2018 FUNDED RESEARCH PROJECTS ANNOUNCED

For the fourth consecutive year, the board of directors of Grayson-Jockey Club Research Foundation has authorized expenditure of more than $1 million to fund veterinary research to benefit all horses. The 2018 allotment of $1,239,083 will fund 11 new projects at nine universities, seven continuing projects, and two career development awards.

"Our ability to report such a positive pattern results from the continuing generosity of individuals, associations, and businesses that realize that improvements to horse health and soundness depend on expert equine veterinary research," said Edward L. Bowen, president of the foundation. "We salute the wisdom, generosity, and dedication of all those donors."

The 2018 slate of research brings Grayson-Jockey Club Research Foundation's totals since 1983 to more than $26 million to underwrite 358 projects at 43 universities.
For more detailed information http://goo.gl/HLnPWo

NEW PROJECTS: (comments by researchers)

Thoroughbred Sales Radiology-Ultrasonography Study
C. Wayne McIlwraith, Colorado State University
This study will improve the industry's understanding of the significance of sesamoiditis, ultrasonographic suspensory branch changes, and stifle lucencies in sales yearlings and two-year-olds.

Underlying Cause Of Recurrent Exertional Rhabdomyolysis
Stephanie Valberg, Michigan State University
Stress-induced modification to the skeletal muscle calcium release channel forms the basis for tying up in thoroughbreds and pinpoints a target for development of effective new treatments.

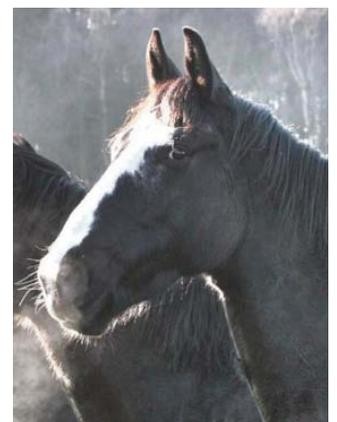### Firocoxib Properties In Equine Pregnancy & Placentitis II
Margo Macpherson, University of Florida
This project should provide a fundamental step toward determining if specific drugs (including firocoxibs) are performing expected functions, such as resolving inflammation, in pregnancies threatened by placentitis.

Effects Of Low-Dust Forage On Lung Health of Athletic Horses
Laurent Couetil, Purdue University
This proposal seeks to provide a non-pharmaceutical solution to the widespread problem of equine asthma by evaluating the benefits of low-dust forage for horses engaged in athletic activity.

Investigating Metabolic Stress And Viral Hepatitis
Sabine Mann, Cornell University
We will study metabolic pathways and hepatic viral infection to find a relationship with maladaptation to training syndrome/high GGT to help improve the health and performance of race horses.

Novel Analgesic Combination In Horses
Alonso Guedes, University of Minnesota
We are developing a medication strategy for joint inflammation/pain that can provide pain relief as well as help protect the joint cartilage from damage caused by chemical mediators of inflammation.

Ampk Agonists And Insulin Dysregulation In Horses
Teresa Burns, The Ohio State University
This project directly impacts the treatment of equine metabolic syndrome by assessing the efficacy of two drugs, metformin and acetylsalicylic acid, in the treatment of equine insulin dysregulation.

Host Factors Involved In EHM Pathogenesis And Latency
Gisela Soboll Hussey, Michigan State University
The development of tools to protect horses from EHV-1 infection, compare the immune responses in old and young horses to identify the mechanisms causing clinical EHM.

Unraveling Complex Traits By Defining Genome Function 2
Carrie Finno, University of California- Davis
This involves developing an atlas of gene regulation in the horse.

Development Of Limited View 3-D Imaging
Chris Kawcak, Colorado State University
The goal of this proposal is to develop a point-of-care, 3-dimensional imaging technique that can be used to better characterize and prevent injuries in racehorses.

Epidemiology Of Drug-Resistant R. Equi At Horse Farms
Steeve Giguere, University of Georgia
We will determine if isolates of Rhodococcus equi highly resistant to antibiotics are widespread at horse breeding farms in Kentucky.
Continuing Projects:

Endocrinopathic Laminitis: Pathophysiology And Treatment
James Belknap, Ohio State University
This study will determine if continuous digital hypothermia is effective and therefore indicated in the management of endocrinopathic laminitis, the most common form of the disease.

Platelet Lysate Therapy In Infectious Arthritis
Lauren Schnabel, North Carolina State University
This proposal examines the antibacterial properties of platelets to treat joint infections in horses more effectively than conventional therapies, with the goal of reducing morbidity and mortality.

Evaluation Of Kisspeptin And Pregnant Mares
Christianne Magee, Colorado State University
This proposal will allow us to gain insight as to how kisspeptins are involved in equine pregnancy and if they can serve as a biomarker for pregnancy compromise.

Bone Marrow Mononuclear Cells For Equine Joint Therapy
Linda Dahlgren, Virginia Maryland CVM
The results from this study will pave the way to investigate a new cell therapy from equine bone marrow as a targeted regenerative therapy for horses suffering from arthritis.

Predicting The Risk Of Equine Fatal Injury During Racing
Tim Parkin, University of Glasgow
We will use the Equine Injury Database (EID) to better predict and identify horses at greatest risk of fatal injury during racing and provide measures to further reduce the number of horses dying on North American racetracks.

Cytotoxic T-Cell Immunity To Equine Herpesvirus Type 1
Doug Antczak, Cornell University
This research will develop critically needed knowledge about how the horse immune system responds to equine herpesvirus type1 vaccination and infection.

Host-directed Control of R. equi Foal Pneumonia-Part II
Angela Bordin,
Texas A&M University
We propose to use an inhaled product applied directly into the lungs to increase immune responses to protect foals against Rhodococcus equi, a bacterium that causes severe pneumonia in foals.

2018 STORM CAT AWARD

The Storm Cat Career Development Award, inaugurated in 2006, is a $15,000 grant designed as an early boost to an individual considering a career in equine research. It has been underwritten annually by Mrs. Lucy Young Hamilton, a Grayson-Jockey Club Research Foundation board member whose family stood the retired champion stallion Storm Cat at Overbrook Farm.

We recently interviewed this years winner, Stephanie Bond of the University of Calgary. Her study is on Airway Inflammation: On Pathogenesis and Performance.

Birthplace and education:
I was born in Bairnsdale, a small country town in Victoria, Australia. I obtained my BVSc(Hons) at the University of Melbourne, graduating in 2013. I also undertook a research year (for the award of a Bachelor of Animal Science) studying equine herpesviruses.

Steps which led toward interest in equine research:
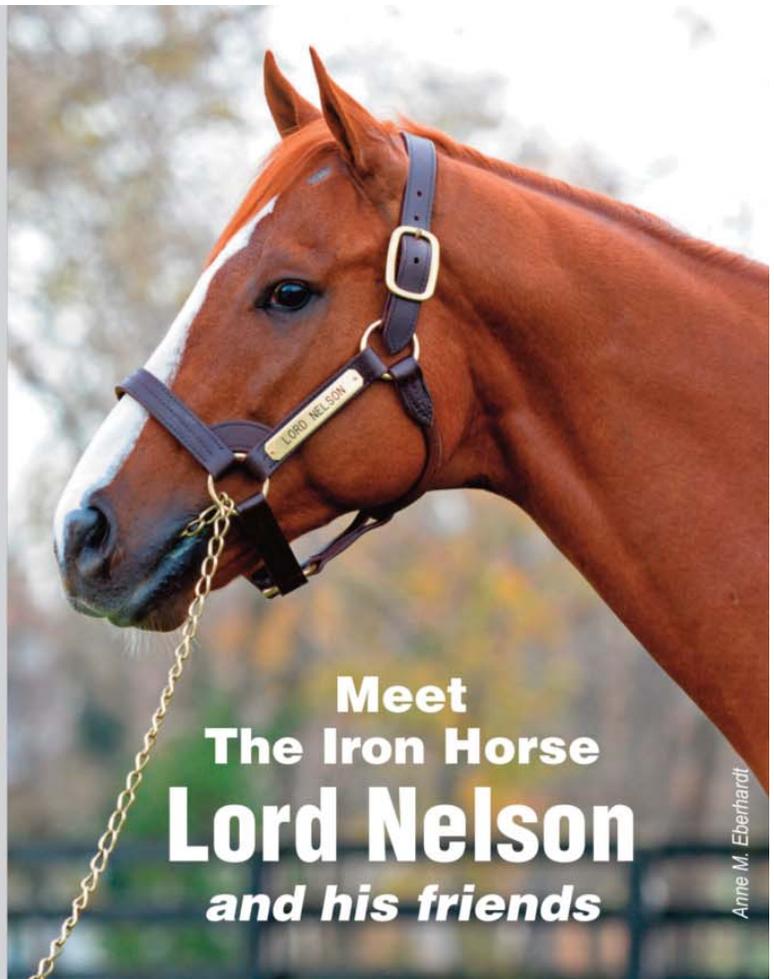I have been surrounded by horses for as long as I can

Meet The Iron Horse Lord Nelson *and his friends*

Anne M. Eberhardt

remember. I grew up on a farm, and rode horses competitively at an amateur level, culminating in my team winning the Victorian State Showjumping Championships. When I was 12 years old I had the opportunity to assist the local veterinarian as he came to the property. I was inspired to volunteer at the local veterinary clinic, and began to envision a career that not only enabled me to improve the welfare of horses, but also satisfied my innate curiosity to figure out how things work. I found the deductive reasoning and problem solving required to practice medicine on animals intellectually rewarding. I then organized placement at an equine hospital which solidified my decision to become an equine veterinarian.

Half-way through my veterinary degree, I undertook a research year during which I spent eight months of the year in South Africa, with my supervisor entrusting me to undertake multiple research projects without his direct supervision. My natural curiosity and drive led to the completion of not one, but three separate projects; most importantly, we developed a rapid, field-based diagnostic test for EHV-1 abortions, which will prevent significant genetic and financial loss for breeders. It was during this time I realized that whilst I enjoy clinical work, research enables me to make a positive impact on far more horses than I could ever treat in clinics.

Learning about which research projects by others was instrumental in solidifying your own interest:
I was fortunate to be granted a Young Member's scholarship in 2014 to attend the Bain Fallon International Equine Conference, and heard Dr Andrew Waller from the Animal Health Trust (UK) present research focused on Strangles, caused by Streptococcus equi, which is the most commonly diagnosed infectious disease of horses worldwide. I was fascinated by how gene sequencing information regarding the genetic evolution of bacteria could be used to identify novel vaccine and diagnostic targets. I examined the possibility of completing a PhD on equine strangles (a contagious bacterial

respiratory disease in horses), to be jointly supervised by the Animal Health Trust in the UK, and the University of Melbourne.

As the degree was not scheduled to begin until November 2015, I came to Canada to gain additional clinical experience. I volunteered at Moore Equine Hospital in Calgary, and met Associate Professor Renaud Léguillette, a fantastic mentor. Dr. Leguillette has a PhD from the Meakins-Christie Laboratory at McGill University and is double board certified as a specialist in equine internal medicine and sports medicine and rehabilitation. Due to my previous research experience, and skills in data analysis and writing, he employed me as a research assistant. He requested my assistance in analyzing multiple data sets in diverse fields of expertise (all related to equine sports medicine), from which I created manuscripts that have successfully gone through the peer-review process. Associate Professor Léguillette offered for me to complete a PhD under his tutelage. This opportunity closely aligned with my long-term vision of performing translational equine research, and after careful consideration and consultation, I applied to the University of Calgary.

Particular areas of equine research you find the most promising and also the most important (not necessarily the same):
I think the new respiratory mask created by the team at Washington State University is incredibly promising and will provide a means to directly assess the impact of upper and lower respiratory tract disease on performance in field situations. Furthermore, the technology will also allow the efficacy of commonly used treatments to be measured, which will have far-reaching clinical implications as treatments could be tailored to optimize performance for each horse. I think research focusing on understanding local bacterial communities (microbiota) in the equine body (gastrointestinal tract and the lungs) is incredibly important. As our understanding of states of health and disease evolves, the development of novel treatments will be possible.

Individuals instrumental in shaping your education and early career:
Professor James Gilkerson was my supervisor at the University of Melbourne and provided my first exposure to equine research. Associate Professor Renaud Léguillette from the University of Calgary is my current PhD supervisor and clinical mentor.

Professor Warwick Bayly from Washington State University is a member of my PhD supervisory committee and has been my direct supervisor for several research projects. I am sincerely grateful to all my mentors, as their guidance, input and friendship over the years have not only helped shape my education but also solidified and affirmed the vision I have for a career in equine research.

Brief description of research directions which led to the award:
The research which led to this award is focussed on inflammatory airway disease, or mild equine asthma. This is a non-infectious, inflammatory disease of the lower respiratory tract which affects up to 66% of the equine population. While the disease pathogenesis for mild equine asthma has not yet been fully elucidated, it is thought to share similarities with severe equine asthma (heaves, or recurrent airway obstruction). We are investigating the pathogenesis of this disease, the impact it has on performance and the efficacy of commonly used treatments using a multifaceted approach.

Very recently, it has been shown that mild equine asthma decreases racing performance in a population of Thoroughbred racehorses, and yet owner compliance is poor regarding veterinary recommendations. This is particularly the case for improving environmental management and limiting exposure to dust, with medical treatment being the preferred option for many clients. Professor Bayly, from Washington State University, has developed a mask which can accurately measure VO2max, airflows and tidal volumes on a breath-by-breath basis under field conditions. This mask will enable us to quantify the impact mild equine asthma has on respiratory performance in the field and help provide statistical evidence regarding the corrective efficacy of treatment. This is central to increasing owner compliance with veterinary recommendations and thus improving not only the welfare, but also the performance, of a large proportion of the equine population.

In order to better understand the pathogenesis of mild equine asthma, we are clarifying the inflammatory cytokine responses that develop in horses with both acute and chronic airway inflammation, and measuring how they are modified in response to treatment. We performed the first published study which characterized the upper and lower respiratory tract microbiota associated with health and mild asthma in horses; we found that the lower respiratory tract showed a clear difference in bacterial communities between healthy horses and those with mild asthma. Furthermore, we investigated the effect of dexamethasone on these bacterial communities and found there was a clear treatment effect at the level of the lower respiratory tract. Investigation of the response of local bacterial communities in the lower respiratory tract to dexamethasone may assist in the development of novel, targeted treatments for mild equine asthma.

Since first meeting Dr Bond in 2015, I have been tremendously impressed with her enthusiasm, work ethic, maturity, and determination to create and embrace opportunities that further her goal of having a career focused on equine respiratory research.

Her current doctoral program at the University of Calgary represents an ideal launching pad for such a career given the university's close proximity to a large population of performance horses in a wide variety of disciplines. Not only does Stephanie have a bright future as an investigator; she has all the makings of a future leader in the equine sector of our profession. She truly epitomizes the sort of person the GJCRF and Mrs. Hamilton had in mind when they created this Award.

As a member of her doctoral thesis supervisory committee I am excited about the design and potential outcomes stemming from Dr Bond's research proposal. It is clinically practical and highly relevant to equine veterinary practice and improving the pulmonary health of many athletic horses and I expect to learn a lot from my participation in the study.

Warwick Bayly
Veterinary Clinical Sciences
Washington State University

2018 ELAINE & BERTRAM KLEIN DEVELOPMENT AWARD

The Klein Development Award is a competitive program intended to promote development of promising investigators by providing a one year salary supplement of $15,000. This program is restricted to one award per year and is named after Bertram and Elaine Klein. The grant is funded by $15,000 donations by the Klein Family Foundation. The 2018 award winner is Jessica M. Gilberti of North Carolina State University. Her study is of Platelet Lysate Therapy in Infectious Arthritis.

We asked Miss Gilberti to tell us about herself:

Birthplace and education:
Born: Greenwich, CT/ Hometown: Westport, CT
Undergraduate (2005-2008): Virginia Tech
    (B.S. Animal Science)
Masters (2008-2010): Virginia Tech
    (M.S. Biomedical and Veterinary Sciences)
Vet School (2010-2014): Iowa State University (D.V.M)
Internship (2014-2015): BW Furlong and Associates
Fellowship (2015-2016): University of Pennsylvania,
     New Bolton Center (Comparative Orthopedic Research)
PhD (2016-current): North Carolina State University
    (Comparative Biomedical Sciences
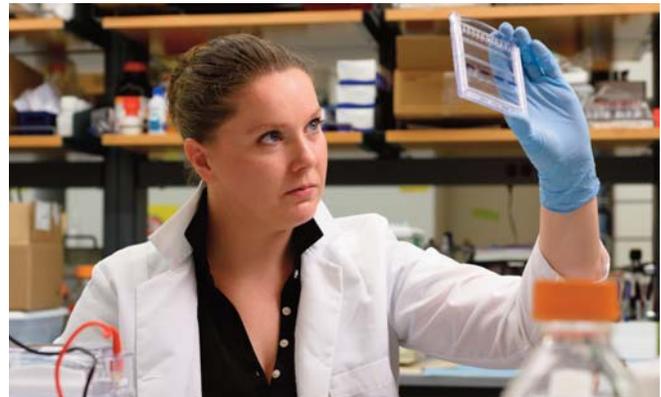
Steps which led toward interest in equine research:
I've had a passion for both learning and horses ever since I was a child. I knew from a very young age that I wanted to be a veterinarian, but it was as an undergrad at Virginia Tech when I first found myself in an environment that not only allowed me to absorb knowledge, but to create knowledge. As a means of becoming a better-rounded applicant for veterinary school, I volunteered with several different research projects, including one on bovine mastitis in the Department of Dairy Science at Virginia Tech.

Because of my extremely positive experience with this research, I went on to pursue a Master's degree with Dr. William Swecker at the Virginia-Maryland Regional College of Veterinary Medicine. Although his program also centered on bovine studies, it was during this period that I was able to collaborate with colleagues in other labs and blossom as a scientific thinker with skills in critical evaluation of the literature and experimental study design.

Learning about which research projects by others was instrumental in solidifying your own interest:
After earning my Master's, I attended Iowa State University for veterinary school. I made time in my hectic schedule to have an active role on a project with my mentor, Dr. Brett Sponseller, who was examining age-related differences in the equine pulmonary immune environment. The results provided insight into the pathogenesis of pneumonia caused by Rhodococcus equi and will aid future studies developing treatments for disease caused by respiratory intracellular pathogens inflicting the young. Dr. Sponseller is a board-certified internal medicine specialist with a special interest in neonatal intensive care. He identified a significant problem to the equine industry as it relates to foal morbidity and mortality and then formulated a research plan to identify how this pathogen interacts with the neonatal immune system. This research was a real turning point for me as it was the first experience that I had with a veterinary clinician scientist.

Particular areas of equine research you find the most promising and also the most important (not necessarily the same):
I truly believe that my current central research interest is both quite promising and very important. I am focusing on the development of novel therapeutics for the treatment of antimicrobial tolerant infections such as biofilms. I am investigating the antimicrobial, immunomodulatory, and chondroprotective properties of platelet-derived proteins to combat infectious arthritis. This is important because the World Health Organization has reported a significant drop in the number of new antimicrobials in development since 2000, and most developed since the 1980s are derivatives of already known drugs without novel mechanisms of

action. Despite a clear need for antimicrobials that target antimicrobial tolerant bacteria within biofilms, currently there are no FDA-approved drugs, and few in development, that affect such bacteria. Bacteria can grow as single cells in suspension (planktonic cells) or communities (biofilms), which are free-floating or surface-associated aggregates of bacteria surrounded by an extracellular matrix. Biofilms occur in approximately 65% of all human infections and are often refractory to anti-microbial treatment, as most conventional drugs target planktonic bacteria. With the increasing incidence of antimicrobial-resistant bacteria, new therapeutics are desperately needed to combat bacterial biofilms.

Individuals instrumental in shaping your education and early career:
I must once again give credit to Dr. Brett Sponseller at Iowa State. I was simply fascinated by his dual role as a veterinarian and a very capable researcher and I was determined after my first few months under his guidance to follow in his footsteps. Secondly, I must mention Dr. Thomas Schaer at the University of Pennsylvania Comparative Orthopedic Research Laboratory, with whom I completed a yearlong fellowship before arriving at North Carolina State. I really blossomed under Dr. Schaer as he allowed me to exert freedom in my hypotheses, experimental design and data analysis. This liberty further improved my ability to perform effective literature reviews, collaborate with other professionals throughout the institution to aid in my methods, write grants to support my research and conduct experiments with my own budget and timeline. Finally, my current mentor at North Carolina State, Dr. Lauren Schnabel, is an absolute standout in the field and is everything an aspiring veterinary researcher should hope to become. Her unwavering support of all of my ambitions is a blessing and she is instrumental in pushing my skillset from student to independent investigator.

Brief description of research directions which led to the award:
During my fellowship, I began assessing the antibacterial properties of platelets to combat recalcitrant bacterial infections and was awarded a young investigator award from the American Quarter Horse Foundation. With the blessing of Dr. Schaer, I am continuing this project as my dissertation research with Dr. Lauren Schnabel. Under her guidance, I have identified the most antimicrobial platelet formulation, platelet-rich plasma lysate (PRP-L), and have optimized its generation and processing. The further development of this treatment with Dr. Schnabel has resulted in a grant from the Grayson-Jockey Club Research Foundation to explore platelet lysate as an adjunctive therapy for infectious arthritis. Dr. Schnabel has been paramount in the expansion of this project from its juvenile roots moving from ability of PRP-L to be directly bactericidal to exploring its immunomodulatory and chondroprotective effects.

Dr. Gilbertie is one of the most hardworking and enthusiastic individuals that I have ever met. She is talented at researching subject matters and formulating her own objectives, hypotheses, and plans of action including study design. She is also talented in the laboratory and gifted at working cohesively as a team with my other laboratory members including research assistants, undergraduate students, and veterinary students.
Dr. Gilbertie came to my laboratory already with a lot of research experience as well as experience with independent thinking and writing. We are working together now to hone her skills in this area even further. I have the utmost confidence in Dr. Gilbertie's abilities and believe that she will be an exceptional clinician scientist who will make substantial contributions to the fields of microbiology and regenerative medicine. Her work on the antimicrobial properties of PRP-L has the potential to significantly impact medicine as a whole and I believe strongly that it will save the lives and athletic abilities of many horses.

Dr. Lauren Schnabel
Assistant Professor,
Equine Orthopedic Surgery
North Carolina State