The University of Kentucky College of Agriculture, Food and Environment has named David Horohov chair of the Department of Veterinary Science and director of the Gluck Equine Research Center. His appointment will begin Sept. 23.

“We are extremely happy that David has joined the administrative team on a permanent basis. We are fortunate to have someone of his distinguished research reputation at the helm of this important department. Even more important, David’s dedication to supporting Kentucky’s signature industry promises a focus on relevant research with high impact,” said Nancy Cox, dean of the College of Agriculture, Food and Environment.

Horohov has served as the interim chair of the Department of Veterinary Science and the interim director of the Gluck Equine Research Center since September 2014. A professor and J. E. and Clementine M. Schlaikjer Endowed Chair, Horohov specializes in equine immunology research. He joined the Gluck Center in 2003. Previously, he was a professor of veterinary immunology within the Department of Pathobiological Sciences at Louisiana State University’s School of Veterinary Medicine.

Horohov earned his bachelor’s degree in entomology from Penn State University, his master’s in insect pathology from Purdue University and his doctorate in immunology from the University of Tennessee, Knoxville. He completed a post-doctorate in cytokine biology with the Food and Drug Administration.

“I am humbled and excited by this opportunity I have been given to be the chair of the Department of Veterinary Science and the director of the Gluck Equine Research Center. I truly believe that this program offers exceptional opportunities, and I hope to continue our successes and accomplishments during my tenure as chair. I greatly appreciate the support I have received from Dean Nancy Cox, the faculty and our stakeholders. I very much look forward to working with all of them, as we move this program forward,” Horohov said.

He will oversee the department’s three entities—the Animal Genetics Testing and Research Laboratory, the Gluck Equine Research Center and the Veterinary Diagnostic Laboratory.

The mission of the Department of Veterinary Science is to assure the health and viability of animal agriculture through teaching, discovery, research and service.

The mission of the Gluck Center, a UK Ag Equine program in the College of Agriculture, Food and Environment, is scientific discovery, education and dissemination of knowledge for the benefit of the health and well-being of horses. The Gluck Center faculty conducts equine research in six targeted areas: genetics and genomics, infectious diseases and immunology, musculoskeletal science, parasitology, pharmacology/toxicology and reproductive health.

For more information on the Department of Veterinary Science, visit http://www.ca.uky.edu/gluck.

--Jenny Evans
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The UK Gluck Equine Research & Service Report is produced by UKGERF and the Department of Veterinary Science. It is published twice a year on behalf of all equine researchers and veterinarians and others in the horse industry who are committed to the continued improvements in equine research and technology.

Research material is meant to be shared. However, materials are copyrighted and require reprint permission from UKGERF.
Kathryn Graves, PhD, associate professor and director of the Animal Genetic Testing and Research Laboratory at the University of Kentucky, gave a talk about genetic testing at the 6th Annual Kentucky Breeders’ Short Course in Lexington, Ky. Genetic testing is defined as any test that detects differences at the DNA level. This includes parentage, heritable disease, and trait testing.

DNA is made up of four nucleotides, or basic structural units, which are labeled A, C, G, and T. Microsatellites are short segments of DNA that are made of short, repetitive sequences of nucleotides, for example: CACACACA. Microsatellites are a marker that can be used to look at parentage because each one has a number of possible variants (alleles) based on the number of repeats. The Animal Genetic Testing and Research Laboratory uses 17 microsatellites to generate DNA profiles for individual horses as well as to confirm parentage.

Microsatellites can also be used to find the location of mutations by comparing the alleles of microsatellites present in affected versus normal horses for a disease mutation or color variation. The closer a marker is to the gene, the greater the linkage (association). The gene map can then be used to look for genes near markers and to sequence the gene. Single Nucleotide Polymorphisms (SNPs) is another type of marker that can be utilized. SNPs are a single base change in the DNA sequence that can have profound effects on phenotype (all of an organism’s observable characteristics). Many SNPs are responsible for coat color variants but can also be associated with other traits such as fertility, body type, muscle function, dwarfism, and more.

During her presentation, Graves spent a substantial amount of time discussing coat color genetics in particular. She broke down the genes and characteristics of various coat colors, as well as the homozygotes (an organism with identical pairs of genes - or alleles -for a specific trait) of mutations. She also discussed cloning, and the reasons for its use. She suggested the primary reasons to clone are related to breeding. Cloning can be used to recover a valuable breeding animal, create a breeding animal from a gelding or infertile mare, recreate a successful performance animal, or to recreate an animal because of emotional attachment.

Graves concluded by saying that genetic testing is still in the early stages. She said that moving forward, it is important not to try and eliminate genetic disease genes too quickly in horses. There is the danger of eliminating good traits accidentally by immediately removing all carriers of an undesirable trait. Tests for complicated traits such as performance and complex diseases such as laminitis or developmental disorders are in the future. However, the current tests available are useful tools to avoid producing horses with heritable disease and should be utilized by every breeder if that disease is present in their breed. The color gene tests can be used to produce horses with coat color that makes them more marketable or to avoid problems caused by some of the coat color mutations that are deleterious when homozygous. The bottom line is that breeders need to take advantage of the genetic tools available to increase their chances for the best possible outcomes.

McCue, Squires Publish Equine Embryo Transfer Manual

Patrick McCue, DVM, PhD, Dipl. ACT, a professor at Colorado State University, and Edward Squires, MS, PhD, Dipl. ACT (Hon.), a professor at the University of Kentucky Gluck Equine Research Center, recently teamed up to publish a manual titled Equine Embryo Transfer.

Targeted toward veterinary practitioners and students, the manual is based on a combination of basic science, applied research, and clinical experience gained from the commercial equine embryo transfer program at CSU and other programs around the world.

In the preface, McCue and Squires write, “It is our hope that experienced practitioners will find useful tips in this manual to enhance embryo collection success or post-transfer pregnancy rates. New graduates and current students may utilize the manual to gain a basic understanding of reproductive principles as well as clinical techniques.”

Chapter topics include everything from a brief history to future directions of equine embryo transfer. The manual contains all the information needed to set up and succeed in an equine embryo transfer program. The format and size of the manual allows the technician or veterinarian to have it available in the clinic or laboratory as a readily available reference guide.

The 172-page manual was published by Teton NewMedia and can be purchased on Amazon.
Graduate Student Spotlight: Carleigh Fedorka

From: Meadville, PA
Degrees and institutes where received: B.S. in Biology from St. Lawrence University in Canton, NY

Carleigh Fedorka came to Lexington, Ky., after graduating from college in New York to start a career in the Thoroughbred breeding industry. During the 2011 nocardioform placentitis outbreak, a form of bacterial placentitis affecting late gestation mares that can cause abortions and abnormal placentas, Fedorka was managing Hinkle Farms in Paris, Ky. Karen Wolfsdorf, DVM, DACT, and veterinarian for Hinkle Farms, asked if the farm would be willing to participate in a study through the University of Kentucky Veterinary Diagnostic Laboratory (UKVDL).

The study piqued Fedorka’s interest in the physiology, pathology, and disease processes that were occurring. Wolfsdorf and Erol Erdal, MS, PhD, DVM, associate professor at the UKVDL, suggested that she speak with the reproduction lab at the UK Gluck Equine Research Center. After meeting with Mats Troedsson, DVM, PhD, DACT, DECAR, professor and past chair of the department of veterinary science at UK, Fedorka decided to pursue a master’s degree in equine reproduction, which eventually became a doctoral degree.

“Although placentitis brought me to the Gluck Center, I have actually been studying the seminal plasma protein CRISP-3 and its possible effect on modulation of the inflammation that we see after breeding,” Fedorka said.

There had been previous research conducted by students in Troedsson’s lab on the effect of seminal plasma, specifically CRISP-3, on inflammation. It was hypothesized that CRISP-3 protects viable spermatozoa from phagocytosis (a living cell that ingests other cells/particles) and post-breeding digestion by neutrophils (white blood cells) which are both immune system responses.

“With this in mind, we are studying the effect that this protein may have on the expression of cytokines in the endometrium of the mare post-breeding, studying both normal mares as well as mares that are found to be susceptible to post-breeding induced endometritis (PBIE),” Fedorka said. “By studying cytokine expression, we can get a picture of whether or not it is involved in numerous signaling pathways of the innate immune system, and further understand its role in the breeding process.”

According to Fedorka, the impact this research could have depends on the outcomes of the studies. Potentially, it could be utilized to modulate post-breeding inflammation and may also assist with uterine clearance.

Fedorka has worked on and led other research projects besides her own in her time at the Gluck Center, including a 2014 field study on placentitis that required taking blood samples from 750 Thoroughbred mares in central Kentucky and looking for biomarkers that predict placentitis. She also worked with another graduate student to look at the potential of Acyline for chemical castration. In addition, she has worked on numerous other research projects within the reproduction lab.

Fedorka describes herself as a “farm manager with a scientific brain.” When she joined the Gluck Center, she wanted to understand the biology and chemistry behind what happens daily in an equine operation.

“During my time at UK, I have been able to answer so many of those questions, as well as further my knowledge of the reproductive system even farther than I could have imagined.” --Carleigh Fedorka

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Potomac Horse Fever Cases and Testing

The University of Kentucky Veterinary Diagnostic Laboratory has seen a recent trend in positive results for Potomac Horse Fever (PHF), which is caused by Neorickettsia risticii. Results are detected using a real-time PCR assay test.

Neorickettsia risticii causes fever, anorexia, leukopenia (reduced white blood cell numbers), and occasional diarrhea in horses and can be fatal in up to 30% of cases. Neorickettsia risticii can also sometimes result in abortion in pregnant mares. PHF has been diagnosed across North America and is usually seen in horses one year old and older.

Exposure is through accidental ingestion of the metacercarial (encysted) stage of a trematode (parasite) within its insect host (such as mayflies). Veterinarians believe horses are infected through inadvertently ingesting insects that land in drinking water. Risk factors include association with rivers, streams, and other aquatic habitats and grazing pastures next to waterways.

The veterinary diagnostic laboratory can help diagnose PHF. A complete blood count might reveal a transient leukopenia in the early stages. A single positive indirect fluorescent antibody (IFA) test for PHF indicates exposure to the agent. Paired samples collected two weeks apart with a fourfold rise in titer is evidence of an active infection. On live animals, a PHF PCR assay should be performed on EDTA blood (i.e., blood collected in a tube containing a chelating agent and anticoagulant) as well as a fecal sample, as the presence of the organism in blood and feces might not temporally coincide.

Specimen
To confirm suspect cases, the UKVDL recommends providing 10 mL of anticoagulated blood in EDTA tubes (purple top) and either feces (at least 5 grams) or a fecal swab for each animal tested using real-time PCR analysis. Please use an appropriate specimen container—feces in gloves can no longer be accepted. Screw-cap tubes are preferred.

Fee and schedule
The fee is $35 in-state and $52.50 out-of-state total for both samples. Turnaround is one to two working days. The test is run Mondays through Fridays.

Please call 859/257-8283 for further information.

--Jenny Evans

UK Gluck Center to Host Immunology Symposium in November

The University of Kentucky Gluck Equine Research Center will host a one-day symposium titled the “Role of Immunology in Equine Health” on Saturday, Nov. 21 from 8 a.m. – 5 p.m. at the Embassy Suites in Lexington, Ky.

This symposium will focus on the role of the immune system in equine diseases caused by viruses, bacteria, and parasites. Scientific experts will specifically present information on the immune response to equine arteritis virus, respiratory disorders, parasitism, skin diseases, and the immune changes in the foal.

Factors affecting the immune response to vaccines will also be presented.

The symposium is targeted toward veterinarians, regulatory officials, farm managers, and breed registry representatives.

The symposium is partially funded by a USDA-NIFA-AFRI (United States Department of Agriculture - National Institute of Food and Agriculture - Agriculture and Food Research Initiative) grant titled “Identification of genetic factors responsible for establishment of equine arteritis virus carrier state in stallions.” However, registration is required and the event costs $25. To register, visit http://immunologysymposium.eventbrite.com.

Eight hours of Continuing Education 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.

--Jenny Evans

See the complete Immunology Symposium schedule on page 6.
Cervical stenotic myelopathy (CSM), a neurologic disease commonly known as wobbler syndrome, was first reported anecdotally back in the mid-1800s. Skeletal malformations of the neck vertebrae in affected animals lead to narrowing of the cervical spinal canal and subsequent spinal cord compression. Clinical signs primarily include neurologic deficits, with the hind limbs typically more severely affected than the forelimbs. In severe cases, veterinarians might recommend euthanasia for humane reasons and to guard horse and human safety.

Equine CSM is a multifactorial disease, meaning it has many causes. High planes of nutrition (overfeeding), increased growth rates, alterations in zinc and copper concentrations, and genetic determinants could be responsible. Researchers have clearly established the relationship between nutrition, mineral intake, and skeletal development; any disruption in this balance can result in asynchronous (uneven) skeletal growth and possible clinical signs of disease. While we know or suspect that all these factors play a role in CSM development, the exact mechanisms leading to clinical disease remain unclear.

What we do know is how gender, breed, and age factor into the epidemiology of this devastating disease. Males are more often affected than females. Breeds such as Thoroughbreds, American Saddlebreds, Warmbloods, and Tennessee Walking Horses are overrepresented, which means they seem to develop the disease more often than horses of other breeds. And in various studies researchers have identified the mean age of CSM horses as younger than 2 years, which has prompted veterinarians to categorize CSM as a developmental bone disease.

Over the years practitioners have developed approaches for diagnosing CSM. All clinical workups begin with the veterinarian conducting a thorough neurologic exam, looking primarily for signs of ataxia (incoordination). The next step is using radiography to visualize the neck vertebrae. Researchers have defined what’s normal or healthy for a neck based on skeletal anatomical measurements at each vertebral site, which helps veterinarians identify presumed areas of spinal canal narrowing. Veterinarians can perform myelograms (special radiographs taken after injecting dye into the spinal canal) to see the actual compression.

Once a veterinarian diagnoses CSM in a horse, the owner has several management and treatment options to choose from. More conservative approaches center on dietary modification and anti-inflammatory administration to slow growth rates,

### Role of Immunology in Equine Health Symposium Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8-8:30 a.m.</td>
<td>REGISTRATION</td>
</tr>
<tr>
<td>8:30-9:30</td>
<td>An overview of the immune system</td>
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<td></td>
<td><em>Amanda Adams, UK Gluck Equine Research Center</em></td>
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<tr>
<td>9:30-10</td>
<td>Immune control of vector-borne pathogens</td>
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<td></td>
<td><em>Robert Mealey, Washington State University</em></td>
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<tr>
<td>10-10:15</td>
<td>BREAK</td>
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<tr>
<td>10:15-11</td>
<td>Immune Response to EAV</td>
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<td><em>Udeni Balasuriya, UK Gluck Equine Research Center</em></td>
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<tr>
<td>11-noon</td>
<td>Equine lymphoma: classification and integrative approach to diagnosis</td>
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<td><em>Renaud Leguillette, University of Calgary</em></td>
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<tr>
<td>Noon-1 p.m.</td>
<td>LUNCH and LECTURE: Trends in vaccine development</td>
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<td><em>Frank Cook, UK Gluck Equine Research Center</em></td>
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<td>1-1:45</td>
<td>Immune response of the uterus to sperm and bacteria</td>
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<td><em>Robert Causey, University of Maine</em></td>
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<td>1:45-2:30</td>
<td>Immune response of the foal</td>
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<td><em>David Horohov, UK Gluck Equine Research Center</em></td>
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<td>2:30-2:45</td>
<td>BREAK</td>
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<tr>
<td>2:45-3:30</td>
<td>Immunodiagnostics and molecular diagnostics of equine lymphoma;</td>
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<td><em>Peter Moore, University of California, Davis</em></td>
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<td>3:30-4:15</td>
<td>Immune response to parasites</td>
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<td><em>Don Knowles, Washington State University</em></td>
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<tr>
<td>4:15-5</td>
<td>Local and systemic immune response to bacterial infection</td>
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<td><em>John Timoney, UK Gluck Equine Research Center</em></td>
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<tr>
<td>5-5:15 p.m.</td>
<td>CLOSING REMARKS</td>
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Many equine researchers from the University of Kentucky College of Agriculture, Food and Environment attended the Equine Science Society (ESS) symposium on May 26-29, in St. Pete Beach, Fla. The National Association of Equine Affiliated Academics (NAEAA) was held on the front end of the ESS symposium May 26.

ESS is held every two years in different locations and promotes quality research on equine nutrition and reproductive physiology production and management, teaching and extension. The event is set up to establish effective communication among researchers, teachers, extension, and production personnel.

Ernie Bailey, PhD, professor in the department of veterinary science at the UK Gluck Equine Research Center, was an invited speaker and presented a full-length paper titled “Genetics After Twilight,” about the next step in genetics. The title references Bailey’s past work, sequencing the entire equine genome on the Thoroughbred mare, Twilight. Bailey’s paper discusses how functional genomics can be used to answer biological questions. Functional genomics is relevant to all areas of equine studies, including immunology, nutrition, reproduction, exercise physiology, and veterinary medicine.

Laurie Lawrence, PhD, professor in the department of animal and food sciences at the UK, received the Equine Nutrition Research Award during the symposium. The award was sponsored by the American Feed Industry Association, and acknowledges Lawrence’s achievements and contributions to the equine industry. Lawrence’s international research on equine nutrition has most recently concentrated on pasture-based feeding and forage for both young and mature horses.

To view other abstracts that were authored and/or co-authored by UK faculty and students, please visit http://www.the-horse.com/articles/36145/uk-strongly-represented-at-the-ess-symposium.

--Hannah Forte
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