin responses to the oral sugar test.  
E. L. Macaon*1, P. A. Harris, V. D. Barker, S. Elzinga, and A. A. Adams1, 1University of Kentucky, Lexington, KY, USA, 2Equine Studies Group, Waltham Centre for Pet Nutrition, Melton Mowbray, Leicestershire, UK, 3University of Michigan, Ann Arbor, MI, USA. |
| 9:30 am | Break. |
| 10:15 am | 7  | Divergent pathways of interzone and anlagen cell chondrogenesis during equine skeletal development.  
C. H. Mok*, R. Dubey, E. Adam, and J. MacLeod, *University of Kentucky, Lexington, KY, USA.* |
| 10:30 am | 8  | Pilot study: Exploring the relationship between inflamm-aging and muscle mass in senior horses.  
A. C. Herbst*, B. Cantu, C. Burns, V. D. Barker, and A. A. Adams, 1University of Kentucky, Lexington, KY, USA, 2Lincoln Memorial University, Harrogate, TN, USA, 3Asbury University, Wilmore, KY, USA. |
| 10:45 am | 9  | Composition of the foal fecal microbiota in response to gradual and abrupt weaning.  
| 11:00 am | 10 | Meta-analysis of probiotic effectiveness for reducing diarrhea and altering the gut microbiome in horses.  
| 11:15 am | 11 | Effect of maternal overnutrition on foal skeletal muscle fiber development.  
A. N. Bradbery*, J. A. Coverdale, T. A. Wickersham, J. L. Leatherwood, K. A. Dunlap, and M. C. Satterfield, *Texas A&M University, College Station, TX, USA.* |
| 11:30 am | 12 | Microbiome effects on metabolic efficiencies in easy and hard keepers.  
A. C. B. Johnson* and A. S. Biddle, *University of Delaware, Newark, DE, USA.* |

**Exercise Science: Graduate Student Competition**  
Moderator: Jennie Ivey, The University of Tennessee  
Location: Mitchel

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 8:00 am | 25 | Impact of endurance exercise on fecal indicators of equine gut health.  
| 8:15 am | 26 | Dietary supplementation of *Saccharomyces cerevisiae* fermentation product attenuates exercise-induced stress markers in young horses.  
H. Valigura*, J. Leatherwood, R. Martinez, C. Warzecha, and S. White, 1Texas A&M University, College Station, TX, USA, 2Diamond V Milling Inc, Cedar Rapids, IA, USA. |
| 8:30 am | 27 | Cytokine and oxidative stress response to vitamin E supplementation in exercising horses.  
M. M. Fagan*, A. Adams, P. Harris, A. Krotky, and K. J. Duberstein, 1Department of Animal and Dairy Science, University of Georgia, Athens, GA, USA, 2Department of Veterinary Science, University of Kentucky, Lexington, KY, USA, 3Equine Studies Group, WALTHAM, Waltham on the Wolds, Leicestershire, UK, 4Mars Horsecare US, Dalton, OH, USA. |
| 8:45 am | 28 | An assessment of equine gait asymmetry when subjected to symmetrical and asymmetrical rider position and its interrelationship with equine motor bias.  
| 9:00 am | 29 | Identification of motor laterality and its correlation to hoof growth patterns and limb kinematics in mature riding horses.  
M. Towe*, G. DeBoer, M. Fagan, and K. J. Duberstein, *University of Georgia, Athens, GA USA.* |
| 9:15 am | 30 | Effects of equine conformation, limb joint angulation, biomechanics and kinematics on rider balance.  
J. Gates*, W. Bridges, R. Blob, T. Scott, and K. Vernon, *Clemson University, Clemson, SC, USA.* |
| 9:30 am | 31 | Workload and kinematics of horses during underwater treadmill exercise.  
E. J. Arnold*, H. S. Spooner, N. Minardi, and R. M. Hoffman, 1Middle Tennessee State University, Murfreesboro, TN, USA, 2Equine PerforMAX, Thompson’s Station, TN, USA. |
| 9:45 am | Break. |
10:15 am 32  A preliminary investigation into the use of a “high altitude chamber” in racing Thoroughbreds.  
J. Li*, B. Nielsen, and C. Robison, Michigan State University, East Lansing, Michigan, United States of America.

10:30 am 33  Weekly sprinting of juvenile animals increases bone strength and size as well as bone formation marker concentration.  
A. Logan*1, B. Nielsen1, C. Robison1, J. Manfredi1, H. Schott1, D. Buskirk1, and K. Hiney1, 1Michigan State University, East Lansing, MI, USA, 2Oklahoma State University, Stillwater, OK, USA.

10:45 am 34  Breed differences in skeletal muscle mitochondrial number and capacity of weanling racing-bred horses.  
C. M. Latham*1, C. K. Fenger2, and S. H. White1, 1Texas A&M University, College Station, TX, USA, 2Equine Integrated Medicine, PLC, Georgetown, KY, USA.

11:00 am 35  Evaluation of surface temperature changes in horses undergoing transport and exercise.  
A. R. Thompson*, T. R. Jones1, K. B. Guay1, and J. L. Leatherwood1, 1Tarleton State University, Stephenville, TX, USA, 2Texas A&M University, College Station, TX, USA.

11:15 am 36  Effect of vortex wave circulation stimulation on bone measurements of mature horses on stall rest.  
A. L. Greene*, C. A. Cavinder, C. P. Heaton, C. A. Mochal-King, C. O. Lemley, and T. T. N. Dinh, Mississippi State University, Mississippi State, MS, USA.

11:30 am 37  Structural changes in equine proximal phalanx during growth.  
S. Moshage*, A. McCoy1, R. Vining1, J. Polk1, and M. Kersh1,2, 1University of Illinois at Urbana-Champaign, Urbana, IL, USA, 2Beckman Institute for Advanced Science and Technology, Urbana, IL, USA.

Nutrition: Graduate Student Competition (1)  
Moderator: Debra Powell, Saint Mary-of-the-Woods College  
Location: Pilot and Pisgah

8:00 am 58  The influence of topically applied oil-based palatants on eating behavior in horses.  
J. Francis*, S. Moreland2, and E. Perry1, 1Southern Illinois University, Carbondale, IL, USA, 2Nutriad Inc, Hampshire, IL, USA.

8:15 am 59  Time budgets in horses during continuous and space-restricted rotational grazing.  
B. A. Gartland*, V. J. Willis, H. E. Maupin, A. R. Miliner, J. R. Downing, and J. C. Gill, Western Kentucky University, Bowling Green, KY, USA.

8:30 am 60  Acceptance and preference of flavors in a high-fiber feedstuff for horses.  
R. Parrott1, V. Farci*, P. Hastie1, and J. Murray1, 1University of Glasgow, Glasgow, Scotland, UK, 2University of Edinburgh, Edinburgh, Scotland, UK.

8:45 am 61  Development of methods to investigate the mechanisms behind increased behavioral reactivity associated with an increased-starch diet.  
L. Bulmer*, J. Murray1, N. Burns1, A. Garber1, N. McEwan1, P. O’Shaughnessy1, A. Hemmings1, N. Evans1, A. Monteiro1, and P. Hastie1, 1University of Glasgow, Glasgow, UK, 2Robert Gordon University, Aberdeen, UK, 3Royal Agricultural University, Cirencester, UK.

9:00 am 62  Testing impacts of starch: Behavioral and physiological responses.  
T. P. Price* and R. R. White, Virginia Tech, Blacksburg, VA, USA.

9:15 am 63  Digestibility and postprandial response according to processing method and meal time of day.  
K. Ely*, P. Harris1, K. Kaufman1, N. Liburt3, A. Krotky3, and B. McIntosh1, 1Virginia Tech Middleburg Agricultural Research and Extension Center, Middleburg, VA, USA, 2Equine Studies Group, Waltham, UK, 3MARS Horsecare US, Dalton, OH, USA.

9:30 am 64  Furosemide effects on calcium balance return to baseline within one week.  
A. Pritchard*, B. Nielsen1, C. Robison1, and H. Spooner1, 1Animal Science, Michigan State University, East Lansing, I, USA, 2Horse Science, Middle Tennessee State University, Murfreesboro, TN, USA.

9:45 am 65  Break.

10:15 am 66  Effect of crude protein on fiber digestibility of a warm-season forage-based diet in mature horses.  
10:30 am 66  
Apparent digestibility, fecal particle size, and mean retention time of reduced lignin alfalfa hay fed to horses.  
A. M. Grev*1,2, M. R. Hathaway1, A. S. Reiter1, C. C. Sheaffer1, M. S. Wells1, and K. L. Martinson1, 1University of Minnesota, St. Paul, MN, USA, 2University of Maryland, College Park, MD, USA.

10:45 am 67  
Estimating dry matter digestibility of forage fiber in equine diets.  
T. Godwin*, G. Webb, P. Lancaster, and W. Boyer, Missouri State University, Springfield, MO, USA.

11:00 am 68  
Effect of soluble fiber on postprandial glucose metabolism in horses.  

11:15 am 69  
Dietary nonstructural carbohydrate affects mare milk production and composition.  
M. Pyles*, A. Fowler, A. Crum, S. Hayes, R. Schendel, and L. Lawrence, University of Kentucky, Lexington, KY, USA.

11:45 am 71  
Changes in cecal environment and forage intake of horses fed increasing amounts of starch.  
P. Ochonski*, T. Douthit, J. Drouillard, C. Vahl, and J. Lattimer, Kansas State University, Manhattan, KS, USA.

Production and Management: Graduate Student Competition (1)  
Moderator: Marcia Hathaway, The University of Minnesota  
Location: Roan

8:00 am 110  
Relationship of environmental conditions to the activity of horses on pasture.  
F. B. Vergara*, B. D. Nielsen, and C. I. Robinson, Michigan State University, East Lansing, MI, USA.

8:15 am 111  
Horse care and management in horse clubs in China.  
Z. Li*1,2, Q.J. Pan1, and S. Porr2, 1Qingdao Agricultural University, Qingdao, Shandong Province, China, 2Murray State University, Murray, KY, USA.

8:30 am 112  
Feeding practices and morphometric measurements in maintenance and lightly worked horses in southeast Texas.  
L. A. Holland*, J. K. Suagee-Bedore, and K. J. Stutts, Sam Houston State University, Huntsville, TX, USA.

8:45 am 113  
Perceptions of veterinarians on the use of nutritional supplements in the horse industry.  
N. Oliver*, H. Spooner, and R. Hoffman, Middle Tennessee State University, Murfreesboro, TN, USA.

9:00 am 114  
Implementation of a chew-sensor based technology as a tool for equine grazing research.  
J. R. Weinert*, J. Werner2, and C. A. Williams1, 1Department of Animal Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ, USA, 2Animal Nutrition and Rangeland Management in the Tropics and Subtropics, University of Hohenheim, Stuttgart, Germany.

9:15 am 115  
Influence of trimming and shoeing on hoof temperature and digital cushion thickness in mature horses.  
M. Gunkelman*, J. Young, and C. Hammer, North Dakota State University, Fargo, ND, USA.

9:30 am  
Break.

10:15 am 116  
Effect of soluble fiber on feed intake behavior and fecal particle size.  

10:30 am 117  
Effect of alfalfa variety and bale wrap-type on dry matter loss and forage nutritive value of round bales in long-term, outdoor storage.  

10:45 am 118  
Influence of diet fortification on body composition and apparent digestion of mature horses consuming a low-quality forage.  
M. L. Much*, J. L. Leatherwood4, J. L. Zoller4, J. R. Baber4, A. N. Bradbery4, R. E. Martinez4, A. D. Keegan2, E. D. Lamprecht2, and T. A. Wickersham4, 1Texas A&M University, College Station, TX, USA, 2Cargill Incorporated, Elk River, MN, USA.

11:00 am 119  
Effects of a novel blend of citrus botanical oils on equine behavior during a startle test and while trailering.  
T. L. Thomson*1, J. K. Suagee-Bedore1, M. J. Anderson1, K. K. Fikes1, B. M. Medina1, A. L. Wagner1, and I. D. Girard2, 1Sam Houston State University, Huntsville, TX, USA, 2Probiotech International, St-Hyacinthe, QC, Canada.
Oral administration of antibiotics alters fecal ecosystem of adult horses in the long-term.
A. Collinet1,2, P. Grimm1, S. Julliand1, and V. Julliand2, 1Lab To Field, Dijon, France, 2Univ. Bourgogne Franche-Comté, AgroSup Dijon, PAM UMR A 02.102, Dijon, France.

Human perception and efficacy of Carassius auratus on maintaining water quality in equine water tanks.
D. Catalano*, B. Heins, S. Missaghi, M. Hathaway, and K. Martinson, University of Minnesota, St. Paul, MN, USA.

Undergraduate Student Competition (1)
Moderator: Neely Walker, Louisiana State University
Location: Blue Ridge

Needs assessment: What are the barriers to use of equine genetic testing?
V. Hammons*, S. Brooks, and C. Wickens, University of Florida, Gainesville, FL, USA.

Industry perceptions of HERDA in performance horses.
A. R. Patout*, N. L. Walker1, and M. Cater2, 1Louisiana State University, School of Animal Sciences, Baton Rouge, LA, USA, 2Louisiana State University Agricultural Center, Baton Rouge, LA, USA.

Public perceptions of equine welfare classification and subsequent use.
K. Melvin*, S. Wallace, L. Schneider, P. Krawczel, and J. Ivey, University of Tennessee Institute of Agriculture, Knoxville, TN, USA.

Improving military personnel resiliency through recreational trail rides.
M. Osborne*, Utah State University, Logan, UT, USA.

Estrous behavior and ovarian function in mares vaccinated against bone morphogenetic protein-15 and growth differentiation factor-9.
H. Davis*, A. Reisenenauer*, M. McQuagge1, K. Klohonatz1, K. Davis1, D. Eckery2, and J. Bruemmer1, 1Colorado State University, Fort Collins, CO, USA, 2National Wildlife Research Center, USDA-APHIS, Fort Collins, CO, USA.

Relationship between insulin dysregulation and morphometric neck measurements in the non-obese stock-type horse.
C. P. Heaton1, C. A. Cavinder1, E. N. McClure*, T. Smith1, P. Harris1, N. Liburt3, and A. Krotky3, 1Mississippi State University, Mississippi State, MS, USA, 2WALTHAM Centre for Pet Nutrition, Melton Mowbray, UK, 3Mars Horsecare U.S. Inc, Dalton, OH, USA.

Effect of short stem forage mixed with grain to promote mastication in horses.
V. L. Sorrentino*, C. L. Wickens1, L. K. Warren1, C. W. Knight1, B. F. Goff2, and R. C. Causey2, 1University of Florida, Gainesville, FL, USA, 2University of Maine, Orono, ME, USA.

Effect of level of bedding on lying behavior in stalled horses.
K. Guay1, M. Fuentes1, R. Trice1, S. Elmore*, M. Attal1, A. Christie1, J. Baker1, and T. Garcia2, 1Tarleton State University, Stephenville, TX, USA, 2Oklahoma State University, Stillwater, OK, USA.

The effect of activated charcoal supplementation on digestibility of horse feed.
N. As-Siddiqui* and K. Kline, University of Illinois at Urbana-Champaign, Urbana, IL, USA.

Impact of Northern Hemisphere daylight hours on unsupplemented vitamin D and E concentrations in horses on pasture in Michigan.
M. Henry*, B. D. Nielsen1, C. Robison1, A. Pritchard1, and R. Stuart1, 1Department of Animal Science, Michigan State University, East Lansing, MI, USA, 2Stuart Products Inc, Bedford, TX, USA.

Retrospective analysis of clinical health markers as indicators of death in malnourished equids.
V. Hughes*, M. Hines1, A. Cox1, L. Schneider1, and J. Ivey1, 1University of Tennessee Institute of Agriculture, Knoxville, TN, USA, 2University of Tennessee College of Veterinary Medicine, Knoxville, TN, USA.

Relating physiochemical properties of equine feeds.

Equine and wildlife use of and preference for salt blocks in pastures.
H. Kunath*, K. Bennett-Wimbush, and S. L. Mastellar, The Ohio State University Agricultural Technical Institute, Wooster, OH, USA.
Effects of whole-body vibration treatment on balance in the equine.
C. Chubb*1, K. Jallaq1, T. Williams2,3, C. Ware1, and N. Churchill1, 1The University of Findlay, Findlay, OH, USA, 2Michigan State University, East Lansing, MI, USA.

Reproductive Physiology Lecture and Luncheon
Sponsored by Tribune Equine Nutrition
Moderator: Gary Webb, PhD, Missouri State University
Location: Expo Center

12:00 pm Buffet lunch service begins
12:30–1:30 pm Enhancing Fertility in Mares: Recombinant Equine Gonadotropins
Jan Roser, PhD, Professor Emeritus in the Department of Animal Science, University of California, Davis.

POSTER PRESENTATIONS
1:30–3:00 pm
Location: Expo Center

Exercise Science: Posters

38 Effect of weight carried on back pain and stride length in horses.
L. Sukovaty*, S. Webb, G. Webb, W. Boyer, and W. McClain, Missouri State University, Springfield, MO USA.

Nutrition: Posters

72 In vitro gas and volatile fatty acid production from 4 substrates incubated with equine fecal inoculum.
A. L. Fowler* and M. Brümmer-Holder, University of Kentucky, Lexington, KY, USA.

73 Comparison of actual and calculated digestible energy values of horse diets.
A. L. Fowler*1, T. L. Hansen2, and L. M. Lawrence3, 1University of Kentucky, Lexington, KY, USA, 2University of Florida, Gainesville, FL, USA.

74 Impacts of selenium form on deficiency and oxidative status of horses in Canada.
A. L. Wagner*1, B. M. Medina1, Y. Chorfi2, D. Cinq-Mars3, and I. D. Girard4, 1Probiotech International Inc, Saint-Hyacinthe, QC, Canada, 2University of Montreal, Montreal, QC, Canada.

75 The impact of DigestaWell Buffer on the equine gut microbiome of healthy horses.
A. L. Wagner*1, B. M. Medina1, I. D. Girard4, and A. S. Biddle5, 1Probiotech International, Inc, Saint-Hyacinthe, QC, Canada, 2University of Delaware, Newark, DE, USA.

77 Effects of dietary protein level on muscle protein signaling pathways in horses.
C. Loos*, S. Dorsch, A. Gerritsen, and K. Urschel, University of Kentucky, Lexington, KY, USA.

78 Postprandial glucose, insulin, and interleukin-1β responses to steam-rolled barley in lean and overweight horses.
J. K. Suagee-Bedore*1 and S. L. Mastellar2, 1Sam Houston State University, Huntsville, TX, USA, 2The Ohio State University, Wooster, OH, USA.

79 Assessment of the palatability of coconut oil and medium-chain triglyceride oil in horse diets.

80 Effect of a fat-supplemented concentrate on fecal cellulolytic bacteria.
M. Pyles*1, A. Fowler1, A. Crum1, S. Hayes1, M. Flythe2, and L. Lawrence1, 1University of Kentucky, Lexington, KY, USA, 2United States Department of Agriculture, ARS-FAPRU, Lexington, KY, USA.

81 Effect of an abrupt diet change on the fecal microbiome.
M. A. Bowman*, S. E. Pratt-Phillips, and P. D. Siciliano, North Carolina State University, Raleigh, NC, USA.
Effect of protein source on nitrogen balance, plasma amino acids, and fecal bacterial communities in exercising horses.
P. Graham-Thiers* and K. Bowen, Emory & Henry College, Emory, VA, USA.

Effect of dietary protein intake on nitrogen balance, plasma amino acids, and fecal bacteria communities in exercising horses.
P. Graham-Thiers* and K. Bowen, Emory & Henry College, Emory, VA, USA.

Effect of crystalline versus protein-bound lysine on plasma amino acids in exercising horses.
P. Graham-Thiers* and K. Bowen, Emory & Henry College, Emory, VA, USA.

Effect of forage type and ration balancer protein content on measures of whole-body protein metabolism in growing horses consuming a predominantly forage diet.
S. Stratton*, A. Gerritsen, C. Loos, and K. Urschel, University of Kentucky, Lexington, KY, USA.

Sampling lag time between cecal and fecal variables: A case study.

Modeling digesta mean retention time in horses using a 2-compartment model.

Teaching and Extension: Posters

Marketing and delivering adult horse extension programming in 2019.
C. Skelly*, G. Shelle, and C. Hetherington, Michigan State University, East Lansing, MI, USA.

Intercropped cool-season forages on dormant warm-season pastures: A preliminary study and an extension field day.

Using survey results to enhance research: A case study of 3 web-based surveys addressing industry needs and practices.
A. Jaqueth*, D. Catalano, M. Hathaway, R. Mottet, and K. Martinson, University of Minnesota, Saint Paul, MN, USA.

Impact of prerequisite selection on a horse care and management laboratory course.
M. Nicodemus*, A. Gilmore, H. Evans, and A. Glenn, Mississippi State University, Mississippi State, MS, USA.

Volunteer impact in an equine-assisted activities and therapy program on confidence and knowledge in college students.
H. Evans*, M. Nicodemus, L. Irvin, L. Beckman, E. Memili, and D. Jousan, Mississippi State University, Mississippi State, MS, USA.

Relationship between development of equine knowledge and feelings of emotional safety in college students enrolled in animal science courses.
K. Cagle-Holtcamp*,1, M. Nicodemus1, A. Gilmore1, D. Christiansen1, K. Galarneau1, T. Phillips1, B. Rude1, P. Ryan1, and W. Sansing1, 1Mississippi State University, Mississippi State, MS, USA, 2Oxford Treatment Center, Oxford, MS, USA.

Development of concentration-specific equine exit exams to evaluate course content and competency of graduates.
B. Gartland1, J. Holland2, and S. Keeley2, 1Western Kentucky University, Bowling Green, KY, USA, 2Midway University, Midway, KY, USA.

Wish I Had a Horse Camp: Introducing youth to horses.
T. J. Swanson*, M. A. Gunkelman, L. L. Hulsman Hanna, E. L. Berg, and C. J. Hammer, North Dakota State University, Fargo, ND, USA.

Youth perceptions of equine ethics at regional 4-H horse shows.
N. L. Walker*, M. Cater1, and C. Wickens2, 1Louisiana State University Agricultural Center, Baton Rouge, LA, USA, 2University of Florida, Gainesville, FL, USA.

Benefits and drawbacks of being a 4-H horse judge.
M. Rising* and K. Waite, Michigan State University, East Lansing, MI, USA.
An online microbial data management system for poring over the equine microbiome.
J. D. Chazi Capelo* and A. Biddle, University of Delaware, Newark, DE, USA.

Teaching the equine skeleton through active learning.
C. Menefee*, S. Jones, and C. Carraway, Stephen F. Austin State University, Nacogdoches, TX, USA.

SYMPOSIA AND ORAL SESSIONS

Genetics: Graduate Student Competition
Moderator: Stephen Coleman, Colorado State University
Location: Foxfire

3:00 pm 52 The lung transcriptome of horses with pasture-associated severe equine asthma identifies a Th17-high Th2-low phenotype.
C. M. Frodella*1, K. A. Thomas1, J. E. Bowser2, C. A. Mochal1, A. L. Eddy1, A. Claude3, and C. E. Swiderski1, 1College of Veterinary Medicine Mississippi State University, Mississippi State, MS, USA, 2Johnson and Wales University, Providence, RI, USA, 3College of Veterinary Medicine Michigan State University, East Lansing, MI, USA.

3:15 pm 53 Combining transcriptomic and proteomic analyses to investigate the pathophysiology of muscle disease in horses.
Z. Williams*, S. Perumbakkam, M. Schott, and S. Valberg, Michigan State University, College of Veterinary Medicine, East Lansing, MI, USA.

3:30 pm 54 Genetics of chronic idiopathic anhidrosis in the American Quarter Horse.
L. Patterson-Rosa*, N. Walker1, M. Mallicote1, R. MacKay1, and S. Brooks1, 1University of Florida, Gainesville, FL, USA, 2Louisiana State University, Baton Rouge, LA, USA.

3:45 pm 55 DNA fingerprinting of Marwari horses, an indigenous Indian breed.
U. Tatu*, A. Bhat, D. Beri, S. Nath, and U. Tatu, 1Indian Institute of Science, Bangalore, Karnataka, India, 2University of California, Davis, Davis, CA, USA.

4:00 pm Break.

Nutrition: Graduate Student Competition (2)
Moderator: Kristine Urschel, University of Kentucky
Location: Pilot and Pisgah

3:00 pm 87 Effect of restricting time allowed for grazing on the fecal microbiome.
M. A. Bowman*, S. E. Pratt-Phillips, and P. D. Siciliano, North Carolina State University, Raleigh, NC, USA.

3:15 pm 88 Effect of forage type on cecal and fecal microbiome and fermentation parameters in the horse.
R. Sorensen*, T. Douthit, J. Drouillard, C. Vahl, and J. Lattimer, Kansas State University, Manhattan, KS, USA.

3:30 pm 89 Transporting and exercising horses: Effects on microflora populations.
K. L. Szemplinski*, T. N. Jones1, K. A. Guay1, W. B. Smith1, and J. Brady2, 1Tarleton State University, Stephenville, TX, USA, 2Texas A&M AgriLife Research, Stephenville, TX, USA.

3:45 pm 90 The effect of yeast supplementation on equine fecal microbial population dynamics following abrupt dietary changes.
A. Garber*, P. Hastie, and J.-A. M. D. Murray, University of Glasgow, Glasgow, UK.

4:00 pm Break.

4:30 pm 91 Direct fed microbial supplementation on nutrient digestibility and visualization of the top 3 fecal microbial isolates in the sedentary horse.
C. P. Heaton*, C. A. Cavinder, H. Paz, B. J. Rude, T. Smith, and E. Memili, Mississippi State University, Mississippi State, Mississippi, USA.
Responses to an intra-articular lipopolysaccharide challenge following dietary supplementation of *Saccharomyces cerevisiae* fermentation product in young horses.
R. Martinez\*1, J. Leatherwood\^2, H. Valigura\^1, C. Arnold\^1, K. Glass\^1, M. Much\^1, R. Owen\^1, C. Warzecha\^2, and S. White\^1, \^1Texas A&M University, College Station, TX, USA, \^2Diamond V Mills, Inc, Cedar Rapids, IA, USA.

Effects of decreased dietary vitamin E plus a proprietary antioxidant blend on mitochondria in young performance horses.
R. Owen\*1, S. White\^1, and K. Brennan\^2, \^1Texas A&M University, College Station, TX, USA, \^2Alltech Inc, Nicholasville, KY, USA.

Fat supplementation: Rice bran oil versus corn oil.
M. Garrick\*1, H. Spooner, J. Haffner, and R. Hoffman, Middle Tennessee State University, Murfreesboro, TN, USA.

**Reproductive Physiology: Graduate Student Competition**

**Moderator:** William Day, SUNY Morrisville

**Location:** Roan

3:00 pm 141 An opioid antagonist, either alone or in combination with a GnRH agonist, alters LH and ovarian responses in transitional mares.
C. D. Sinclair\*1,2, E. Oberhaus\^3, N. Long\^2, E. Stafford\^3, T. Rozell\^1, J. Stevenson\^1, and J. Koubal\^1, \^1Kansas State University, Manhattan, KS, USA, \^2Clemson University, Clemson, SC, USA, \^3Louisiana State University, Baton Rouge, LA, USA.

3:15 pm 142 Contraceptive vaccination for mares and its effects on cyclicity and estrous behavior.
A. Reisenauer\*1, M. McQuagge\^1, K. Klononatz\^1, K. Davis\^1, P. Graham\^1, J. Gifford\^2, D. Eckery\^1, and J. Bruemmer\^1, \^1Colorado State University, Fort Collins, CO, USA, \^2New Mexico State University, Las Cruces, NM, USA.

3:30 pm 143 Unconventional signaling of stallion sperm activation.
M. McQuagge\*1, A. Reisenauer, J. Graham, Q. Winger, and J. Bruemmer, Colorado State University, Fort Collins, CO, USA.

3:45 pm 144 Supplementation of INRA 96 extender with EC-Oxyrase for cold storage of stallion spermatozoa.
J. Shore\*2, G. Webb\^1, W. Boyer\^1, and L. Sukovaty\^1, \^1University of Arkansas, Fayetteville, AR, USA.

4:00 pm Break.

**Teaching and Extension: Graduate Student Competition**

**Moderator:** Kathy Anderson, University of Nebraska–Lincoln

**Location:** Mitchel

3:00 pm 162 Biosecurity education in the equine industry for the next generation.
A. E. Neu\*1, D. N. Catalano\^2, S. J. Schiek\^2, D. K. DeWitte\^2, E. L. Cortus\^2, and K. L. Martinson\^1, \^1University of Minnesota, St. Paul, MN, USA, \^2University of Minnesota Extension, Willmar, MN, USA, \^3University of Minnesota Extension, Mankato, MN, USA.

3:15 pm 163 Experience colors perception of equine affective states.
B. G. Kirkland\*1 and K. M. Hiney, Oklahoma State University, Stillwater, OK, USA.

3:30 pm 164 Characterization of forage utilization on small- and medium-scale horse operations in Florida.
A. C. Vasco\*1, C. L. Wickens, M. O. Wallau, T. L. Hansen, E. R. Santos, and L. K. Warren, University of Florida, Gainesville, FL, USA.

3:45 pm 165 Effects of therapeutic riding on parental perceptions of mental and physical disability improvement.
S. Benton\*1, L. Petr\^2, L. Schneider\^2, and J. Ivey\^1, \^1University of Tennessee, Knoxville, TN, USA, \^2Shangri-La Therapeutic Academy of Riding, Knoxville, TN, USA, \^3University of Tennessee Institute of Agriculture, Knoxville, TN, USA.

4:00 pm Break.

4:30 pm College and career plans of horse-oriented youth.
S. E. Kenderdine\*1, H. S. Spooner\^2, F. D. Jousan\^2, A. L. Herrin\^1, and R. M. Hoffman\^1, \^1Middle Tennessee State University, Murfreesboro, TN, USA, \^2Mississippi State University, Starkville, MS, USA.
Factors influencing student success in a senior-level horse management course.
K. P. Anderson, H. Lavoie*, and K. Hanford, University of Nebraska, Lincoln, NE, USA.

Interpretation and understanding of equine behavior terminology and learning theory in undergraduate students.
C. Wires*, B. Talbert1, C. Croney1, M. O’Haire3, R. Hoffman2, and C. Brady1, 1Purdue University, West Lafayette, IN, USA, 2Middle Tennessee State University, Murfreesboro, TN, USA.

Undergraduate Student Competition (2)
Moderator: Rhonda Hoffman, Middle Tennessee State University
Location: Blue Ridge

Full-body vibration effects on thermography in horses.
K. Jallaq*, T. Williams21, C. Ware1, and C. Chubb1, 1University of Findlay, Findlay, OH, USA, 2Michigan State University, East Lansing, MI, USA.

A characterization of response variables to sub-maximal standardized exercise tests in recreational horses.
S. Loya*, A. M. McNally, D. N. Smarsh, and W. B. Staniar, The Pennsylvania State University, University Park, PA, USA.

Preliminary evaluation of equine forelimb kinematic response to commonly used head and neck positions.
M. Kane*, M. Fagan, and K. Duberstein, University of Georgia, Athens, GA, USA.

Method-comparison analysis between a Contour Next glucometer and YSI 2900 biochemistry analyzer in equine.
A. J. Kittle*, S. E. Sisler1, N. Nguyen1, J. C. Gill1, and V. Reed2, 1Western Kentucky University, Bowling Green, KY, USA, 2Equipuncture Integrative Veterinary Services PLLC, Austin, TX, USA.

Break.

Comparison of total radiographic bone aluminum equivalences (RBAE) from digital radiographs to bone ash content of the equine third metacarpal.
B. J. Emmert*, C. I. Robison, A. Pritchard, and B. D. Nielsen, Michigan State University, East Lansing, MI, USA.

Meteorological and lunar influence on the occurrence of colic in horses.
D. Ferriola, L. Vigouroux*, J. Bryk-Lucy, and L. Ritchie, Centenary University, Hackettstown, NJ, USA.

Omeprazole does not affect cribbing behavior in horses.
R. Wren*, A. Rumore, and R. Gettinger, Randolph College, Lynchburg, VA, USA.

The effect of grooming and therapeutic riding by adolescents with autism spectrum disorder on equine salivary cortisol concentrations.
M. Shields*, E. Kemeny1, C. Gramlich2, D. Hutchins3, and S. Burk1, 1Otterbein University, Westerville, OH, USA, 2Slippery Rock University, Slippery Rock, PA, USA.

OTHER EVENTS

Graduate Student Professional Development Session
6:00–7:00 pm
Location: Expo Center
Student Social
7:00–10:00 pm
Location: Salvage Station
*Busing will be provided to and from Salvage Station. Meet in hotel lobby at 7:00 pm. Last bus will leave Salvage Station at 10:00 pm.

Wednesday, June 5

5K Fun Run/Walk
6:00–7:00 am
Start in front of the Asheville Adventure Center.
Sponsored by Zinpro Corporation

WORKSHOPS

Workshop Session 1
8:00–9:50 am A unique ESS-wide session—The Fate of Wild and/or Unwanted Horses and Burros; How Do We Make a Difference?
Leaders: Tom Lenz, PhD, National Wild Horse and Burro Advisory Board member, and Jason Bruemmer, PhD, Colorado State University
Location: Expo Center

Workshop Session 2
10:00–11:50 am Future Application of Models to Predict Nutrient Requirements: Outlook on Equids
Leaders: Nathalie L. Trottier, Michigan State University; Carey Williams, Rutgers University; Laurie Lawrence, University of Kentucky; Dominique Bureau, University of Guelph; Christine Skelly, Michigan State University; Mark Edwards, California Polytechnic State University; Tayler Hansen, University of Florida; and Krishona Martinson, University of Minnesota
Location: Pilot and Pisgah

10:00–11:50 am Are You Ready to Publish? Understanding the Publishing Process
Leaders: Ed Squires, Editor-in-Chief, Journal of Equine Veterinary Science, and Aisling Murphy, Senior Publisher with Elsevier
Location: Roan

10:00–11:50 am Development and Incorporation of Equine Hospice, Euthanasia, and Grief Recognition/Support into the Undergraduate Curriculum
Leaders: Lynn Taylor, Centenary University, and Jesslyn Bryk-Lucy, Centenary University
Location: Mitchel

10:00–11:50 am Hands-On Podcasting for Equine Teaching and Extension
Leaders: Karen L. Waite, Michigan State University; Kris Hiney, Oklahoma State University; and Betsy Greene, University of Arizona
Location: Foxfire
OTHER EVENTS

North Carolina Industry Tour
(optional ticketed event—includes dinner)

12:00 pm  Load buses in hotel lobby
* Buses will depart at 12:15 pm.

12:15–3:00 pm  Individual choice of one of the following tours:
• Explore Downtown Asheville
• Visit the Biltmore Estate
• Visit the Tryon International Equestrian Center

4:00–8:00 pm  North Carolina BBQ dinner—The day will end with a North Carolina BBQ at Legends Grill at the Tryon International Equestrian Center.
* Buses will begin returning to the hotel at 7:30 pm.

Thursday, June 6

ARPAS Exam
6:00–8:00 am
Location: Mitchel

Invited Speaker—Equine Bioscience
Moderator: Carolyn Hammer, PhD, North Dakota State University
Location: Expo Center

8:00–9:00 am  Chronobiology and the Horse: Internal Timing in an Elite Athlete
Barbara Murphy, PhD, University College Dublin.

POSTER PRESENTATIONS

9:00–10:30 am
Location: Expo Center

Equine Biosciences: Posters

13  Plasma prolactin and adrenocorticotropin responses to thyrotropin-releasing hormone in mares treated with detomidine and butorphanol.
E. L. Oberhaus*, D. L. Thompson Jr.*, L. E. Kerrigan1, and A. M. Chapman1, Louisiana State University Agricultural Center, Baton Rouge, LA, USA, Louisiana State University School of Veterinary Medicine, Baton Rouge, LA, USA.

14  Impacts of Gastro-Well on gastric ulcer prevalence of competition horses in Canada.

15  Effect on the insulin response to varying doses of corn syrup to the oral sugar test (OST).
E. L. Macon*, P. A. Harris2, A. Herbst2, and A. A. Adams1, University of Kentucky, Lexington, KY, USA, Equine Studies Group, Waltham Centre for Pet Nutrition, Melton Mowbray, Leicestershire, UK.

16  Feeding reduced lignin alfalfa hay modulates the horse fecal microbiome in an individualized manner.
A. Gomez, A. Grev, R. Mottet, M. Hathaway, C. Sheafer, and K. Martinson*, University of Minnesota, St. Paul, MN, USA.
Electromyographic measurement of horses chewing senior feed at different feeding heights and time of day. Are there differences?
M. Gordon*1, M. Jerina1, N. Schultz2, and R. Jacobs1, 1Purina Animal Nutrition, Gray Summit, MO, USA, 2S&S Advanced Analytics, LLC, Lincoln, NE, USA.

Postpartum trace element concentrations in mare and foal mane hair and blood.
K. Krebs*, S. Hayes, B. Cassill, and M. Brummer-Holder, University of Kentucky, Lexington, KY, USA.

Genetics: Posters

Exploring the genetics of dynamic laryngeal collapse associated with poll flexion in Norwegian-Swedish Coldblooded Trotter racehorses.

Production and Management: Posters

Effect of feeder style on behavior and cortisol concentrations in group-fed horses.
K. Bennett-Wimbush*, S. L. Mastellar1, and J. Suagee-Bedore2, 1Ohio State ATI, Wooster, OH, USA, 2Sam Houston State University, Huntsville, TX, USA.

Stress-related behavior of horses in adapted therapeutic riding lessons and hippotherapy sessions.
R. A. Klose and E. L. Berg*, North Dakota State UniversityFargo, ND, USA.

Sale prices of recreational American Quarter Horses as an economic indicator.
J. Pedoto1, R. Coleman*1, and J. Black2, 1University of Kentucky, Lexington, KY, USA, 2Colorado State University, Fort Collins, CO, USA.

Effect of sex and body condition score on the success rate of a modified fecal collection bag.
M. E. Cozzarelli*, C. P. Heaton, C. A. Cavinder, B. J. Rude, and T. Smith, Mississippi State University, MS, USA.

Comparative assessment of intake and consumer preference of Standlee Premium Western Forage Alfalfa hay versus a locally sourced alfalfa hay using objective attributes.
B. S. Perron*, R. D. Jacobs2, M. L. Jerina2, M. E. Gordon2, and S. Duren3, 1Sul Ross State University, Alpine, TX, USA, 2Purina Animal Nutrition, Gray Summit, MO, USA, 3Standlee Premium Western Forage, Eden, ID, USA.

Acclimation of the equine distal limb following exposure to extreme cold.
M. Gunkelman*, A. Nichols, and C. Hammer, North Dakota State University, Fargo, ND, USA.

Thermography of the equine hoof immediately following trimming and shoeing.
M. Gunkelman*, F. Ryan, C. Keiper, and C. Hammer, North Dakota State University, Fargo, ND, USA.

Miscanthus and hemp as alternative bedding material for horses.
J. Wolfzorn*, D. Harding, A. Davis, M. Santiago, and C. Porr, Murray State University, Murray, KY, USA.

The impact of nonsteroidal anti-inflammatory drugs on the equine gastric microbiome.
T. Stone, K. Babiarz, G. Garcia, and A. S. Biddle*, University of Delaware, Newark, DE, USA.

Climate factors driving equine cyathostomin species distribution in the United States.
R. Davis, H. Nelson, and A. S. Biddle*, University of Delaware, Newark, DE, USA.

Development of accurate weight tape regression equations for Warmblood and Clydesdale horses.

Proprioceptive considerations and the use of FIRR therapy for conditioning and rehabilitating sport horses.
E. Douglas1, S. Keeley*, and J. Holland2, 1MEND Equine Bodywork, Lexington, KY, USA, 2Midway University, Midway, KY, USA.

An investigation into equestrian spur use in the United Kingdom.
C. Lemon, V. Lewis*, L. Dumbell, and H. Brown, Hartpury University, Hartpury, Gloucestershire, UK.
Reproductive Physiology: Posters

145 An opioid antagonist, either alone or in combination with a GnRH agonist, influences FSH and ovarian responses in transitional mares.
C. D. Sinclair*1,2, E. Oberhaus1, N. Long3, E. Stafford1, T. Rozell1, J. Stevenson1, and J. Kouba1, 1Kansas State University, Manhattan, KS, USA, 2Clemson University, Clemson, SC, USA, 3Louisiana State University, Baton Rouge, LA, USA.

146 Differential effects of progesterone on the combined estradiol benzoate-sulpiride stimulation of plasma luteinizing hormone and prolactin concentrations in geldings.
C. M. Camp*, K. M. Wilson, and E. L. Oberhaus, Louisiana State University Agricultural Center, Baton Rouge, LA, USA.

147 Inclusion of pyruvate in stallion semen extenders.
J. Shore*1,2, G. Webb1, W. Boyer1, and L. Sukovaty1, 1Missouri State University, Springfield, MO, USA, 2University of Arkansas, Fayetteville, AR, USA.

SYMPOSIA AND ORAL SESSIONS

Exercise Science (1)
Moderator: David Marlin, David Marlin Consulting
Location: Mitchel

10:30 am 46 Heart rate, speed and lactate during the cross-country phase of an advanced and CCI*** 3-day event.
J. D. Pagan*, K. O’Neill1, N. Ireland1, and M. Davies2, 1Kentucky Equine Research, Versailles, KY, USA, 2ClockitEQ Ltd, Perth, WA, Australia.

10:45 am 47 A supplement containing a marine-derived mineral complex combined with trace minerals and vitamins increases bone density in Thoroughbred racehorses in early training.
J. D. Pagan*, A. Swanhall, E. Ford, and E. Mulvey, Kentucky Equine Research, Versailles, KY, USA.

11:00 am 41 Effect of stirrup iron style on normal forces and rider position during the posting trot.
E. D. Stapley and J. M. Manfredi*, Michigan State University, East Lansing, MI, USA.

11:15 am 42 Effectiveness of clicker-trained versus handler-led horses for gait analysis.
M. Fagan*, G. Deboer, M. Towe, and K. J. Duberstein, Department of Animal and Dairy Science, University of Georgia, Athens, GA, USA.

11:30 am 43 Effects of whole-body vibration on lameness, stride length, cortisol, and heart rate in healthy horses.
S. Sugg*, H. Spooner, A. Berger, and J. Haffner, Middle Tennessee State University, Murfreesboro, TN, USA.

11:45 am 44 Effect of vortex wave circulation stimulation on muscle thickness in mature horses on stall rest.
A. Greene*, C. Cavinder, C. Heaton, C. Mochal-King, C. Lemley, and T. Dinh, Mississippi State University, Mississippi State, MS, USA.

12:00 pm 45 GPS- and stopwatch-determined running speeds of horses differ.
A. Lindner* and A. Brand, Arbeitsgruppe Pferd, Juelich, Germany.

Nutrition (1)
Moderator: Holly Spooner, Middle Tennessee State University
Location: Pilot and Pisingah

10:30 am 95 Sugar beet pulp presentation alters intake behavior of horses.
P. Grimm*1, M. Terra Braga1, A.Destrez2,3, V. Julliand4, and S. Julliand1, 1Lab To Field, Dijon, France, 2AgroSup Dijon, Univ. Bourgogne Franche-Comté, Dijon, France, 3INRA, CNRS, UMR6265 CSGA (Centre des Sciences du Goût et de l'Alimentation), Dijon, France, 4PAM UMR A 02.102, Dijon, France.

10:45 am 96 In vitro effect of alfalfa composition on gastric ecosystem activity.
P. Grimm*4, V. Julliand2, and S. Julliand1, 1Lab To Field, Dijon, France, 2Univ. Bourgogne Franche-Comté, AgroSup Dijon, PAM UMR A 02.102, Dijon, France.
11:00 am 97 Influence of milk composition and foal microbiota on diarrhea incidence. M. Pyles*, A. Fowler¹, A. Crum¹, S. Hayes¹, R. Schendel¹, M. Flythe², and L. Lawrence¹, ¹University of Kentucky, Lexington, KY, USA, ²United States Department of Agriculture, ARS-FAPRU, Lexington, KY, USA.


11:30 am 99 Bioavailable silicon supplementation may influence biomarkers, but not lameness, in mature horses. A. Pritchard*, B. Nielsen, C. Robison, and J. Manfredi, Michigan State University, Lansing, MI, USA.

11:45 am 100 Impact of antioxidant supplementation on plasma thiols and the muscle proteome in Thoroughbred horses. M. Henry*¹, D. Velez-Irizarry¹, J. Pagan¹, L. Sordillo¹, J. Gandy¹, and S. J. Valberg¹, ¹Department of Large Animal Clinical Sciences, Michigan State University, East Lansing, MI, USA, ²Kentucky Equine Research, Versailles, KY, USA.

12:00 pm 101 Use of haptoglobin, magnesium, adiponectin, and leptin as screening markers for insulin dysregulation in obese horses. G. H. M. Counotte¹, A. Durham², V. L. Vandendriessche*³, and L. van den Wollenberg¹, ¹GD Animal Health, Deventer, Overijssel, the Netherlands, ²Lipook Equine Hospital, Lipook, Hampshire, UK, ³PAVO Horse Nutrition, Heijen, Limburg, the Netherlands.

Reproductive Physiology
Moderator: Joann Kouba, Kansas State University
Location: Foxfire

10:30 am 148 Ascorbic acid status in pony mares and young pony foals. D. J. Marlin*¹ and W. R. Allen², ¹David Marlin Consulting, Cambridge, UK, ²The Paul Mellon Laboratory of Equine Reproduction, Newmarket, UK.

10:45 am 149 Effects of sub-dermal, 72-mg slow-release melatonin on mare estrous induction. C. Matlock, K. Guay, E. Purnell*, and L. Smitherman, Tarleton State University, Stephenville, TX, USA.

Genetics
Moderator: Joann Kouba, Kansas State University
Location: Foxfire

11:00 am 57 Transcriptomic and proteomic analysis of pathways limiting glycogen repletion in the horse. D. Vélez-Irizarry*¹, K. Aldrich¹, V. Mesquita², J. Pagan², and S. Valberg¹, ¹Department of Large Animal Clinical Sciences, Michigan State University, East Lansing, MI, USA, ²Kentucky Equine Research, Versailles, KY, USA.

Teaching and Extension
Moderator: Betsy Greene, University of Arizona
Location: Roan

10:30 am 169 Equine veterinarians’ educational needs in equine nutrition. J. L. Nichols*¹,², J. S. Robinson¹, K. M. Hiney¹, J. W. Ramsey¹, and H. R. Terry¹, ¹Oklahoma State University, Stillwater, OK, USA, ²Bluebonnet Feeds, Ardmore, OK, USA.

10:45 am 170 Bringing horse genetics to owners and industry professionals through online extension. L. Patterson-Rosa, C. Wickens, and S. Brooks*, University of Florida, Gainesville, FL, USA.

11:00 am 171 Volunteer Horse Patrol: Building the trail community. D. Ciano¹, S. Stearns², B. Khanal², and J. Nadeau*², ¹CT Horse Council, Berlin, CT, USA, ²University of Connecticut, Storrs, CT, USA.

11:15 am 172 A survey of parasite management practices in Georgia. K. Turner*, A. Britt Jr., and N. Fuhrman, University of Georgia, Athens, GA, USA.

11:30 am 173 Equine-assisted counseling as an intervention for undergraduate female college students experiencing anxiety. C. J. Hammer*, A. R. Bach-Gorman, and E. L. Berg, North Dakota State University, Fargo, ND, USA.
11:45 am 174 Use of the Ankom RF Gas Production System for undergraduate research in equine nutrition. M. Halpin*, J. Lattimer, J. Drouillard, and T. Douthit, Kansas State University, Manhattan, KS, USA.

12:00 pm 175 The economic impact of the Michigan 4-H Horse Judges List. K. Waite* and M. Rising, Michigan State University, East Lansing, MI, USA.

**Exercise Science Lecture and Luncheon**
Sponsored by Buckeye Nutrition
Moderator: Jennie Ivey, PhD, University of Tennessee
Location: Expo Center

12:15 pm Buffet lunch service begins

12:45–1:45 pm Ground Reaction Forces: The Sine Qua Non of Terrestrial Locomotion
Hilary Clayton, BVMS, PhD, Diplomate ACVSMR, FRCVS, Sport Horse Science, LC, Michigan State University Professor, and Mary Anne McPhail Dressage Chair Emerita.

**Equine Biosciences**
Moderators: Jessica Bedore, Sam Houston State University, and Carolyn Hammer, North Dakota State University
Location: Roan


2:45 pm 21 Utilization of electromyography to measure chewing characteristics of feedstuffs in horses. M. Gordon*, M. Jerina1, N. Schultz2, and R. Jacobs1, 1Purina Animal Nutrition, Gray Summit, MO, USA, 2S&S Advanced Analytics LLC, Lincoln, NE, USA.

3:00 pm 22 Antibiotics challenge, dysbiosis, and immunoglobulin A response in horses. A. Collinet*1,2, P. Grimm1, S. Julliand1, and V. Julliand2, 1Lab To Field, Dijon, France, 2Univ. Bourgogne Franche-Comté, AgroSup Dijon, PAM UMR A 02.102, Dijon, France.

3:15 pm Break.

4:00 pm 23 Skeletal response to whole-body vibration in stalled, yearling horses. C. J. Huseman*1, T. H. Welsh Jr1, L. J. Suva1, B. J. Dominguez1, C. Paulk2, M. M. Vogelsang1, and D. H. Sigler1, 1Texas A&M University, 2Kansas State University.

4:15 pm 24 A review of the solar symmetry of the hoof and third phalanx. M. F. Craig2 and S. R. Malone*, 1Texas A&M University, 2Rutgers, The State University of New Jersey, New Brunswick, NJ, USA, 2EponaMind, Paso Robles, CA, USA.

**Exercise Science (2)**
Moderator: Sarah White, Texas A&M University
Location: Mitchel

2:15 pm 39 Horse owner understanding of equine gastric ulcer syndrome (EGUS). D. J. Marlin*1, J. Williams2, K. Pickles3, and B. Sykes4, 1David Marlin Consulting, Cambridge, UK, 2Hartpury University, Gloucester, UK, 3Chine House Veterinary Group, Sileby, UK, 4School of Veterinary Science, University of Queensland, Australia.

2:30 pm 40 Is EIPH a misnomer and could it be hampering our attempts to understand the etiology of the condition? D. Marlin*1 and R. Schroter2, 1David Marlin Consulting, Cambridge, UK, 2Imperial College, London, UK.

2:45 pm 48 Performance analysis of faults at international showjumping competition. D. J. Marlin*1 and J. Williams2, 1David Marlin Consulting, Cambridge, UK, 2Hartpury University, Gloucester, UK.
Horse does not affect physiological responses of players in arena polo.
A. Pritchard*, S. Barthel¹, and D. Ferguson², ¹Animal Science, Michigan State University, East Lansing, MI, USA, ²Kinesiology, Michigan State University, East Lansing, MI, USA.

Break.

A preliminary analysis of factors that result in faults in amateur (90–120 cm) showjumping.
J. Williams*¹, M. Perlo¹, and D. Marlin², ¹Hartpury University, Gloucester, Gloucestershire, UK, ²DM Consulting Ltd, Cambridge, Cambridgeshire, UK.

Is there an effect of the time elapsed between heart rate measurements on the CRI score in endurance competitions?
M. de Mira¹, M. Arroja², J. Williams*³, and D. Marlin⁴, ¹Instituto de Ciências Agrárias e Ambientais Mediterrânicas (ICAAM), Universidade de Évora, Évora, Portugal, ²Faculdade de Medicina Veterinária, Universidade de Lisboa, Lisbon, Portugal, ³Hartpury University, Gloucester, UK, ⁴David Marlin Consulting, Cambridge, UK.

Nutrition (2)
Moderator: James Lattimer, Kansas State University
Location: Pilot and Pisgah

Sampling of feces during daytime is sufficient when titanium dioxide is used to estimate organic matter digestibility in equine.
F. J. W. C. Schaafstra*¹, J. T. Schonewille¹, D. van Doorn¹, J. van Laar¹, M. C. Blok², and W. H. Hendriks¹, ¹Department of Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, Utrecht, the Netherlands, ²Department of Equine Sciences, Faculty of Veterinary Medicine, Utrecht University, Utrecht, the Netherlands.

A comparison of the nutrient composition of European feeds used at the 2010 and 2018 FEI World Equestrian Games.
J. D. Pagan*, E. Phethean, C. Whitehouse, and M. Lennox, Kentucky Equine Research, Versailles, KY, USA.

Omeprazole reduces calcium digestibility in Thoroughbred horses.
J. D. Pagan*, L. Petroski-Rose, A. Mann, and A. Hauss, Kentucky Equine Research, Versailles, KY, USA.

Fermentation parameters of commonly used feed ingredients in the equine cecum.
P. Ochonski*, J. Drouillard, T. Douthit, C. Vahl, and J. Lattimer, Kansas State University, Manhattan, KS, USA.

Are prebiotics beneficial for digestion in mature and senior horses?
C. P. Heaton*, C. A. Cavinder¹, H. Paz¹, B. J. Rude¹, T. Smith¹, E. Memili¹, P. Harris², N. Liburt³, and A. Krotky³, ¹Mississippi State University, Mississippi State, MS, USA, ²WALTHAM Centre for Pet Nutrition, Melton Mowbray, UK, ³Mars Horsecare U.S., Inc, Dalton, OH, USA.

The effect of space-restricted rotational grazing on body weight and insulin/glucose dynamics in horses.
J. C. Gill¹, N. T. Ashley¹, S. E. Pratt-Phillips², and P. D. Siciliano², ¹Western Kentucky University, Bowling Green, KY, USA, ²North Carolina State University, Raleigh, NC, USA.

Glucose and insulin response to feeding Standleee Premium Western Forage Alfalfa hay versus a locally sourced alfalfa hay.
B. S. Perron*, R. D. Jacobs², R. K. Splan¹, M. L. Jerina², M. E. Gordon², and S. Duren², ¹Sul Ross State University, Alpine, TX, USA, ²Purina Animal Nutrition, Gray Summit, MO, USA, ³Delaware Valley University, Doylestown, PA, USA, ⁴Standlee Premium Western Forage, Eden, ID, USA.
**Production and Management**  
*Moderator: Kristine Vernon, Clemson University*  
*Location: Foxfire*

2:15 pm  135  **Effects of grazing muzzles on behavior and physiological stress of individually housed miniature horses.**  
K. Davis¹, M. Iwaniuk¹, R. Dennis¹, P. Harris², and A. Burk*¹, ¹*University of Maryland, College Park, MD, USA, ²Waltham Centre for Pet Nutrition, Waltham-on-the-Wolds, Leicestershire, UK.*

2:30 pm  136  **Effects of grazing muzzles on voluntary exercise and physiological stress in a miniature horse herd.**  
K. Davis¹, M. Iwaniuk¹, R. Dennis¹, P. Harris², and A. Burk*¹, ¹*University of Maryland, College Park, MD, USA, ²Waltham Centre for Pet Nutrition, Waltham-on-the-Wolds, Leicestershire, UK.*

2:45 pm  137  **Daily activity and shade use by horses in a desert environment.**  
E. A. Greene*¹, A. D. Wright¹, C. W. Knight¹, and D. E. Diaz², ¹*University of Arizona, Tucson, AZ, USA, ²University of Maine, Orono, ME, USA.*

3:00 pm  138  **School horse workload, injuries, and footing in a collegiate equestrian program.**  
L. E. Taylor*¹ and M. A. Taylor², ¹*Centenary University, Hackettstown, NJ, USA, ²Seton Hall University, South Orange, NJ, USA.*

3:15 pm  Break.

4:00 pm  139  **Effects of 27 months of rotational versus continuous grazing on horse and pasture condition.**  
C. A. Williams*¹, K. Sullivan¹, and L. B. Kenny¹,², ¹*Rutgers, The State University of New Jersey, New Brunswick, NJ, USA, ²Pennsylvania State Extension Montgomery County, Collegeville, PA, USA.*

4:15 pm  140  **Glucose and insulin responses of horses grazing integrated warm- and cool-season grass rotational pasture systems.**  
J. R. Weinert* and C. A. Williams, Department of Animal Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ, USA.

**OTHER EVENTS**

**ESS Business Meeting**  
5:00–6:00 pm  
Location: Pilot and Pisgah

**ESS Awards Banquet**  
6:30–7:00 pm  
Cocktail hour (cash bar)  
Location: Expo Center Veranda

7:00–9:30 pm  
Dinner and Awards  
Location: Expo Center
Awards

The Outstanding Educator Award
This award recognizes an individual who has demonstrated excellence in the area of equine education, either to students or persons in the horse industry.

2019 Recipient: Dr. Krishona Martinson

Josie Coverdale Award for Outstanding Young Professionals
This award recognizes an individual under the age of 40 with less than 10 years of service in academia or industry, who has made meritorious contributions to equine science, in teaching, research, public service, or industry. The award was renamed in memory of Dr. Josie Coverdale, who received this award in 2013.

2019 Recipient: Dr. Jessica Lucia Leatherwood

The American Feed Industry Association (AFIA) Award in Equine Nutrition Research
This award is designed to stimulate research excellence in equine nutrition.

2019 Recipient: Dr. Carey Williams

The Equine Science Society and American Society of Animal Science–Equine Science Award
This award recognizes outstanding achievement in the areas of extension, research, teaching, or agribusiness in the equine industry.

2017 Recipient: Dr. Paul Siciliano
2018 Recipient: Dr. Jason Bruemmer
2019 Recipient: Dr. Shannon Pratt-Phillips

Fellows of the Equine Science Society
The Fellow Award recognizes distinguished service to the horse industry and to the Equine Science Society over an extended period of time.

2019 Recipient: Dr. Brian Nielsen

The Distinguished Service in Equine Science Award
This award recognizes outstanding contributions to the field of equine science. The award is the most prestigious honor that the Equine Science Society can bestow upon one of its members.

2019 Recipient: Dr. Sheryl “Sheree” King
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