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Maxwell and Muriel Gluck pledged a \$3 million challenge grant to UK to build a \$9 million equine research facility. Today the Gluck Center has 20 faculty members conducting equine research in genetics and genomics, immunology, infectious diseases, parasitology, pharmacology and toxicology, musculoskeletal science, and reproductive health.

## UK's Gluck Center Celebrates 30 years of Improving Horse Health, Well-Being

The University of Kentucky (UK) Maxwell H. Gluck Equine Research Center is celebrating 30 years of legacy service to the equine community worldwide.

A 30th anniversary research seminar, open house, and celebration dinner will take place Oct. 12. The seminar will begin at 8 a.m. at the Gluck Center, in Lexington, and will feature the inaugural Teri Lear Memorial Lecture followed by an open house. Dinner will begin at 6 p.m. in the Woodford Reserve Room at Kroger Field. Stuart

Brown, DVM, chair of the Gluck Equine Research Foundation and a Hagyard Equine Medical Institute veterinarian, will host the program honoring Peter Timoney, MVB, PhD, FRCVS, Gluck Center professor, for his lifelong contributions to equine infectious disease research.

"I look forward to this milestone 30th anniversary of the Gluck Center and the recognition of the contributions of Dr. Peter Timoney throughout his career," said Brown. "The Gluck Center is an internationally recognized center of excellence in equine research and discovery for the benefit of the health of horses of all breeds and disciplines."

The center opened its doors June 5, 1987, with a promise to fulfill Thoroughbred breeder and entrepreneur Maxwell Gluck's legacy and continue the research and distinguished service in the Department of Veterinary Science, established in 1915, to the equine industry. Professors in the department were already world-renowned for their equine reproduction and infectious disease research contributions.

"From its beginning, the Maxwell H. Gluck Equine Research Center has represented a partnership between the University of Kentucky and the equine industry," said David Horohov, PhD, center director and department chair. "This collaborative spirit continues to this day as the mission of the Gluck Center is the scientific discovery, education, and dissemination of knowledge for the benefit of the health and well-being of horses."

Gluck and his wife, Muriel, pledged a \$3 million challenge grant to UK to build a \$9 million equine research facility on the condition the state and those in the equine industry match the funds. Kentucky Governor John Y. Brown Jr. matched the challenge grant with \$3 million in state economic development bonds. Other equine industry leaders quickly embraced Gluck's idea and rallied together to make his vision a reality. University President Otis Singletary organized a special advisory committee of influential equine industry representatives led by William S. Farish III, owner of Lane's End Farm, to meet the challenge through a "Support the

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## Gluck Center Anniversary

Foundation” campaign. Farish, along with John Gaines, owner of Gainesway Farm; James E. “Ted” Bassett III, president of Keeneland; Albert G. Clay, owner of Fairway Farm; and Frederick L. Van Lennep, owner of Castleton Farm, raised more than \$4.2 million within a month.

“This accomplishment could not have been possible without the vision of many leaders from the equine industry and the University of Kentucky who partnered in this venture 30 years ago and assembled such a distinguished faculty to execute on the strategy of this equine-focused research center,” Brown said. “Today, we recognize the benefit of this investment across the many areas of cutting-edge research performed by our team of faculty members, under the leadership of Dr. Horohov, as we celebrate the legacy of this commitment for decades to follow in support of the mission to improve horse health and well-being.”

Today the Gluck Center is part of the

UK College of Agriculture, Food and Environment, and 20 faculty members conduct research on equine genetics and genomics, immunology, infectious diseases, parasitology, pharmacology and toxicology, musculoskeletal science, and reproductive health.

“Over many years, our college and Kentucky’s signature industry have been dependent on each other to do what is best for the equine economy,” said Nancy Cox, MS, PhD, college dean. “The health and well-being of the horse underpins the industry. The Gluck building investment was a manifestation of this interdependency of the university and the industry. While we celebrate the past 30 years, we pledge continued dedication to this evolving industry for many more years.”

Additional details about the 30th anniversary events, along with ticket reservation information, are available at [ukalumni.net/gluck](http://ukalumni.net/gluck). **UK**

>Jenny Evans, MFA, is the senior veterinary science marketing and promotion specialist at the UK Gluck Equine Research Center.

## Masthead

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## Winterizing Pastures Starts in Fall

Winter is a hard season for horse owners. Water freezes, grass isn’t growing, and mud seems abundant. Winter is also hard on pastures, and a single winter of poor management can undo years of costly improvements. However, there are steps you can take to prepare cool-season pastures for winter and improve the pasture’s chances of weathering the cold season well.

Fall nitrogen for cool-season pastures is best applied in split applications of 30-40 pounds actual nitrogen per acre.



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## Winterizing Pastures

Fall is an excellent time to submit a soil sample to your county extension agent or agricultural dealership for analysis and apply lime, phosphorus, and potassium fertilizer based on the results. You generally won't see nitrogen on your sample results as it does not persist in soil, but that doesn't make it any less important to maintaining a healthy pasture through the winter.

### Fall Nitrogen Applications

A fall nitrogen application is a simple and relatively inexpensive step that can have big impacts down the line. Nitrogen is known to have the single greatest impact on plant growth, which is why hay producers apply it in the spring and summer to boost yield. However, the goal of pasture management isn't necessarily producing as much forage as possible, but producing enough and to produce it when it's needed.

Low nitrogen application rates in the fall will not result in significant growth increases, but will encourage plants to build root reserves. This will allow grasses to stay active longer into the winter, survive the potentially harsh conditions better, and green up earlier in the spring. All of these things can result in more winter and early spring grazing and, as a result, less need for supplemental hay.

These benefits are not limited to the winter and early spring months, however. Stronger plants are more likely to spread new tillers and fill in areas left bare by annual weeds or grasses.

In one study, UK researchers found that applying just 30 pounds of nitrogen twice in the fall increased grass cover by nearly 20% the following spring, compared to those areas not fertilized or only fertilized once.

Thick grass stands shade out weeds and reduce summer weed pressure, especially for annuals such as crabgrass and ragweed. Larger root systems help grass stands better survive summer droughts because they can access more water in the soil. Further, fertilizer applications are generally easier to do in the fall. In most areas, fall is dryer than spring, making getting equipment onto fields easier and less destructive. Finally, nitrogen prices might be cheaper in fall than in spring and summer, and farm supply stores and custom applicators



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Consider using a designated sacrifice area for turnout and hay-feeding to protect pastures during the winter.

will likely not be as busy.

Fall nitrogen for cool-season pastures is best applied in split applications of 30-40 pounds actual nitrogen per acre in September or October and again in October or November. For the transition zone, this is generally in late September or early October and again in November. Late summer or early fall applications can boost newly seeded grasses, but could also boost still-active warm-season grasses, such as nimblewill and crabgrass. Nitrogen uptake by cool-season grasses will be minimal after a hard freeze (<20°F) and is not recommended. Check with your local county extension agent for timing recommendations.

Organic nitrogen sources, such as manure, are excellent fertilizers, but won't have as much benefit on fall pastures, because nitrogen is bound to organic matter and requires warm temperatures to break down. Use highly soluble nitrogen sources, such as urea or ammonium nitrate, for fall applications.

### Other Tips

This fall, consider prepare a designated sacrifice area for winter turnout and hay-feeding to protect pastures. When pastures aren't growing, they

are unable to recover from grazing or traffic. However, horses will continue to graze plants even after they go dormant. Repeated grazing of dormant plants and hoof traffic can damage pastures, killing plants and thinning the stand.

Ideally, sacrifice areas are armored with geotextile fabric, rock, and dense grade aggregate to keep dry footing under horses all winter long. However, sacrifice areas do not have to be armored. If a pasture is already in poor health and slated to be improved the following year, it might be beneficial to designate it as a sacrifice area to protect other healthier pastures.

### Take-Home Message

Preparing pastures for winter can help minimize the impacts of horses and harsh weather, allowing managers to protect their investments in pasture improvements, reduce hay feeding, and strengthen pastures for spring and summer grazing. **UK**

>Ray Smith, PhD, forage extension specialist, and Krista Lea, MS, UK Horse Pasture Evaluation coordinator, both of UK's Department of Plant and Soil Sciences, provided this information.

### Additional References and Resources

- **Late Fall Nitrogen Fertilization For Cool-Season Grasses**  
[sites.ext.vt.edu/newsletter-archive/csces/2003-11/latefall.html](https://sites.ext.vt.edu/newsletter-archive/csces/2003-11/latefall.html)
- Schwer, Smith, Huo, Keene, Lourie, Roberts and Morrison. Late Fall Nitrogen Applications for Horse Pastures. American Forage and Grassland Council, June 2009.
- **Soil Sampling and Nutrient Management in Horse Pastures**  
[uky.edu/Ag/Forage/agr200.pdf](http://uky.edu/Ag/Forage/agr200.pdf)

## Cluster of Potomac Horse Fever Cases Confirmed in Kentucky

Veterinarians in Central Kentucky have confirmed more than two dozen cases of Potomac horse fever (PHF) in area horses so far in 2017. At press time, eight have been diagnosed since the beginning of August.

The UK Veterinary Diagnostic Laboratory's (UKVDL) Equine Disease Maps indicate four cases were diagnosed in May, nine in June, and nine more in July. Most of the affected horses have been from Fayette County, with other cases being confirmed in horses from Woodford, Bourbon, Harrison, Scott, and Taylor counties.

In addition to performing PCR diagnostic testing on samples from live horses, Jacqueline Smith, PhD, MSc, BSc, Dipl. AVES, UKVDL epidemiologist and founder

of the UKVDL Disease Mapping Initiative, said the laboratory has conducted three necropsies confirming PHF.

"Typically June, July, and August are the months for the most cases of PHF, yet it can be seen throughout the spring, summer, and fall," Smith said. "We average seven cases per month during the summer for PCR testing and average one to two per summer month in necropsy."

Bryan Waldrige, DVM, MS, Dipl. ABVP, ACVIM, of Park Equine Hospital at Woodford, in Versailles, Kentucky, who has treated many PHF cases over the years, agrees and said he expects additional cases to be confirmed throughout August.

Keeping this in mind, area owners are encouraged to



Horses can be exposed to PHF's causative agent by inadvertently ingesting aquatic insects infected with flukes carrying the bacteria or by drinking flukes directly from rivers or streams.

watch their horses closely for signs of disease and alert veterinarians of suspicious signs as soon as possible. Smith said PHF's fatality rate ranges from 5–30%, and horses treated early in the course of disease might have a better chance of surviving.

Potomac horse fever is caused by *Neorickettsia*

*risticii*, an organism found in some flukes (a wormlike parasite) that infect aquatic snails and insects (such as caddisflies and mayflies). Horses can be exposed by inadvertently ingesting aquatic insects infected with flukes carrying the bacteria or by drinking flukes directly from rivers or streams. However, even horses residing far from water bodies aren't out of PHF's reach.

"I've seen this in racehorses, and there was a report of Potomac at a Minnesota show barn, as well," Waldrige said of horses contracting PHF without residing near natural water sources. "Pole lights (near barns) or big lights on barns will attract the flies. The flies can then get into horses' water buckets, feed troughs, and hay, and the horses can consume them that way. There's, for sure, a role in having lights on your barn.

"I've seen (PHF) on farms where the horses never drink water that doesn't come out of a spigot, and the farm I'm thinking of had the worst Potomac I've ever seen," he added.

Also complicating diagnosis is the fact that PHF has been known to yield highly variable clinical signs. Smith

## UK ALUMNI SPOTLIGHT

### NATALIE HEITZ

Originally from Louisville, Kentucky, Natalie Heitz is a 2012 graduate of UK's Equine Science and Management program and previous president of the UK Horse Racing Club.

Heitz grew up interested in horses, taking riding lessons and visiting racetracks with her grandmother, a handicapper. Once Heitz came to UK, she had virtually unlimited access to horse farms. Her first job on a farm was at UK's Maine Chance Farm, followed by Hagyard Equine Medical Institute, then Dixiana Farm, all in Lexington.

After graduation, Heitz entered the prestigious Godolphin Flying Start program, formally Darley Flying Start, where she traveled the world learning about various aspects of the Thoroughbred industry. After completing the two-year program, Heitz entered veterinary school at Auburn University, where she is on track to graduate in May 2018 and become an equine veterinarian.

Heitz is currently one of eight student residents at Auburn's teaching veterinary hospital. Those residents work the emergency shifts and assist with bloodwork, initial exams, communicating with the on-call veterinarian, completing paperwork, and speaking to the owner.

In July, Heitz returned to UK for two weeks to work with Laurie Lawrence, PhD, professor in UK's Department of Animal and Food Sciences, to learn more about equine nutrition. During those two weeks, she had the opportunity to visit with several trainers about their feeding practices, study the types of supplements available for horses, and attend the American Association of Equine Practitioners' Colic Symposium.

Asked what advice she had for current equine science and management students, Heitz said, "Take any opportunity you get, no matter how small. It, along with hard work, will pay off." **UK**



>Alexandra Harper, MBA, is the operations and communications coordinator at the UK Ag Equine Programs.



## Potomac Horse Fever

said signs owners should watch for include acute onset fever, depression, decreased appetite, mild colic-like signs, watery diarrhea, edema (fluid swelling), and, later in the course of disease, acute laminitis.

However, not all affected horses develop all these signs.

"The signs are so vague," Waldridge said. "The two you hear about most are fever and going off feed—those are usually the first things you see."

However, he said he's already had a case this year in which the horse never developed a fever. And in the past, he's had cases that have never had diarrhea.

"It definitely appears to be a strain-related disease," he said. "How lucky or unlucky you get and how sick the horse gets in the end depends on which strain ends up infecting the horse."

Should a horse contract PHF, treatment centers around intravenous oxytetracycline administration for several days.

"If given early in the clinical course of the disease, a response to treatment is usually seen within 12 hours," Smith said. "This is associated with a drop in rectal temperature, followed by an improvement in demeanor, appetite, and borborygmal (gut) sounds."

"In animals that exhibit signs of enterocolitis (inflammation of the small intestine and colon), fluids and non-steroidal anti-inflammatory drugs should be administered," she added. "Laminitis is more common than in other causes of enterocolitis and, if it develops, is usually severe and often refractory to treatment."

Waldridge also cautions that even if a horse's clinical

signs appear to resolve initially, the situation can still take a rapid downturn.

"The horse can be back to almost being normal," he said. "Within 24 hours, you might as well have been pouring distilled water in their left ear. You never know. That's just the thing with Potomac ... you just hope you've got a wimpy strain that you're going to get with a dose or two of oxytet."

"The bad ones, it's a six-lane highway to hell treating them. It just seems like no matter what you do you're not getting anywhere."

While PHF can, indeed, be challenging to prevent, owners can take steps to reduce horses' risk of consuming infected insects and snails.

"Try not to put pole lights over feed and water troughs," Waldridge recommended. "Put lights

somewhere you don't have stalls or feeding implements."

He also said that, although horses can be exposed to the causative agent in the absence of a natural water source, keeping horses away from ponds, streams, and other water bodies could help reduce their risk of inadvertently ingesting contaminated insects and snails.

Finally, "Keep water troughs and buckets free and clear of bugs," he said.

Chances are, Central Kentucky veterinarians will still see their share of PHF cases this year. But Waldridge said they'll face each one head-on and learn from the ones



Horses don't have to live near water to contract PHF. Barn lights can attract flies, which then get into horses' water buckets, feed troughs, and hay and subsequently into the horse.

that don't end with a healthy horse.

"It's my most-hated disease," he said. "Every year I swear I'm not going to let it get the best of me. There's always at least one horse a year that just tortures you—you've done everything right, and then it still gets you." **UK**

>Erica Larson is the news editor for *The Horse*.

## To Vaccinate or Not?

Walk into most barns, and you'll hear owners "wishing" for some ailments over others when their horses aren't healthy:

"Pray for an abscess!"

"I hope she's just a little dehydrated and not colicking badly."

"That leg's just a little stocked up from standing in the stall ... right?"

One thing you won't hear them hoping for is Potomac horse fever (PHF). In fact, many owners go to great lengths to protect their horses from contracting this potentially deadly disease. One option is vaccination with one of the inactivated whole-cell vaccines on the market.

"Although vaccination has been reported to protect 78% of experimentally infected ponies, it has been marginally protective in the field," said Jacqueline Smith, PhD, MSc, BSc, Dipl. AVES, University of Kentucky Veterinary Diagnostic Laboratory's (UKVDL) epidemiologist and founder of the UKVDL Disease Mapping Initiative. "Vaccine failure has been attributed to antigenic and genomic heterogeneity among the more than 14 different strains isolated from naturally occurring cases."

In other words, the different virus strains are all unique, and protection against one strain won't necessarily afford protection against another.

"Furthermore, vaccine failure may also be due to lack of antibody protection at the site of exposure, because the natural route of transmission has been determined to be oral ingestion of the agent," she added.

While some veterinarians recommend vaccinating, Bryan Waldridge, DVM, MS, Dipl. ABVP, ACVIM, of Park Equine Hospital at Woodford, in Versailles, Kentucky, said it's not one of his go-to products.

"I don't routinely recommend it," he said. "I've seen horses on farms where the owners vaccinate, and those horses still get sick."

Like Smith, he said it comes down the bacterial strain. If vaccinated horses are exposed to the specific strain in the vaccine, effective protection is more likely. If they're exposed to a different strain, it's less likely to afford protection against the disease, Waldridge said.

Still, some veterinarians recommend the vaccine for at-risk horses. Discuss your horse's risk level and whether vaccination is appropriate with your veterinarian.—*Erica Larson*

# Humans Might Be to Blame for Some Horse-Related Injuries

Recent study results suggest that equestrians can reduce the number of injuries—and, thus, doctor and emergency room visits and hospitalizations—through increased awareness and education about other peoples’ role in horse-related injuries.

“While we tend to be very aware of what our horse and other horses are doing, we tend to pay less attention to the riders and others around us, which can lead to unexpected accidents and more

serious injuries,” said lead researcher William Gombeski Jr., MPH, MBA, senior advisor at UK HealthCare.

In a 2007 study, researchers showed that horse-related injuries seem inevitable, even to the most safety-conscious equestrians. Out of 679 equestrians, 81% had experienced one riding injury while 21% had experienced a severe injury requiring surgery, hospitalization, or rehabilitation.

In their recent study, Gombeski and colleagues evaluated data collected through rider-submitted forms to SaddleUp SAFELY, an initiative from UK and 40 medical and equine organizations seeking to reduce the frequency and



Accidents involving poor handler judgement were considered 60% preventable by riders and experts.

severity of horse-related injuries. Of 266 cases of injured equestrians, 16% were caused by other people; of those, 63% were considered preventable by riding safety experts, and 51% were considered preventable by the injured party.

Because 44% of human-generated injuries led to hospitalization compared to 21% caused by other factors, the researchers theorized that human-generated accidents cause more serious medical problems than nonhuman-generated accidents. The team also found that advanced/professional riders were more at risk for human-caused accidents, possibly because they are more likely to provide lessons and supervise other riders with less experience.

The team grouped the injuries into five categories:

- Not using equipment correctly (considered 90% preventable by riders and safety experts);
- The handler using poor judgment (considered 60% preventable by riders and experts);
- Poor public understanding of horse behavior (considered 33% preventable by riders and 25% by experts);
- Misleading or no information shared (considered 75% preventable by riders and 100% by experts); and
- Poor riding behavior/etiquette (considered 50% preventable by riders and 25% by experts).

To combat injuries caused by others, Gombeski recommended farms host training sessions and regular discussions to review common situations that lead to injury and that participants develop solutions to these scenarios. UK

>Sarah Evers Conrad is an equestrian journalist and president of All In Stride Marketing, in Lexington, Kentucky.

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<sup>\*</sup>Currently, there are no vaccines available with USDA-licensed label claims against equine abortions, uveitis or acute renal failure due to *L. pomona*.

<sup>1</sup> Data on file, Study Report No. B850R-US-12-011, Zoetis LLC.

<sup>2</sup> Data on file, Study Report No. B951R-US-13-043, Zoetis LLC.

<sup>3</sup> Data on file, Study Report No. B951R-US-13-046, Zoetis LLC.

<sup>4</sup> Data on file, Study Report No. B951R-US-15-092, Zoetis LLC.



## Allen Page

interest to many in the equine industry. Page and colleagues are studying the duration of immunity and how long horses' immune cells respond appropriately following EHV-1 challenge.

Page has a bachelor's degree in animal science and veterinary degree from University of California, Davis. He completed a yearlong internship with Hagyard Equine Medical Institute, in Lexington, Kentucky, after he graduated from veterinary school. He then came to UK and completed his doctoral degree and

postdoctoral studies where his efforts primarily involved work with *Lawsonia intracellularis*, a bacterial disease of weanling and yearling horses. **UK**

>Katie Lampert is a marketing and communications intern at the UK Gluck Equine Research Center.

## A Visit to Maine Chance Farm With UK's Parasitology Team: An Experience to Remember

*Maddie Regis, a marketing senior and communications and alumni relations student intern with UK Ag Equine Programs, spent a morning with the parasite research horse herds and the scientists that study them. Here, she shares her experience.*

Every Wednesday morning, Martin Nielsen, DVM, PhD, Dipl. ACVM, Dipl. EVPC, professor in the parasitology laboratory at the UK Gluck Center, and his group of graduate students venture to the university's Maine Chance Farm to collect samples from their research horse herd. I was lucky enough to have the opportunity to go with them.

The group met at the Gluck Center promptly at 7 a.m. and then headed out to Maine Chance Farm. Their job was not the most glamorous in the world—they go to the farm to collect fecal samples from a herd of full-size horses as well as a herd of Miniature Horses. However, the fecal samples and the research they're involved in are important for horses around the world.

Nielsen said these herds are unique: The full-size horse herd has not been dewormed since 1979, and the Miniature Horse herd has existed since 1974. Both herds were established by Gene Lyons, PhD, professor in the Gluck Center, along with his research companion and former chair of the Veterinary Science department Hal Drudge, PhD.

"These herds represent a remarkable resource for our research program, and they were a main reason why I chose to move from Denmark to Kentucky and start working at UK," Nielsen said. "What an incredible foresight demonstrated by these esteemed gentlemen four decades ago. Dr. Lyons remains a very active part of this research today."

Indeed, Lyons was the first person to arrive at the farm on the day of my visit, and he works tirelessly in and out of the lab to care for the horses and produce research results.

Both herds are influential in parasitology research for a variety of reasons.

"The horses have substantial parasite burdens, but they are remarkably healthy, so that is interesting," Nielsen said. "Perhaps we don't need to deworm as much as we tend to do. In recent years, we have used this herd to develop and validate new diagnostic methods for important parasites. We collect samples from these horses and use these to tweak, optimize,



Above: Dr. Gene Lyons remains active in parasitology research.

Below Left: Dr. Martin Nielsen says he enjoys spending time with his research horses.

Below Right: The Miniature Horse herd harbors multidrug-resistant parasites, allowing researchers to study different treatments' effects.



and validate our diagnostic tests. We also collect the parasites and study their DNA and genes to learn more about how drug resistance may develop."

While the horse herd provides plenty of information for the future of parasitology, the Miniature herd helps address a common problem, Nielsen said.

"The Miniature herd has been treated with regular paste dewormers following typical treatment programs over the decades," he explained. "As a result, these Minis have multidrug-resistant parasites, just like we find on many horse farms across the world. With this herd, we are testing various treatment protocols to identify the best and most sustainable deworming strategy in face of all the drug resistance. Right now, we are evaluating different combinations of existing products to see if some of these may be useful in the short- and long-term."

## Maine Chance Farm

Nielsen and his group begin by sampling the full-size horse herd, which involves moving the horses from their large field into smaller paddocks and then bringing them into the barn to be sampled. Many of the herd members are foals, and it was quite a sight to see the researchers trying to get all the mothers and babies organized when they decided they wanted to play. On the day of my visit, a foal had been born earlier that morning, which was an extra special treat. When I got to interact with these horses, it was easy to see why Nielsen and his team consider going to the farm the highlight of their week.

"I am a horse enthusiast, so for me it is just such a special treat to get out of the office and labs and get to hang out with 'my' horses," he said. "We enjoy

hanging out with them and getting to know their personalities. When I started working here, a lot of the older mares had not been handled much and they were quite nervous about everything. Now, they have all turned into sweethearts and have become very comfortable with our procedures."

Foals, of course, are very popular, especially with Nielsen's students.

"We spend a lot of time with the foals to get them used to wearing a halter and to be brought in and out of the barn," he said. "This exercise is very popular with my students, and I see lots of selfies being taken while doing this."

When all the samples had been collected, the researchers turned the horses back out (some of the horses showed their enthusiasm during this part!) and then it was on to the Miniature herd. Nielsen describes this herd accurately when he says they have a lot of personality. For such tiny horses, they have a

lot of opinions!

I helped herd them over to the sampling shed and, at first, they just stood there, deciding they did not want to move. Finally, however, they took off as fast as their little legs could carry them. Getting to watch a large herd of Miniature Horses gallop across a field is pretty unique and very entertaining. The Minis were very good for their sampling, although they were very happy when they got to gallop back to their field again.

After the Miniature herd returned to their field, it was time to pack up and head back into town until the next time the group comes out to visit the herd and collect samples.

Spending a morning at Maine Chance Farm watching Nielsen and his team was a wonderful experience. It is clear they all care about the horses very much and are passionate about the research they're doing. **UK**

## UK Horse Pasture Evaluation Program Benefits Students, Farms

An equestrian for the past 15 years, UK junior Anna Intartaglio loves everything about horses. It's no surprise she jumped at the chance to spend her summer conducting research that's meaningful to the industry. As an intern in the UK Horse Pasture Evaluation Program, she has gained a deeper understanding of the industry she loves so much.

"This summer internship has been really fascinating," said Intartaglio, a Greentown, Pennsylvania, native. "I've been learning so much about pastures, horse nutrition, pasture management, and farm management."

She is just one of a few select students chosen for the competitive summer internship program in the UK College of Agriculture, Food and Environment. With guidance from Ray Smith, PhD, UK



KATIE PRATT, UK AGRICULTURAL COMMUNICATIONS

Anna Intartaglio, left, and Kelly Hagan conduct a pasture evaluation on a Central Kentucky horse farm.

forage extension specialist, and Krista Lea, MS, program coordinator, the interns work with farm owners and managers to provide in-depth pasture analysis with the ultimate goal of keeping horses safe and healthy and increasing farms' efficiency and productivity.

Interns can apply to the program from any U.S. college or university. In addition to conducting research for area farms, many students use it as an opportunity to do independent research projects.

Kelly Hagan, a Nicholasville, Kentucky, native and senior at Asbury University, in Wilmore, Kentucky, is one of those students. A biology major, she is studying alfalfa growth for her senior research project.

"Being able to go out and do the work and then come back and put the data in and see the differences gets me really excited," she said. "We're doing work, and changes are happening. It's fun to see the results."

The program is an opportunity to educate not only

the interns but also members of the horse industry on the importance of pastures. Knowledge of pasture forages is important as some species, like endophyte-infected tall fescue, could negatively impact broodmare and foal health.

"A well-managed pasture provides a lot of the feed and nutrition for the horse," Smith said. "Having the ground covered in grass rather than bare places and dirt allows for good footing and safety."

Smith and Lea train the interns in forage and weed identification. Then, the students spend the summer going to farms and analyzing the forage species and weeds in pastures. Once the analysis is complete, they and Lea present the results, along with short-term and long-term pasture management recommendations, to farm owners, managers, and staff. Since the program began in 2005, more than 200 farms and more than 30 student interns have participated.

"Several of the interns



## Horse Pasture Evaluation

have actually fallen in love with forage production and have gone on to do graduate school with us," said Lea, who also started in the program as a summer intern before advancing to her current position. "They have chosen to do forage research long-term. We have several that have actually changed courses because of this program. The other ones that don't, even if they continue on to whatever they want to do, they still have a much better appreciation for the ag community." **UK**

>Katie Pratt is an agricultural communications specialist at UK.

## UK Gluck Center to Host Fifth USDA-NIFA Symposium on Equine Arteritis Virus Research Outcomes

The Gluck Equine Research Center will host the fifth and final year of a USDA-NIFA-AFRI (National Institute of Food and Agriculture-Agriculture and Food Research Initiative) grant awarded in 2012 titled, "Identification of genetic factors responsible for establishment of equine arteritis virus carrier state in stallions," on Nov. 10 at the Griffin Gate Marriott, in Lexington, Kentucky.

Udeni Balasuriya, PhD, MS, BVSc, Schlaikjer Professor of Equine Infectious Disease at the Gluck Center, received the grant. Equine viral arteritis (EVA) outbreaks result in significant economic losses to the equine industry due to high rates of foal loss in pregnant mares, death in young foals, and carrier state establishment in stallions. The virus is maintained in the equine population between breeding seasons by persisting in carrier stallions.

This year's symposium will focus on the outcomes of the various research studies undertaken as part of the grant. Several internationally recognized scientists who have contributed to research in infectious diseases, immunology, host response to infectious agents and vaccines, and global spread

## Stay Socially Connected to UK Ag Equine Programs

The UK College of Agriculture, Food and Environment has several equine-related social media pages featuring the latest news and event information.

Follow us on Twitter:

**UK Ag Equine Programs:** @UKAgEquine

**UK Maxwell H. Gluck Equine Research Center:** @UKGluckCenter

**NEW!! UK Veterinary Diagnostic Laboratory:** @UKVDL



Prefer Facebook? Like these pages we administer:

**UK Ag Equine Programs** An overarching framework for all things equine at UK, including the undergraduate degree program, equine-related student organizations, equine research, and outreach activities.

**UK Equine Alumni** A community established for the alumni of UK's equine programs, including ESMA, graduate students, and club and team members.

**UK Maxwell H. Gluck Equine Research Center** The Gluck Center's mission is scientific discovery, education, and dissemination of knowledge for the benefit of the health and well-being of horses.

**NEW!! UK Veterinary Diagnostic Laboratory** The UKVDL's mission is to develop and apply state-of-the-art diagnostic methodology to improve animal health and marketability, to protect the public health, and to assist in the preservation of the human-animal bond through the principles of One Health.

**UK Horse Pasture Evaluation Program** A service program offered to Kentucky horse farms with the goal of overall improved pasture management.

**Saddle Up SAFELY** A rider safety awareness program sponsored by UK HealthCare; the UK College of Agriculture, Food and Environment; and community organizations. It aims to make a great sport safer through education about safe riding and horse handling practices. **UK**

of arthropod-borne diseases of horses and other livestock will speak at the symposium.

This symposium is for equine veterinarians, farm managers, extension staff, equine scientists, equine industry leaders, horse owners, scientists from other departments on campus, faculty, post-doctoral scholars, and graduate students.

Seven-and-a-half hours of continuing education (CE) is pending approval by the Kentucky Board of Veterinary

Examiners for veterinarians and veterinary technicians; CE sheets must be signed at the meeting to receive credit.

Register for the symposium at [2017eavsymposium.eventbrite.com](http://2017eavsymposium.eventbrite.com). Individuals with questions can contact Jenny Evans at [jenny.evans@uky.edu](mailto:jenny.evans@uky.edu) or 859/218-1089. **UK**

>Jenny Evans, MFA, is the senior veterinary science marketing and promotion specialist at the UK Gluck Equine Research Center.

## Partnership With UK Provides Opportunities for LMU Veterinary Students

The UK Department of Veterinary Science cooperative agreement with LMU's College of Veterinary Medicine (CVM) is providing research experiences for LMU veterinary students.

This partnership resulted from the American Veterinary Medical Association Council on Education requirement that veterinary students be provided with the opportunity to participate in research programs. While LMU was able to provide state-of-the-art teaching facilities and classrooms, LMU CVM founding dean Glen Hoffsis, DVM, MS, Dipl. ACVIM, felt students would benefit from hands-on experience in the established research laboratories at UK's Gluck Equine Research Center. These laboratories, along with scientific experts and a research farm of about 300

## UK, LMU Partnership

horses, provide a unique opportunity for both LMU faculty and veterinary students to engage in equine research. The location also played a key role, as LMU is located in Harrogate, Tennessee, approximately 130 miles south of UK.

“Since Kentucky does not have a veterinary school, this cooperative agreement also brings aspiring veterinarians to our area and introduces them to the local equine industry,” said David Horohov, PhD, chair of the department of veterinary science and director of the Gluck Center.

LMU welcomed its first class of veterinary students in 2014 and, the following summer, the first group of three veterinary students began their student research experience in laboratories at the Gluck Center. A second group of 11 students arrived in Lexington for their research experience the following year. This summer, another eight students spent several weeks collaborating with faculty, staff, and postdoctoral and graduate students at UK on a variety of research projects. There was a barbecue hosted at the Gluck Center to welcome the students, and the summer concluded with an LMU student research presentations seminar at the



COURTESY UNIVERSITY OF KENTUCKY

Eight LMU students studied with UK researchers this summer.

### UKVDL.

Hoffsis stepped down in May 2016, and his replacement Jason Johnson, DVM, Dipl. ACT, continues to build the program. Johnson and Horohov also continue to look for opportunities to not only enhance the experience for the veterinary students but also to

encourage collaboration among the faculty at LMU and UK. Several collaborative projects are already in the works with many more to come. [UK](#)

>Jenny Evans, MFA, is the senior veterinary science marketing and promotion specialist at the UK Gluck Equine Research Center.

## LMU Students Share Collaborative Research Project Updates

Eight LMU veterinary students spent their summer collaborating with researchers in the UK Department of Veterinary Science in Lexington. Each student focused on a specific project and then reported on their project during an LMU Student Research Presentations day at the end of July at the UKVDL.

**ANA WEILAND** completed her summer project, “Non-invasive Method for Sexing Equine Embryo During Embryo Transfer,” with Alejandro Esteller-Vico, PhD, assistant professor, in the

Gluck Center’s reproductive health lab.

Embryo transfer involves flushing an embryo from one, often valuable, mare and transferring it to a recipient mare’s uterus. This procedure is becoming common in most breeds except for Thoroughbreds (The Jockey Club still prohibits any type of assisted reproductive techniques in Thoroughbred breeding). It has been helping increase the number of foals from



PHOTOS COURTESY UK

Ana Weiland

mares that are in competition or having reproduction problems. Weiland’s project examined whether embryos obtain any genetic material before being transferred into the recipient mare.

She said current methods of finding gender determination, such as an ultrasound, are not ideal because they’re not useful until too far along in the pregnancy. Current preimplantation genetic diagnoses use a micromanipulator to biopsy the trophectoderm (outer layer of the embryo), but her team recently began using the micromanipulator to sample the blastocoel fluid (which contains the embryo’s DNA), which is not yet an established method

but is expected to help the team determine how much genetic material (DNA/RNA) is present in free fluid within the embryo.

She said, however, this method is impractical and expensive, which is why the laboratory is looking into other noninvasive methods for obtaining this genetic material. Researchers conducting studies in humans and mice noticed DNA and RNA leaking into the culture media during *in vitro* embryo culture. The researchers then used the DNA and RNA for PGD (preimplantation genetic diagnosis) and sexing. Weiland and colleagues would like to mimic this procedure in equine embryos, which are much



## LMU Students

larger than mice or human embryos.

Potential PGD uses include avoiding detrimental diseases such as HYPP (hyperkalemic periodic paralysis disease). Weiland said the study could help breeders select foal traits such as sex, size, color, and gait.

“My favorite part of the summer was discovering the many ways to collect the embryo depending on the size embryo, as it changes drastically with rapid growth, doubling in size almost every two days with each week,” she said.

**BRITTANY JONES** completed her summer project, “Combination Equine Deworming vs. Multi-drug Resistant Parasites,” with Martin Nielsen, DVM, PhD, Dipl. ACVM, associate professor, Schlaikjer professor of equine infectious disease, in the Gluck Center’s parasitology laboratory.

She used a herd of Miniature Horses from UK’s Maine Chance Farm that has been maintained since 1974 and harbors multidrug-resistant parasites. The Nielsen laboratory collected fecal samples from the herd every two weeks. They used those fecal samples to look at combination deworming treatments and parasite resistance. The study established baseline efficacies of the dewormers being evaluated, and Jones’ role was to establish the efficacy of the first combination treatment of these. Her preliminary results indicated no differences between the tested deworming regimens.

Jones said this study is important because there are not many dewormers on the market and equine parasites are becoming more resistant to the ones available. There

are also no new products coming on the market, so researchers must find a way to use the current drugs without promoting further resistance.

In addition to doing her research project, Jones helped with various other projects and assisted Ashley Steuer, graduate research assistant, with diagnostic samples from dogs, cats, bears, and others received at the UK Veterinary Diagnostic Laboratory.

Jones also attended the AAVP (American Association of Veterinary Parasitologists) conference, which took place July 22-25 in Indianapolis, Indiana. While there, she had the opportunity to visit the Indianapolis Zoo, tour its veterinarian hospital, and talk to the zoo veterinarians about parasite problems.

**KAITLIN WALTON** completed her summer project, “Effects of Endocrine Disease on Cytokine Production in Geriatric Horses,” with Amanda Adams, PhD, assistant professor, in the Gluck Center’s immunology laboratory. Her work focused on PPID (pituitary pars intermedia dysfunction), or equine Cushing’s disease.

“PPID affects 20% to 30% of all horses as they age, and more than 85% of these horses are 15 years old or older,” she said.

This disease is caused by a decrease in dopaminergic inhibition, which increases the activity of the pars intermedia and leads to increased adrenocorticotropic hormone (ACTH) levels. Because of ACTH’s effects, PPID horses are



Brittany Jones

commonly thought to have decreased immune function. Older horses are being used more for competition and breeding purposes, which makes it essential for researchers to better understand how older horses’ immune systems function.

“I have been able to see a lot of things, such as blood collection for basal ACTH and TRH (thyrotropin-releasing hormone) stimulation testing, and have also been able to help with other projects, including oral sugar tests at the farm and PBMC (peripheral blood mononuclear cell) isolation and ELISAs in the lab,” Walton said.

**NIKOLETTE BIRKY** completed her summer project, “The Effect of Donor Age on the Osteogenic Potential of Equine Bone Marrow Stem Cells,” with James MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair, in the Gluck Center’s musculoskeletal science laboratory. She also worked with Jasmin Bagge, graduate research assistant, in MacLeod’s laboratory.

Birky compared bone marrow stem cells in foals, yearlings, seniors, and geriatric horses, focusing on optimizing an assay related to bone matrix synthesis. Bone marrow stem cells are multipotent, meaning they can create several cell types. The cells for her project were harvested from donor horses’ sternums.

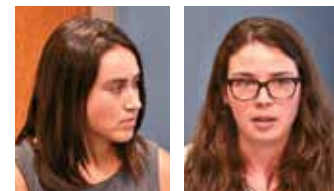
The clinical significance of this study is that stem cells used to treat joint disease and other equine health conditions can potentially be collected from the patient itself. However, the importance of age as a variable is not well understood. Collecting stem cells from the patient might work well in a young horse, but could have lower success in an

adult horse, and might not be a viable option in an older animal. There is much to learn, and Birky’s research focused on stem cell performance as a function of donor age.

“I have learned several new skills that I can take back with me to veterinary school, such as cell culture, sterile technique, and how to discuss a subject without getting stuck on the heavy medical terminology,” Birky said.

## SOFIA SANTACATERINA AND NATASHA MARZOLF

completed their summer project, “Effect of Stabling on Surfactant and Plasma Lipidomic Profiles in Yearling Horses,” with David Horohov, PhD, chair of the Department of Veterinary Science, director of the Gluck Equine Research Center, and professor; and Undine Christmann, DVM, MSc, PhD, Dipl. ACVIM, associate professor of veterinary medicine at LMU, in the immunology laboratory.



Sofia Santacaterina and Natasha Marzolf

Inflammatory airway disease, or mild equine asthma, is thought to be underdiagnosed in horses because clinical signs present themselves after the disease has already begun its course. Clinical signs include coughing and overall decrease in performance. Dust and allergens associated with barn environment often promote the disease process. Santacaterina and Marzolf

## LMU Students

compared the effects of barn environment or pasture environment on surfactant and plasma lipidomic profiles in young horses.

In previous studies researchers found a decrease in phospholipid content of surfactant in horses with asthma and an increased level of cyclic phosphatidic acid in asthmatic horses with clinical signs.

"I didn't have a lot of lab experience coming into this so it was great to work in a lab and see those kind of procedures," Santacaterina said.

Marzolf echoed that statement, adding, "I didn't have a whole lot of horse experience, other than what we were taught in veterinary school, so I really enjoyed being able to work with the horses."

**STACI PALMER** completed her summer project, "The Effect of Regumate (altrenogest) on the Immune Function of the Open Mare," with Barry Ball, DVM, PhD, Dipl. ACT, Albert G. Clay endowed chair in equine reproduction, professor, in the reproductive health laboratory, and Adams in the immunology laboratory. Carleigh Fedorka, PhD, a postdoctoral scholar, served as her mentor.

Researchers have studied the effects of progestins on immune responses in humans and in mice. Palmer's study primarily focused on inflammatory mediators called cytokines. Studies on humans and mice revealed that when females receive progestins, pro-inflammatory cytokines decrease.



Staci Palmer

Palmer said Regumate is the most common progestin given to horses. It is used in pregnant mares to increase cervical tone and decrease myometrial contractility and in the nonpregnant mare to synchronize or suppress estrous cycles.

**TATIANA FRAGUELA** completed her summer project, "Magnetic Resonance Imaging of the Suspensory Apparatus in Thoroughbred Racehorses," with Jennifer Janes, DVM, PhD, Dipl. ACVP, assistant professor and anatomic veterinary pathologist, and Laura Kennedy, DVM, Dipl. ACVP, assistant professor and anatomic veterinary pathologist, at the UKVDL.



Tatiana Fraguela

Fraguella said catastrophic musculoskeletal injuries are the leading cause of equine deaths at racetracks. Suspensory apparatus failure is the most common catastrophic injury occurring in North America. The paired proximal sesamoid bones, suspensory ligament, intersesmoidean ligament, and the distal sesamoid ligaments are components of the suspensory apparatus. This apparatus functions as an energy-storing device to prevent excessive fetlock hyperextension.

Previous work has shown pre-existing bone and cartilage lesions at the sites of catastrophic injury, which supports the theory that these injuries are the result of cumulative stress and fatigue rather than a single "bad step." Like stress fractures, catastrophic injuries can occur unilaterally, but the underlying disease is typically bilateral. Therefore, it is informative to examine both forelimbs when

performing the post-mortem examination. Fraguela spent her time comparing post-mortem MRI studies between racehorses euthanized due to suspensory apparatus failure and those euthanized for unrelated reasons. She evaluated a variety of bone and soft tissue parameters, which are currently being analyzed to identify possible

regions of interest.

"The prospect of studying these type injuries and hopefully helping to prevent these kinds of injuries are exactly why I got into veterinary medicine," Fraguela said. **UK**

>Katie Lampert is a marketing and communications intern at the UK Gluck Equine Research Center.

## Download These **FREE** Special Reports Today

**Catastrophic Injuries ■ Equine Herpesvirus**

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YOUR GUIDE TO EQUINE HEALTH CARE

## Upcoming Events

### Aug. 31, 4-5 p.m.

UK Department of Veterinary Science Equine Diagnostic Research Seminar Series

Topic: Stem Cell Applications in Equine Medicine: Where are we and what are some of the things we need to think about to get to where we want to go?

Speakers: Jamie MacLeod, VMD, PhD, UK Gluck Equine Research Center, and Peter Morrese, BVSc, MVM, MACVSc, Dipl. ACT, ACVIM, CVA, Rood & Riddle Equine Hospital

Location: UKVDL

### Sept. 28, 1-6 p.m.

UK Department of Veterinary Science Equine Diagnostic Research Seminar Series

100th Equine Diagnostic Seminar Series Celebration Mini-Symposium Topics and speakers:

- Immunosenescence and How it Affects the Care of the Old Horse, Amanda Adams, PhD, UK Gluck Equine Research Center;
- Constructing a Wellness Program for the Aging Performance Horse, Marian Little, DVM, Luitpold Pharmaceuticals;
- Endocrine Diseases of the Older Horse and How to Diagnose Them, Lisa Tadros, DVM, PhD, Dipl. ACVIM, Michigan State University;
- Dental Care of the Geriatric Horse, Jack Easley, DVM, MS, ABVP, Dipl. AVDC (Eq), Easley Equine Dentistry;
- Feeding the Old Grey Mare, Sarah Ralston, VMD, PhD, Dipl. ACVN, Rutgers, The State University of New Jersey;
- Feeding the Older Horse with PPID and/or Insulin Resistance, Kristine Urschel, PhD, University of Kentucky; and
- Podiatry Care of Older Horses, Scott Fleming, DVM, CF, Rood & Riddle Equine Hospital

Location: UKVDL

Free, but registration is required at [100thseminarseries.eventbrite.com](http://100thseminarseries.eventbrite.com)