

# RUTGERS

New Jersey Agricultural  
Experiment Station

## Rutgers Equine Science Center

**A Year in Review:**  
Report to Stakeholders

July 1, 2009 – June 30, 2010



***esc.rutgers.edu***

Equine Science Center

Better Horse Care Through  
Research and  
Education

## MESSAGE FROM THE DIRECTOR

The Equine Science Center at Rutgers, The State University of New Jersey, is a hub of discovery, learning, and influence whose sole focus and concentration is the horse. The Equine Science Center is a soft-walled center, not one of bricks and mortar such as a sports complex or equestrian riding center with a single building or facility used for an exclusive purpose or activity. **The mission of the Equine Science Center is better horse care through research and education to advance the well-being of horses and the equine industry.** Center research programs utilize the expertise of multi-disciplinary, interdisciplinary and inter-institutional teams of faculty and staff which result in measurable outcomes and impacts. Feel free to contact us at any time. A complete list of Center faculty and staff can be found in this document as Appendix A.



Through surveys and focus groups with stakeholders, the Center re-affirms annually the horse industry's needs, including the following categories:

- Horse health and well-being
- Right to farm, farm viability and land use
- Integrity of equestrian sport
- Environmental stewardship
- Sustainability of the horse industry and development of future leaders

The Center continues to be competitive for grants, contracts and donations. Since July 1, 2009 faculty and staff have procured over \$1.5 million in extramural funding and \$234,650 in donations and gifts. State Equine Initiative dollars have provided seed money which has been leveraged into cutting-edge discoveries which are translated into language that people, such as policy decision-makers, can understand and use.

In 2011 the Center will celebrate its tenth anniversary. Since 2001, the Center has established itself prominently within the state, regionally, nationally and even internationally through its thoughtful business plan, research and outreach programs, partnerships with state and federal agencies and private entities, dynamic website, and the widespread recognition and acknowledgement it has received as a result of the impacts of its program. The undergraduate and graduate students who have participated in these programs have gained valuable experience which is translated into a high success rate of acceptance into veterinary and graduate programs in addition to producing students with skills needed to better manage horse care in the industry.

The Equine Science Center has gained the respect and credence of equine enthusiasts in New Jersey and beyond. The New Jersey horse industry relies on the Equine Science Center to fill a unique role that beckons the support of the horse industry because it:

- Speaks for the entire horse industry
- Provides credibility for the horse industry
- Has no hidden agenda
- Is the sole source for programming to ensure the industry's viability and vitality
- Is the place of education for the future leaders of the horse industry

In 1992, a committee of stakeholders representing various equine interests formed the Equine Advisory Committee to support the School of Environmental and Biological Sciences formally known as Cook College. The committee secured from the New Jersey Legislature an allocation of \$1.2 million in uncollected pari-mutuel winnings for the New Jersey Agricultural Experiment Station – of which \$300,000 was used to support equine research and the facilities and operations of the Equine Science Center. (Subsequently, \$900,000 in funding to the Experiment Station for Strategic Initiatives was made a line item in the state budget.) The Equine Advisory Committee evolved into a more formal advisory group, the Rutgers University Board for Equine Advancement (RUBEA). Over time the goals and composition of the board have been modified as required.

Membership on the board, once drawn from a wide spectrum of equine organizations in the state, was redefined to emphasize individuals and organizations who impact the horse industry, not only in New Jersey but nationally and internationally, and have the desire and wherewithal to assist the Equine Science Center in meeting its fund-raising goals. RUBEA hopes this expanded function will make it as effective as possible in promoting the stature and progress of the Equine Science Center and assuring its continued vitality.

**Officers:**

- Sandra M. Denarski, **Chair**
- Stephen P. Dey II, DVM, **Vice Chair**
- David Meirs II, VMD, **Chair Emeritus**
- Taylor Palmer Jr., **Chair Emeritus**

**Members:**

- Ryan Avenatti
- Debra Bahr
- Cathy A. Ball
- Michael Campbell
- Elizabeth Durkin, Esq.
- Karyn Malinowski, Ph.D.
- Kenneth H. McKeever, Ph.D, FACSM
- Leo C. McNamara
- Mark Mullen
- Sarah L. Ralston, VMD, Ph.D., ACVN
- Ryck Suydam
- Thomas Swales, IV
- Carey A. Williams, Ph.D.
- Richard A. Wills

## CENTER HISTORY & OVERVIEW

In 1978, visionaries at Rutgers University, who saw that horses were the future of the livestock industry in New Jersey, established a formal equine sciences program within the Department of Animal Sciences at the School of Environmental and Biological Sciences (SEBS). The move proved to be remarkably prescient, as today the equine industry in New Jersey has become a dominant force in agriculture and a key component in open space and farmland preservation in the Garden State.



In 2001, Rutgers University's Board of Governors recognized the excellent science, teaching and extension components of the equine sciences program by declaring the Rutgers Equine Science Center an official center of the university.

The Equine Science Center has the ability to reach across university affiliations and academic departments worldwide to put together the best and brightest experts to examine almost any issue or challenge facing the well-being of horses or the horse industry. The Center exists solely for the horse, the protection of its health, well being and surroundings, its symbiotic relationship with humans, and position as a major socio-economic part of the rural/urban/suburban landscape in New Jersey and the world.

Throughout history the horse has served as an outstanding model for human medicine. Many human conditions and ailments, such as obesity, Type II diabetes, inflammation, osteoarthritis, cardiovascular function, immune function, nutritional deficiencies, thermoregulation, and aging issues all occur in horses and are being studied effectively via equine models.

For example, Rutgers researchers have relied on the physiological similarities between horses and humans and the athletic nature of horses to investigate food extracts that may prevent post-exercise inflammation. The project is a multi-year, multi-disciplinary, collaborative effort sponsored by the U.S. Army to screen and test plant products that can reduce the need for soldiers to take non-steroidal anti-inflammatory drugs. An investment of \$80,000 Strategic Initiative dollars resulted in pilot data used for grant applications that resulted in \$1.4 million research grant from the Department of Defense.

The **Equine Exercise Physiology Laboratory** is considered to be the best-equipped and most active lab of its kind in the country. It is a major draw for students interested in pre-veterinary medicine at Rutgers and is one of only two such labs not affiliated with a school of veterinary medicine in the United States. Researchers utilizing the lab focus on preventive research rather than curing clinical syndromes or diseases. One area involves investigation of the use of performance-altering substances in racehorses. The Center develops tests to detect the use of illicit substances, and provides expert testimony in litigation involving the use of performance-altering substances. Such testimony was key to the success of a test case argued before the New Jersey Supreme Court. The case supported one of the key testing programs in New Jersey, which has had impact across the country. In New Jersey alone, more than 50 pending cases have been settled without going to trial based on information obtained from the Center, saving New Jersey an estimated \$1.25 million in litigation costs.

The Center is the entity responsible for delivering useful, science-based information to people around the world through its **robust website ([esc.rutgers.edu](http://esc.rutgers.edu))** which disseminates news; posts podcasts and webinars, numerous fact sheets and bulletins, and informational virtual tours of its research facilities; and educates budding scientists and potential Rutgers University students through "Equine Science 4 Kids." Strategic Initiative dollars have been matched two-to-one to enable the Center to use new

technology to deliver its programs. Website traffic is phenomenal. In 2009, the Center's website received:

- 2.8 million hits
- Over 1,000 visits per day
- 95,000 unique visitors
- 20,000 return visitors
- An average page view length of 86 seconds

The website continues to be a potent marketing tool for sponsors, donors, and prospective students, in addition to its more traditional role as an educational instrument and resource center. In fact, one of the top ten pages visited is the fact sheet describing the SEBS Equine Sciences minor.

The Equine Science Center also serves as an important element of the SEBS teaching program. The Center took the lead in the development of two new courses which focus on horse health and horse industry leadership. The first, "**Advanced Equine Health Care and Management**," is a semester-long program whereas the second is a two-day short course on "**Developing Future Leaders for the Equine Industry**." Both courses are open to adult learners and continuing education students. These courses, which were made possible by the efforts of the Center, brought enhanced revenue to the Department of Animal Sciences and the Center.

In addition, two of the core courses, Horse Management and Equine Nutrition, are offered on-line and in the class room to non-matriculated students through the Office of Continuing Professional Education, providing the opportunity for both experienced and inexperienced horse owners/trainers/breeders, not only locally but as far away as New Zealand, to update or gain new knowledge on how best to manage and feed their horses.

Three Center faculty members, who reside in the Department of Animal Sciences, are pivotal to the success of undergraduates who gain hands-on experience by participating in independent research in the exercise physiology lab and the Young Horse Teaching and Research Program. Over the past three years these core faculty members provided research opportunities to 355 students and generated 720 credit hours valued at \$222,000 in tuition. In 2010 alone, 21 Animal Science Pre-Vet applicants, 8 of whom were involved with the equine program, were accepted to at least one veterinary school in the U.S. and abroad.

Undergraduates who choose not to go on to graduate studies are highly valued by veterinarians and the pharmaceutical industry as technicians and research assistants, by horse farms as managers and trainers, and in many other facets of the horse industry. The three largest horse feed manufacturers in the United States, Cargill, Purina Mills, and Blue Seal, have all hired three of our most recent Ph.D. students as directors of their research and outreach programs.

On the extension and outreach side, recently completed programs with direct impacts on the horse industry include the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm, which investigates and provides effective solutions for water quality management, nutrient waste management, forage needs, weed management, rotational grazing, and a host of other challenges facing livestock farmers worldwide. This half-million-dollar initiative generated funding from external partners at more than double the level of that provided by the Equine Science Center. Partners include the USDA Sustainable Agriculture Research and Education program, the Natural Resources Conservation Service, the Environmental Protection Agency Region II, the New Jersey Department of Agriculture, and the Department of Environmental Protection.

The Center's "*The New Jersey Equine Industry 2007: Economic Impact*," a quarter-million-dollar initiative involving nearly a dozen private and public partners, continues to impact public policy decision-making as the state battles with the issue of the future of sports, gaming, and entertainment in New Jersey. The 2007 study and the "*Impact of slot machines/video lottery terminals (VLTs) on the economy, horse racing and breeding industry, agriculture and open space in states/provinces where they exist: Why is this important for New Jersey?*" report, released in July 2009 (both available on the Center's website) are cited regularly nationwide, as state governments deliberate horse racing's future nationally.

# **Report on Major Programs**

## **Equine Science Center Research and Outreach**

A complete list of funded projects for fiscal year 2010 can be found as Appendix B.

### **Horse Health and Well-Being**

#### **Effects of Age and Training on the Cytokine, Myokine, and Endocrine Regulation of Glucose Metabolism in Standardbred Mares**

The Center resumed its work in the area of aging in horses throughout 2008-2009 due to the efforts of Ph.D. candidate Nettie Liburt conducting research in Kenneth McKeever's lab. Previous work funded by the Center documented aging-induced changes in endocrine function with a suppression of the cortisol and vasopressin responses to exercise as well as a disruption of the glucose and insulin response following exercise in standardbred mares. This research was designed to investigate several hypotheses regarding age-related changes in hormone and cytokine production before and after exercise training.

The practical message garnered from this research is that care must be taken when designing an exercise regimen for aged animals. As cortisol plays a role in glycogen replenishment in muscles, lower levels of cortisol in older animals may result in a decreased amount of readily available glucose as fuel for energy in response to exercise stress, and by consequence aged horses may take longer to recover compared to young horses.

It is not uncommon for older horses to have difficulty maintaining weight and muscle tone, and a decreased cortisol level may contribute to these symptoms. Humans classify abnormally low cortisol concentrations as Addison's disease, but to our knowledge, no such classification has been made in equine pathology. Post-training, old mares had a decrease in rump fat thickness, but no change in body weight, indicating that muscle remodeling occurred. This change in body composition likely had an influence on the responsiveness of the system to physiological challenges. Exercise is important for maintaining muscle tone, heart/lung function, etc., and should certainly not be eliminated from the older animal's lifestyle. However, intensity and duration of exercise need to be kept modified to the individual's capabilities.

Novel findings showed differences in the quantity and presence of cytokines that affect insulin sensitivity in adipose tissue from the neck, rump muscle and blood. Although there were tissue differences, the cytokines studied were not affected by age and exercise training. Exactly how these cytokines may be affecting glucose regulation remains to be determined, however this investigation was one of the first of its kind, and certainly the first to compare tissues in old and young horses. It has again been shown that exercise improves insulin sensitivity, and is crucial for helping older horses maintain normal glucose metabolism.

Moderate exercise training appears to attenuate age-related changes in hormones associated with the response to physiological perturbations that affect whole body energy homeostasis and glucose metabolism. While older animals have a naturally decreased exercise capacity, exercise should not be eliminated from the lives of horses in this age group. In fact, it is very important to maintain some kind of exercise regimen as tolerated by the individual to help maintain normal metabolism, muscle tone and cardiovascular health. Exercise may be a crucial factor in the care of all horses, with particular significance for aged horses, as it is critical for preventing or moderating insulin resistance.

## **How Specific Gut-Derived Bacteria Could Influence the Development of Laminitis**

The objective of a pilot study at the Center under the leadership of Janet Onishi, was to evaluate the possibility that microbes establish an infection in laminae and thereby contribute towards the development of laminitis. The study consisted of two groups of horses; control (non-laminitic) and chronic/recurrent (laminitic) horses. Laminae tissue homogenates were prepared and used to determine the presence or absence of a panel of gram negative and positive bacteria. Bacteria were identified using biochemical tests and DNA sequencing of 16S rDNA and virulence genes. Laminae tissue from chronically laminitic horses revealed significantly higher levels of bacteria compared to control, non-laminitic horses. Additionally, the presence of potentially pathogenic bacteria in the laminae tissue suggests that a subclinical infection could account for the persistence of laminitis in the chronically laminitic horse.

It is not clear whether microbes in the laminae are involved in initiating the disease or whether microbes gain access to the laminae secondarily as a result of the abnormal hoof growth involving white line expansion in the chronically laminitic horse. To differentiate these possibilities, studies are in progress to investigate the involvement of bacteria in the development of the acute phase of this laminar disease. Collaborations have been established with research veterinarians that have expertise in conducting the carbohydrate overload models of acute laminitis. As a result of these studies, it is clear that further research is needed to investigate the involvement of bacteria in the development of both the acute and chronic phase of this laminar disease. It may be prudent to evaluate the effect of anti-microbial therapy on improving the outcome of horses afflicted with laminitis in addition to strategies to prevent the disease.

## **Nuclear Magnetic Resonance Spectroscopy (NMR)-based Metabonomic Analyses: A Search for Metabolic Markers**

Sarah Ralston contributed in three areas of research during the report period. NMR based metabonomic analyses were able to detect significant differences in amino acid, lipoprotein, lipid and glucose profiles of yearling horses that developed osteochondrosis (OCD) lesions versus half or full siblings that did not develop lesions, despite having had the same nutritional and environmental management since birth. Based on these results, it appears that a characteristic metabolic profile may be established for young standardbred horses that develop OCD. The profile has now been used to predict foals at risk before lesions appear, and the predictive profile has been validated, though more refinement is necessary to identify the defective metabolic pathways involved in genetically predisposed foals. Once this is accomplished, therapeutic modalities may be explored to prevent lesions in foals at risk.

## **Total Mixed Ration (TMR) Cubes for Young, Growing Horses**

Growth rates of yearling draft cross horses, two-year old draft crosses, and yearling mustangs fed forage based total mixed ration cubes as the sole source of nutrition (other than free access to salt and water) were compared. Yearling draft crosses grew at rates comparable to their siblings in the previous year fed either the forage based cubes without a grain-based concentrate or a standard hay/grain-based concentrate ration. However, both the yearling draft crosses and two-year olds, as in previous studies, grew faster than predicted by the National Research Council (2007) and were more efficient (higher gains/Mcal consumed) than mustangs, which voluntarily consumed the estimated amounts of feed and grew at rates predicted by the NRC. There were no feed related problems and it was noted that in 2009-2010, using TMR cubes that contained no grain, there was a lower incidence of epiphysitis in the yearlings than in previous years when some grain (10 to 15%) had been added to the formula.

## **Mustang Versus Draft Cross Behavior and Trainability**

In a series of controlled, standardized tests, the reactions/responsiveness of yearling mustangs were compared to that of yearling draft crosses and two-year old draft crosses. Yearling mustangs and draft crosses had no halter training or handling other than routine vaccinations/deworming prior to coming to the Rutgers Young Horse Teaching and Research Program (YHTRP). Two-year olds had a full year of training/handling on site. Preliminary results indicate that mustangs, though more attentive to new stimuli, were also more responsive to cues given by the handler, resulting in higher scores for tasks such as lifting a leg on cue, halting, turning, and moving away from pressure than their yearling draft cross counterparts or even the two-year olds. When confronted with potentially frightening new stimuli like plastic bags on the floor or a person standing on a stool, mustangs tended to hesitate more when the object was first noticed but “spooked” less violently when made to approach it than did the draft cross counterparts, which did not tend to notice the new stimuli until much closer to it. The main difference between the two types of horses was a higher degree of awareness of their surroundings by the mustangs, which can be used to advantage in training.

## **Farm and Land Mangement and Environmental Stewardship**

### **Ryders Lane Environmental Best Manangement Practices Demonstration Horse Farm**

In 2010, the Equine Science Center and the New Jersey Department of Agriculture teamed up to launch the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm virtual



tour. The virtual tour is accessible through the Center’s website at [esc.rutgers.edu](http://esc.rutgers.edu). The virtual tour features a photographic storyboard detailing each individual Best Management Practice (BMP) currently demonstrated at the Ryders Lane farm. The BMPs have been divided into four categories: Comprehensive Nutrient Management Plan (CNMP), Manure, Water, and Pasture. As visitors peruse the four categories, they find pictures of the farm with accompanying descriptive text explaining the purpose of each BMP. Ryders Lane serves as a fully-functional and operating horse farm developed to address numerous environmental issues such as preserving water quality,

proper nutrient and waste management, fencing, farm and pasture management, and soil enrichment, to name a few. The virtual tour of Ryders Lane is both a research and educational tool to assist the public’s understanding of how to successfully manage environmental challenges a farm may face.

Ninety percent of surveyed respondents stated that they found the Ryders Lane virtual tour useful and 86% stated that they would use knowledge gained in future horse care and farm management decisions.

### **Training for Animal Waste Management Plans**

Rutgers Cooperative Extension (RCE) staff played a major role in development of the state Animal Waste Management Rule requiring farmers to manage manure in an environmentally sensitive manner. This includes 3,000 to 5,000 livestock farmers in New Jersey with more than 7 animal units who must submit written nutrient management plans. Michael



Westendorf coordinated statewide activities for animal waste management and nutrient management planning. This included working closely with the New Jersey Department of Agriculture and the Natural Resources Conservation Service in developing animal waste management plans for small to mid-size animal farms and designing educational efforts for outreach to these farmers. Since February of 2009, RCE staff held approximately 75 meetings attended by nearly 2,000 people. Equine farmers were a significant part of these meetings. All operations with eight or more “animal units” (one animal unit equals 1,000 pounds) and fewer than 300 animal units must develop a self-certified Animal Waste Management Plan over the next 18 to 36 months.

Lord Nelson, the mascot for the youth component of the Center’s website, was used to present the “Scoop on Poop” as part of the educational campaign for the Animal Waste Management Rule.

## **Farm and Land Management Workshop**

The Farm and Land Management Workshop, where the newly developed self-guided tour of the Ryders Lane farm was unveiled, was held on Friday, October 16, 2009. The workshop featured discussions and best management practice demonstrations led by several Rutgers University faculty members. Topics included: manure storage and research; biofiltration swales, paddock draining systems and rain gardens; fencing and rotational grazing; and composting. At the end of the workshop, attendees visited the new class of horses in the Young Horse Teaching and Research Program.

## **Animal Waste Research**

Animal waste research studies the influence of animals, feed, manure storage/disposal, pasture and cropping management, soil and environmental quality, erosion control, and site characteristics in order to minimize negative environmental impacts of equine operations. Research related to diet showed that overfeeding phosphorus had an effect on phosphorus in manure. This form of phosphorus is very water soluble and potentially a risk to water quality. Research is ongoing with other phosphorus sources and a comparison of dietary nitrogen levels. Comparison of four bedding sources found an effect upon air quality, ease of cleaning, cost, and composting characteristics. A wheat straw pellet received high marks compared to traditional bedding such as straw and wood shavings.

A Near Infrared Reflectance (NIR) spectroscopy procedure for analyzing horse manure has been completed. This procedure decreases cost and increases ease of horse manure analysis. Over 100 manure samples were taken and calibrations developed for nitrogen, phosphorus, potassium, gross energy, and Neutral Detergent Fiber (NDF). An extension program is planned for 2010 to assist producers in determining nutrient content of manure and using results in developing manure spreading management plans. An NRCS project was funded (\$74,900) to determine feed management practices on equine farms, and to develop a protocol that NRCS can use to encourage equine producers to make feed management changes. Proper feed management on equine farms can reduce nutrient (N, P, and K) environmental losses.

**eXtension:** Extension Specialist Michael Westendorf serves as the Small Farms Manure Management team leader for the Livestock Poultry Environmental Center (LPE) eXtension Outreach Program. In this role, he coordinated a team of 10 - 15 agriculture scientists in the development of web-based manure management information. To view all eXtension materials about animal waste, go to: <http://www.extension.org/animal%20manure%20management>. Thirty-nine individual web pages have been developed. Fact Sheets on the topic can be found at [http://extension.org/pages/Managing Manure on Horse Farms](http://extension.org/pages/Managing%20Manure%20on%20Horse%20Farms).

**Regional Project:** NE-1041 was approved by the USDA and the Northeast Region Directors as a regional project beginning in October, 2009. This project takes a long range view of equine environmental research and involves multiple agricultural disciplines (animal science, plant science, engineering, economics, etc.) to study the effects of feed, animals, bedding, fertilizer, and manure, on pasture, crops, water, soil, air, energy, and potential manure usage on equine operations. Research has been and will be conducted at Rutgers University and other partnering institutions and on farms where appropriate. Key results will culminate as published research as well as active demonstrations or educational exhibits at participating institutions. Modeling of energy and nutrient flows will help to understand the origins and ultimate destination of these flows. The project homepage can be found at <http://nimss.umd.edu/>. At the homepage of the website, select “Search”. Type “NE-1041” into the “Enter Project Number” search box.

The first project meeting was held October 10-11, 2009 at Rutgers University. It consisted of a two day working meeting in which project goals and objects were developed. Four team focus areas were initiated: 1) pasture management, 2) feeding management, 3) manure production, storage, and disposal, and 4) water quality and horse manure waste, soil quality and management. Research projects were discussed and plans made for collaborative efforts between institutions. The four teams agreed to develop literature reviews in each of the areas and to submit those for publication to an equine or environmental journal.

### **Impact of Horse Manure and Composted Manure on Soil and Water Quality**

A project of Daniel Gimenez and Stephanie Murphy, the impact of horse manure and composted manure on soil and water quality was designed to characterize changes in the quality and quantity of soil organic matter and its placement within the soil matrix. Hongsheng Liu of the Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences analyzed the samples for organic matter content as well as for a variety of enzymes. In addition, aggregates were imaged with a medical tomographer and the 3D images will be analyzed for microscopic changes in pore structure.

A more in-depth study to evaluate organic matter effects on soil is being adopted by Rutgers Soil Testing Laboratory, and soil samples, both current and archived, will be analyzed using this new technology. The basic concept is that rewetting dry soil samples stimulates the resting biological community to revitalize and consume soil organic matter for sustenance, which releases a “microburst” of carbon dioxide. In addition to its use in predicting nutrients supplied by the horse manure/compost, this procedure is perceived as a measure of the biological “quality” of the soil.

During the summer 2010, a second and final round of infiltration measurements will be made on experimental plots at the Snyder Research and Extension Farm and at the Ryders Lane Farm. Changes in soil structure resulting from the addition of equine manure will be quantified and used to interpret and model soil water dynamics at Ryders Lane. Accumulated data over the years of the study will be compiled and analyzed.

### **Agri-Environmental Assessment of Equine Pasture in the Colts Neck Watershed**

This was a study funded for three years by the Center and conducted under the leadership of Bill Sciarappa, an Agriculture and Resource Management agent for Rutgers Cooperative Extension in Monmouth County. The Colts Neck Upper Navesink watershed has a high population of horses and acreage in equine pastures and trails. Current surveys of the Upper Navesink watershed show that there are approximately 14,000 horses and several other types of farm animals among only 11,999 residents. In this particular study region of Colts Neck Township, much of the open space where groundwater supplies are sequestered is agricultural in nature, largely equine pastures. This pilot project identified

environmental and economic benefits from such agricultural land-use as well as threats to the loss of this ecologically valuable resource. A primary goal of this agri-environmental investigation was to determine the impacts of agriculture and equine operations, specifically, on water quality and quantity. A second goal was to determine the amount and financial value of all surface and ground water recharge of this model watershed emphasizing agricultural and open space contributions in comparison to potential nonagricultural developments in the future. Follow-up extension programs will suggest appropriate best management practices to remediate and protect this agro-ecosystem.

Results showed that the overall health and natural resource wealth of the Upper Navesink watershed was relatively good. Residential communities are amply spaced and lawns do not appear to be excessively fertilized. Equine operations are largely in compliance with best management practices with few exceptions, although pasture management can always be improved everywhere. It remains difficult to manage the ever-growing deer and goose populations, but several programs are in progress. The largest threat to this watershed is that of increased development creating more impervious surfaces, atop an elevated, sloping watershed leading to more storm-water run-off, increased stream velocity, more erosion and concentration of non-point source pollutants. An increase of impervious surfaces leads to a decrease of groundwater recharge along with the well-known increase in soil movement through erosion. Some evidence of this problem is already occurring in the lack of macroinvertebrates in highly sedimented rivers. While this has not yet led to increased nutrient loading, that is the next probable step to occur in the process of environmental degradation. In addition, if the environmental integrity of the Upper Navesink watershed region is not protected, the more significant issues facing the lower watershed region will be exacerbated.

Overall project findings are summarized below:

- Water monitoring revealed few instances where values for nutrients and non-point source pollutants in the seven sub-watersheds exceeded acceptable limits. Low pH values were expected.
- Stream assessment showed a dearth of aquatic life due to significant sedimentation. Erosion and topography may play key roles. More investigation is needed.
- Soil monitoring showed typical levels of macro and micro nutrients reflective of farms, fields, forests, streambanks and residential land uses.
- Microbial source tracking methods showed great promise in developing a new multi-tiered system to detect bacterial source problems more precisely.
- Turf trials revealed several strong cultivar candidates for use in pasture grass management – tall fescue, orchardgrass and, surprisingly, bentgrass.
- The pasture grass trial revealed several weak cultivar candidates susceptible to horse hoof traffic – especially timothy and bluegrass.
- Pasture grass quality in terms of nutritional analysis was not significantly different among 40 tests cultivars and blends. Pasture grass quantity and sustainability appear more important than higher quality with lower biomass or short-term survival.
- Natural Capital Analysis showed the long-term eco-services value of open space with 8 billion gallons of recharge annually overwhelms the value and importance of short-term exploitation of residential or industrial development.

## **Ensuring a Sustainable Future for the Equine Industry**

### **Equine Science 4 Kids!**

In 2010 the Center launched *Equine Science 4 Kids!*, an interactive youth component available on the Center's website, [esc.rutgers.edu](http://esc.rutgers.edu). The component features Lord Nelson, a 37-year old American

Quarter horse, as the figurehead guiding youth through the educational component. The goal was to create an online classroom with Lord Nelson as the lead educator. Although the updated component features interactive elements and games, the primary focus is equine science specifically developed for youth ages 10-14 years. The youth component focuses on three modules: Healthcare and Nutrition—covering scientific subjects such as the odd things horses eat, aging, and keeping horses healthy; Exercise Physiology—addressing similarities in how horses and humans exercise, antioxidants, and oxygen consumption; and Horses and the Environment—detailing how horses and humans fit harmoniously in a clean environment.



Visitors to Equine Science 4 Kids have the opportunity to email their horse-related questions directly to “Lord Nelson”. All questions are answered in a timely manner. If Lord Nelson receives the same question repeatedly, the question will be added to the Frequently Asked Questions (FAQs) feature that is available in each of the three modules. Keeping current with technology, Lord Nelson also has a blog, “Holy Hoofprints!,” to share his thoughts and perspective with Equine Science 4 Kids visitors. His blog consists of “a day in the life of a horse” as it relates to equine science. Visitors may also join Lord Nelson’s Fan Club to receive email notification of new content, blog entries, and interactive games as they are added to the youth component. In the first 30 days after launching, Equine Science 4 Kids received 7,000 hits with an average page view of 86 seconds. Ninety-six percent of survey respondents stated that they learned something about equine science after exploring the site and that they would recommend the site to a friend.

## **Horse Industry Alliance**

The Equine Science Center continues to serve as an advisor to the racing industry and an advocate for unity and cooperation among the various equine breed groups and disciplines. The urgency for a “unified voice” became critical in 2006, as the issue of the sustainability of the racing industry came into sharp focus among legislators, horsemen, breeders, the agricultural industry, the gaming industry, and academia. The Center’s role in bringing the various forces together has been recognized for its outstanding value and effectiveness.

The woes of the racing industry were not just confined to a handful of men and women who breed and race horses, however. It was clear then (and still is) that many aspects of the New Jersey economy and the quality of life for residents – not to mention the services that are available to all horse people – depend on a viable racing industry.

Exacerbating the problem was the fact that surrounding states passed legislation enabling limited gaming operations at racetracks in addition to traditional pari-mutuel betting. These additional gaming revenues resulted in increased purses and breeders’ incentives in those states and, as a result, siphon off the best horses from New Jersey. In July, 2009 Center director Malinowski released the report, *“Impact of slot machines/video lottery terminals (VLTs) on the economy, horse racing and breeding industry, agriculture and open space in states/provinces where they exist: Why is this important for New Jersey?”*, published by the Hall Institute of Public Policy.

## **Responsible Horse Ownership**

In 2009, the Center identified the need to address the concern and consequences of the growing unwanted horse population. Answers to horse ownership questions such as; what to do when one can no longer adequately care for a horse or, what to do if one is looking to purchase a horse, are available on the

new Responsible Horse Ownership page of the Equine Science Center website, an initiative led by Sarah Ralston.

The Center is making a concerted effort to educate current and potential horse owners about the many responsibilities that are part and parcel of owning a horse. It is imperative that prospective owners are well aware of the long-term commitment and needs of horses in their care. The dedicated webpage includes downloadable PDF handouts and web PowerPoint presentations entitled “Responsible Horse Ownership” and “The Economics of Horse Ownership.” Visitors to the Responsible Horse Ownership webpage will also find a series of Fact Sheets related to owning a horse. The Responsible Horse Ownership webpage also contains information from the American Horse Council’s Unwanted Horse Coalition.

## **Academics**

Students interested in pursuing careers in the horse industry or just improving their knowledge of horses can study equine science in the Department of Animal Sciences, <http://animalsciences.rutgers.edu/>. Under the auspices of the Animal Industries-Equine Specialization major, students take all of the equine didactic courses available in addition to courses in marketing, basic sciences and animal science, and also sign up for “hands-on” credits through the Equine Practicum, Research in Animal Science course and/or Cooperative Education. A minor in Equine Science is also available to students majoring in other disciplines.

Courses tend to emphasize the science of horses—not only “how” as in many other equine curricula, but “why.” Students interact closely with their advisors and are given guidance in career decisions.

Rutgers has a Memorandum of Understanding with the University of Delaware, Pennsylvania State University, and Delaware Valley and Centenary Colleges, wherein our students can take a semester of “how to” classes on topics such as equine breeding management, horse training and conditioning, horse show management, therapeutic riding instruction, and stable management, to name a few.

## **Young Horse Teaching and Research Program (YHTRP)**

In the mid-1990’s, Sarah Ralston was a member of a group advising Wyeth on better management practices for the controversial pregnant mare urine (PMU) industry. Through this association, Ralston created a program in which she could combine her research interests in transportation stress and young horse nutrition with the equine science teaching program at Rutgers University. Through this program, Ralston has been able to debunk some of the myths and erroneous information about the PMU industry and provide valuable information on the nutrition and management of draft cross horses.

The first 10 years the YHTRP program featured progeny of mares used in the production of PMU for hormone replacement products (Premarin). The resultant draft cross weanlings were registered with the North American Equine Ranching Information Council (NAERIC) and excellent sport horse prospects. However, the general public misperception at that time was that PMU progeny were just “by products” therefore, were at risk of being sold to slaughter. The objectives of the YHTRP are three-fold: to conduct research on behavior and nutritional needs of non-traditional breeds, to teach



students to handle and train young horses in addition to learning the principles of controlled research, and to promote non-traditional horses potentially “at risk” as valuable potential instead of merely being in need of “rescue”.

Over the years there has been a steady increase in acceptance of the draft crosses into a variety of disciplines. Meanwhile the number of horses produced by the industry has been drastically reduced, going from 30,000+ per year when the YHTRP started in 1999 to only 3,000 in 2009. Due to the expense of obtaining the draft cross horses – especially from the NAERIC ranches in Canada, the fact that there are so few produced that they are no longer considered at risk, and the low demand due to the poor economy, it has been decided to no longer obtain draft crosses in the future of the program.

In 2009-10 the YHTRP had a unique slant; for the first time in its history, the program included mustangs. Throughout the fall 2009 and spring 2010 semesters, students incorporated mustangs into their research. The four mustangs, RU Rambling Rose, RU Canella, RU Casanova, and RU Marley, were extremely popular during the annual spring auction. Despite unseasonably cold and rainy weather, a sizeable crowd, including 21 bidders attended the auction on Sunday, April 25 at the Round House on G. H. Cook Campus. All 12 of the young horses were sold. Several of the young horses were sold to owners of previous YHTRP graduates. Other horses were purchased by the students who handled and trained them as part of the program.

For more information about the Young Horse Teaching and Research Program, please visit <http://younghorse.rutgers.edu> or call Sarah Ralston at 732-932-9404.

## **Public Course Offerings**

Many of the SEBS undergraduate courses are open to the general public through the Office of Continuing Professional Education. Courses include: Developing Future Leaders for the Equine Industry; Horse Management; Equine Nutrition; and Advanced Equine Health and Management.

Developing Future Leaders for the Equine Industry, is a two-day short course directed toward those involved in New Jersey’s equine industry. Developed and offered by the Equine Science Center, the course brings together a team of instructors led by Mary Nikola and Karyn Malinowski. Topics include the value of the equine industry, networking and relationship-building, decision-making strategies, leadership practices and behaviors, building coalitions, and industry management. In 2010, seventy-five percent of the students stated in a pre-and post-class survey that the class exceeded expectations. All students expressed the desire to expand the class to more days and indicated an increase in skill set for building legislative relationships and in coalition building by 202 and 344 percent, respectively.

Horse Management, taught by Sarah Ralston, is a 14 week course providing an introduction to the anatomy, physiology, nutrition and behavior of a horse. Animal science equine management techniques and the practical aspects of horse care including stabling, shoeing/hoof care, common diseases and emergency care are discussed in classroom lectures. Students benefit from live demonstrations and hands-on training. In addition to the classroom lectures and demonstrations, optional field trips are offered throughout the program schedule.

Ralston also offers Equine Nutrition, providing in-depth information on the function and peculiarities of equine gastrointestinal physiology and the importance and metabolism of the nutrients essential for equine well being. Common feeds and supplements used to provide these nutrients are discussed in addition to how to read and interpret commercial feed labels and balance rations, using feed analyses and computer programs. Students learn how to recognize and prevent feed-related illnesses and how to meet the special needs of horses that are ill or geriatric. Practical approaches to feeding various

classes of horses, such as broodmares, stallions, foals and performance horses, in addition to feeding systems including pasture management, are presented in the last segments of the course. Several optional "wet labs" and field trips are offered during the semester.

Advanced Equine Health Care and Management is taught by Michael M. Fugaro, a veterinarian and associate professor of equine studies at Centenary College and an adjunct professor at Rutgers University. This course presents in-depth information on the diseases and common emergency disorders of horses. It utilizes basic concepts of anatomy and physiology, applies them to clinical situations that arise in horses, and teaches students how to effectively manage health-related situations. A limited number of seats in the program are available to continuing education (non-matriculated) students.

### **Doris C. Murphy Endowed Scholarship in Equine Science**

The Doris C. Murphy Endowed Scholarship in Equine Science was created to honor the memory of a woman who loved animals. Shortly before Ms. Murphy's death in 1998, she contacted her financial advisor, Kate Sweeney of Smith Barney, and expressed her desire to support animal studies. Ms. Sweeney, a Cook College alumna, suggested the equine science program as an appropriate beneficiary, and as Ms. Murphy was also very supportive of women's education, the endowed scholarship is offered to female undergraduate students majoring in Animal Sciences with an equine science interest. Students must also be New Jersey residents. Scholarship recipients for the 2009-2010 academic year were Caitlin Belding, Lisa Furbeck, Kathleen Richards, Rachel Waltzer, and Jennifer Woodruff.

## **Community/Industry Involvement**

### **Equine Science Center Participates in First Urban 4-H Summer Science Program**

On July 7, 2009, the Center hosted 45 high school students at the Equine Exercise Physiology Laboratory as part of the inaugural 4-H Summer Science Program for urban youth. High school students from Camden, Hackensack, Paterson, and Trenton learned about science as they explored research in a series of interactive activities in equine, animal, marine, environmental and food sciences alongside a number of Rutgers faculty from these disciplines. Most of these urban youth enjoyed their first 4-H experience as they gained a better understanding of opportunities available in science, engineering, and technology.



The Center presented the students with a high-speed equine treadmill demonstration and simulated experiment as well as an opportunity to study equine behavior while observing yearlings from the popular Young Horse Teaching and Research Program. Young people in attendance learned how agriculture and science intersect at the Equine Science Center, with the hope that they will get inspired and realize that if they like horses, or are interested in science, there is a place for them at Rutgers University.

### **“All About Horses” Camp**

The New Jersey Museum of Agriculture partnered with the Equine Science Center for the 2009 “All About Horses” camp, an introductory camp for children new to horse care, horse riding, and those generally interested in horses. The first day of camp featured instruction by Carey Williams, Equine Extension Specialist. Campers experienced two days of grooming and training lessons followed by two days of trail rides and a demonstration of a horse on the high-speed treadmill.

### **Rutgers University and Centenary College Collaborate to Offer “Science of Horses”**

Rutgers University and Centenary College offered a one-day seminar to introduce the academic discipline of equine science and discuss career opportunities available within the equine industry. The seminar was held at DREAM Park on Saturday, August 8, 2009. Sarah Ralston and Carey Williams joined Michael Fugaro to provide a day of equine science education and innovative professional development. The seminar was geared toward middle- and high school science and agricultural teachers, and equine enthusiasts. Topics included basic horse behavior, nutrition, normal and equine abnormalities, as well as information on higher education and occupations in the equine science field.

### **Governor Corzine’s Appointed Commission Discussed the Future of the Horse Racing Industry in New Jersey**

On Wednesday, September 9, 2009, the Center hosted the Governor's Commission on the Future of Horse Racing. The agenda included two presentations: an Equine Industry Update from Karyn Malinowski and a presentation by commission member Dennis Robinson, president and CEO of the New Jersey Sports and Exposition Authority.

Malinowski presented results from the Center's 2007 New Jersey equine industry economic impact study and highlights from the 2009 report on the impact of slot machines and video lottery terminals on the horse racing industry. Mr. Robinson's presented an overview of statistical data on casino gaming interests in the Northeast, specifically looking at New Jersey, New York, Pennsylvania, Delaware, and Connecticut. The Center was proud to present the facts about the current and projected state of the equine industry in New Jersey. Welcoming the Commission to Rutgers University provided an opportunity for the Center to introduce itself to policy decision-makers and share the achievements and scientific advancements of the Center.

## **Colts Neck Barn Tour**

Rutgers University Animal Sciences students served as tour assistants on behalf of the Equine Science Center during the Colts Neck Barn Tour, held September 12, 2009. The tour, sponsored by the Colts Neck Polo Club, featured exclusive visits to five grand stables in Colts Neck, NJ. The Ashley Lauren Foundation and Someone Special Needs You were the designated beneficiaries of the tour. Students answered equine-related questions from tour attendees, provided support to stable owners, and were exposed to influential individuals within the horse industry, and were provided the opportunity to share the science-based research they are currently conducting and the hands-on equine experience they are receiving at the Equine Science Center.

## **Stakeholder Strategic Planning Meeting**

Every year, the Equine Science Center convenes a stakeholder meeting which brings together diverse segments of the New Jersey horse industry with key faculty and staff associated with the Equine Science Center.

The meeting is designed to encourage open discussion in order to:

- Take the pulse of the industry
- Elicit feedback on Equine Science Center programs and strategies
- Identify the industry's current issues and concerns
- Share with our constituency the work of the Equine Science Center

Participants are reminded of the Center's mission: Better Horse Care through Research and Education to Advance the Well-Being and Performance of Horses and the Equine Industry. On October 16, 2009, more than 60 stakeholders gathered to focus their attention on horse health, integrity of the equestrian sport, land use and environmental stewardship, the future of the equine industry and other areas of concern. After evaluating recent Center accomplishments, open discussion amongst stakeholders was encouraged. Attendees expressed concern about colic, treating and administering medication, and laminitis. Natural supplements were also discussed, as well as identifying solar energy sources on farms, water runoff rules, composting and the animal waste management rule, and soil disturbance and drainage issues. Stakeholders also focused on responsible horse ownership, reinvigorating the horse racing industry in New Jersey, hay and alternative sources of forage, and the therapeutic benefit of horses.

## **New Jersey Society of Pennsylvania**

On November 3, 2009, the Center welcomed over 80 members from the New Jersey Society of Pennsylvania for a day of equine research and technology.

Visitors assembled at the New Jersey Museum of Agriculture before a brisk morning walk to the Equine Science Center's Equine Exercise Physiology Laboratory. Karyn Malinowski spoke with guests about the importance of the Center, and the significant impact research conducted at the Center has on the local and global equine industry. Kenneth McKeever shared the history of the equine exercise physiology lab and explained the scientific principles of exercising horses on an equine treadmill. Carey Williams led the treadmill demonstration.

The visit concluded with an optional tour of the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm; guests also had the option of viewing the draft cross weanlings and mustangs as part of the Young Horse Teaching and Research Program.

## **Record Turn-Out for Annual Equine Science Update**

On Tuesday, December 8, 2009, the Equine Science Center welcomed over 170 guests to the annual Equine Science Update at the Cook Campus Center. Center researchers offered guests a first-hand look into current scientific research projects as well as activities and projects conducted at the Center. The evening began with a lively presentation entitled "Lights, Camera, Equine!" by Anna Matthews and Julie Vence, Warren County 4-H members. Karyn Malinowski, presented a year in review as she highlighted accomplishments of the Center during 2009.

In looking toward the future, Malinowski revealed the Center's plan to enhance the youth component of its website *Equine Science 4 Kids!*. Other presentations included Environmental Impacts of Equine Operations: Presentation of the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm by Carey Williams; Mustangs and Metabonomics by Sarah Ralston; Effects of Age and Training on the Hormonal Regulation of Glucose Metabolism in Horses by Nettie Liburt, doctoral candidate in Kenneth McKeever's laboratory; and How Gut-Derived Bacteria Influence the Incidence of Laminitis by Janet Onishi, a visiting scientist at the Center.

The Equine Science Update was a major draw for members of 4-H clubs within the state of New Jersey. Members representing Burlington, Gloucester, and Cumberland counties chartered a bus bringing over thirty eager equine enthusiasts to the event. Wendy Hale, chair of the Horse Project Advisory Committee presented the Equine Science Center with a \$1,000.00 donation from the Burlington County 4-H Club. Estella Almeida and Helen Ferraro, also with the Horse Project Advisory Committee, presented a \$1,000.00 donation to the Center from the Tri-County (Middlesex, Monmouth, and Ocean) 4-H Horse Clubs.

## **Annual Horse Management Seminar**

"So you want to keep your horse sound...?" was the over-arching theme of the Horse Management Seminar hosted by the Rutgers Equine Science Center and Rutgers Cooperative Extension, on Sunday, February 7, 2010 with approximately 75 people in attendance. Carey Williams assembled presenters recognized as experts in their field to offer personal insight and perspectives. Topics included: biomechanics and physiotherapy; leg care tips; rehabilitation from injury; unwanted horses; and responsible horse ownership. In the post-seminar evaluations the importance of the topics ranged from a 3.84 – 4.56 (on a scale of 1-5 with 5 being the most valuable) with information on physiotherapy and back care being the most valuable. When attendees were asked to rank the seminar concepts and to indicate the extent that their knowledge changed after attending the Horse Management Seminar, all topic areas ranged from a 1.6 (no increase in knowledge at all) to a 4.4.

## Multi-Media

In an effort to continually implement new ways to experience its website, the Center added a Multi-Media webpage in spring 2010. The Multi-Media page features archives of staff interviews, Center videos, and other interactive media such as webinars, virtual tours, and the highly popular podcast series. The page provides easy access to a variety of educational tools to give the public a menu from which to select.

## Webinar Series

The Center offered six webinars in the fall of 2009 and spring of 2010. By definition, a webinar is a seminar, presentation, and/or lecture transmitted over the internet. Webinars are designed to be interactive with the ability to give, receive, and discuss information. The webinar series is open to the public and registration is simple. Best of all, there is no fee to participate. When presented live, each webinar attracted an impressive audience that actively participated in the presentation.

The complete webinar series is archived on the Equine Science Center website and can be found on the multi-media page. The series contains in-depth presentations on equine science and horse industry issues. By providing an archive to the series, the Center aims to reach individuals who were unable to participate during the live sessions. In the fall, the post-webinar survey responses were overwhelmingly positive with an average rating of 4.09 (on a scale of 1-5 with 5 being the most valuable) for the four seminars. Overall knowledge score of the participants went from a 2.83 (1 = no knowledge, 5 = excellent knowledge) before the seminar to a 3.76 after the seminar. In terms of using the webinar system for extension programming, 88.9% of the respondents to the survey had no difficulty with directions to access the webinar and highly enjoyed it. Only 3.7% of the respondents said they would rather have traditional extension programming, and 76.4% said they were eager to participate in future webinars.

Post-webinar survey results from the spring series were similar to the fall with an overall average educational value of the seminars being 4.06 out of 5. Participants increased their knowledge from a 2.12 to a 3.53 (1 = no knowledge, 5 = excellent knowledge) after the webinar. Sixty percent of respondents mentioned that they would use the methods presented in the webinars for horse or farm management. Again, 94.1% of the respondents found the webinars easily accessible and enjoyable, and 76.5% were eager to participate in future webinars.

## Spirit of the Horse Award

Beginning in January 2006, the Equine Science Center was invited to present an award at the annual Breeders Awards Dinner of the New Jersey Department of Agriculture. This event highlights the achievements of the state's horses and horse people, culminating with the Governor's Trophy for the Horse Person of the Year. The "Spirit of the Horse" award recognizes individuals whose lives have been profoundly changed because of their involvement with horses and who have acknowledged the impact by giving back to the horse industry.

The Center named Antoinette Nigito as the 2010 recipient of the "Spirit of the Horse" award. Mrs. Nigito received the award during the 53<sup>rd</sup> annual award ceremony on Sunday, January 31, 2010 from Sandy Denarski, chair of the Rutgers University Board for Equine Advancement, and Center director Karyn Malinowski.



## **Awards**

### **Equine Science Center Director Honored as 2009 “Horseperson of the Year”**

Karyn Malinowski was named the “Horseperson of the Year” by the New Jersey Department of Agriculture’s Equine Advisory Board. Malinowski was presented with the 2009 Governor's Trophy on Sunday, January 31, 2010 at the 53th Annual New Jersey Breeder's Luncheon, an event which celebrates the state's best in the equine field. Malinowski’s research and extension programs focus on improving the well-being and the quality of life for equine athletes while ensuring the vitality and viability of the equine industry, both statewide and nationally. She assumed the lead role in conceptualizing and building the equine science program at Rutgers University and has long been active in cultivating funding for research and extension programs from a variety of sources to sustain the Equine Science Center. Malinowski led the industry effort which resulted in the New Jersey Agricultural Experiment Station receiving \$1.2 million for *Strategic Initiatives* in 1992 from the New Jersey State Legislature. Strategic Initiatives funding has brought in over \$17 million to NJAES from 1992-2010.

### **Carey Williams, Colorado State’s 2010 “Distinguished Young Alum”**

Carey Williams, Rutgers University Equine Extension Specialist and associate director of outreach with the Equine Science Center, received the 2010 Colorado State University Department of Animal Sciences “Creating the Mold” Distinguished Young Alum award. Colorado State University faculty nominate potential “Creating the Mold” award winners from a pool of Department of Animal Sciences alum who has been graduated within the past 15 years. Williams was selected to receive the award in part for her professional accomplishments and positive impact on the equine industry. Her academic achievements as an undergraduate and graduate student as well as her outstanding contributions through extension, teaching, and research were also taken into consideration for the award.

### **SEBS/NJAES Recognition**

Sarah L. Ralston, Associate Professor in the Department of Animal Sciences specializing in equine nutrition and associate director of teaching with the Equine Science Center, received the 2010 SEBS Academic Innovation Award. Ralston was recognized for her development of the highly innovative, sustainable, and forward thinking Young Horse Teaching and Research Program, which has been in existence for over a decade. The award was presented during a dinner reception at the G. H. Cook Campus Center on Cook Campus in New Brunswick on Monday, April 19, 2010.

### **New Scholarship Enables Continued Student Research**

Nettie Liburt, a Ph.D. candidate in the Rutgers University Graduate Program in Endocrinology and Animal Biosciences, was the inaugural recipient of a new scholarship from the Equine Science Center. The award was given by an anonymous donor. The scholarship is hinged on three criteria: 1) a student in need of financial support; 2) demonstrated contribution to the well-being of horses; and 3) student’s professed intention to continue his/her work to benefit horses.

### **Mid-Atlantic Nutrition Conference**

The Mid-Atlantic Nutrition Conference was held in Timonium, MD on March 24-25, 2010. Rutgers University Ph.D. candidate, Nettie Liburt and graduate student Danielle Smarsh, presented their work at the conference. Ms. Liburt received second place in the graduate student competition for her poster titled “Glucose homeostasis and the pituitary-adrenal response to cortisol stimulation tests before and after exercise training in old versus young Standardbred mares.”

### **Ernest C. Bell Scholarship**

Caitlin Belding, a senior at SEBS, was the recipient of the Ernest C. Bell Scholarship for 2010. The Ernest C. Bell Memorial Scholarship Fund was established by the New Jersey Equine Advisory Board to perpetuate Mr. Bell’s memory and his ideals of courage and determination.

## **Business Operations**

In 2009 the Center director, associate directors and director of communications developed a new business plan for the period 2009-2014. The document identifies the Center’s accomplishments over the previous five years and details a roadmap for future activity and progress.

### **Center Objectives for the Period 2009-2014:**

1. Continue providing clearly-defined programs and deliverables for the Equine Science Center
2. Communicate the programs, deliverables and implementation progress of the Equine Science Center sufficiently and successfully to the administration, faculty and staff of Rutgers, the School of Environmental and Biological Sciences, the New Jersey Agricultural Experiment Station, RUBEA, stakeholders, other interested groups and the public at large
3. Create a succession plan for the leadership and administration of the Center
4. Secure sufficient capital and operating funds for the Center to ensure its viability for 10 to 20 years and beyond
5. Expand the breadth and scope of the Center’s research, teaching and outreach capabilities

### **Marketing, Media and Public Relations**

The Equine Science Center continued its major marketing campaign in 2009/10, positioning the Center as the provider of wide-ranging services to the public. A new look for Center advertisements (see Appendix C) was created and focused on the theme that horses make good neighbors and teachers. The first ad, produced in partnership with the New Jersey Department of Agriculture, featured environmental Best Management Practices for horse farms; the second featured *Equine Science 4 Kids!* Ads were placed in six issues of Horse News and in the Pennsylvania Equestrian World Horse Expo issue distributed to 19,000 people, and the Equine Journal.

The Center used the look of the two ads and featured the “Scoop on Poop” and *Equine Science 4 Kids!* on recycled shopping bags and mouse pads which were distributed at the Equine Science Update, in county Extension offices, and at Ag Field Day.

The Center also acquired a major presence at the Meadowlands Racetrack featured in a banner at the finish line. The banner demonstrates the partnership between the Center and the New Jersey Sports and Exposition Authority (NJSEA) which recognized the Center for its value to horse racing in the state of New Jersey.



### **Now on Facebook: “Friends of the Rutgers Equine Science Center Club”**

The board of directors of the Equine Science Center formed an Advocacy Committee, chaired by Cathy Ball at its 2009 spring meeting. The newly formed “Friends of the Rutgers Equine Science Center Club” held its inaugural meeting in May 2009, and created a Facebook page named after the club.

The goal of the new Facebook page is to create a shared sense of community among alumni, students, faculty, staff and equine enthusiasts. The Facebook page has news, upcoming events and a discussion forum. The Center’s aim is to utilize social media to further the Center’s mission of “Better Horse Care through Research and Education.” The “Friends of the Rutgers Equine Science Center Club” Facebook page is open to the public and anyone can join, although one must have a Facebook account to do so. (Facebook accounts are free, and there is no membership fee to join the group).

The Friends of the Rutgers Equine Science Center Club’s Facebook page can be viewed at: <http://www.facebook.com/home.php?#/group.php?gid=107954324793> .

### **Rutgers Equine Science Center’s Horse Treadmill Debuted on ESPN**

On October 16, 2009 the Equine Science Center’s high-speed treadmill was featured on ESPN during the broadcast of the Rutgers versus Pittsburgh football game. The segment, which aired during the fourth quarter of the game, showed footage of Snowdrift, a standardbred mare, exercising on the treadmill. The video clip also mentioned the significance of the Equine Science Center as a resource to the equine industry and for its scientific research which benefits both horses and humans.

### **Media Relations**

Forty-seven press releases were produced and distributed to the media from July 1, 2009 through mid-year 2010. The Equine Science Center was cited 105 times and featured in publications ranging from The Star Ledger to Standardbred Canada.

During the same time period, three Open Houses were held to accommodate the many requests received from the public for treadmill demonstrations. Attendees include prospective donors and students. In addition to an overview of the Center’s work and the ever-popular treadmill demonstration, attendees witness a “mock experiment” conducted by graduate students.

The Center also produced two newsletters during the period. Each newsletter was distributed to more than 8,000 recipients. Both are archived on the Center’s website for the convenience of stakeholders.

## **Fund-Raising and Development**

In 2009, the Center secured a quasi-endowment at the Rutgers University Foundation with over \$300,000 in this account. For the period of 2009-2010, \$234,659 was procured by faculty and staff in cash gifts, donations, and income from miscellaneous sources such as registration at events. Since its last Stakeholder Report, the Center welcomed two new members of the “Community of ‘50’ for Equine Excellence,” and a new Platinum Partner, the Standardbred Breeders and Owners Association of New Jersey.

Overall, the fund-raising focus of the Center continues to be an endowment of \$3 million. The Center has called upon its advisory board to wholeheartedly assist in achieving the endowment through private gifts and assistance in fundraising and advocacy efforts.

### **Equine Science Center and New York Times Best Selling Author Team-Up for Fundraiser**

The Center hosted a fundraising reception featuring Susan Richards, author of the New York Times Best Selling Book “Chosen by a Horse”. The event took place on Monday, May 24, 2010 at the New Jersey Museum of Agriculture on the G. H. Cook Campus in New Brunswick, NJ. Approximately 100 people attended the event which began with dinner at 5:30 pm followed by Richards reading passages from her new book, “Saddled”, which was released in early May. The event was sponsored by RUBEA members Sandy Denarski and Liz Durkin, Durkin & Durkin, LLC, and Johnson & Johnson.



### **New Jersey State 4-H Horse Show Benefits the Equine Science Center**

The 2009 New Jersey State 4-H Championship Horse Show included a new division in its prize list: the Equine Science Center Benefit Fun Show. Intended to recognize the Center for its contributions to the equine industry, the show featured classes and games sponsored by participating 4-H counties. The show, which was held at the Horse Park of New Jersey from Thursday, August 20 - Sunday, August 23, raised \$400.00 for the Center.

### **Women of Influence**

Beginning in the fall of 2009, the Center began hosting intimate dinner parties with “Women of Influence” who are members of the “Community of ‘50’ for Equine Excellence. The purpose is to engage influential women in the horse industry in networking opportunities and to discuss issues of importance to the Equine Science Center and the horse industry.

## **Events**

Events coordinated and hosted by the Equine Science Center or where Center description and activities were the presentation focus:

### **2009**

|                  |                                                                        |
|------------------|------------------------------------------------------------------------|
| July 7           | Urban 4-H Summer Science Program                                       |
| July 31          | Department of Animal Sciences Retreat                                  |
| August 7         | Hambletonian Veterinarian Continuing Education Seminar                 |
| August 12        | Colts Neck Business Association                                        |
| August 20 - 23   | State 4-H Championship Horse Show                                      |
| September 9      | Governor's Commission on the Future of Horse Racing Meeting            |
| September 12     | Colts Neck Barn Tour                                                   |
| September 19     | All Breed Horse Show                                                   |
| October 7        | USET and Pennfield Feeds Lecture                                       |
| October 10 – 11  | Regional Project: NE-1041 Inaugural Meeting                            |
| October 15       | ESPN filming of Treadmill Lab                                          |
| October 16       | Stakeholder Meeting, Open House, and Farm and Land Management Workshop |
| October 17       | Coming Out Party for Young Horses                                      |
| October 26       | Women of Influence Dinner                                              |
| October 29       | World of Horses Lecture – Morristown Museum                            |
| November 3       | New Jersey Society of Pennsylvania – tour Treadmill Lab and lunch      |
| November 10      | Women of Influence Dinner                                              |
| November 16 – 17 | NJ Farm Bureau Convention                                              |
| November 21      | Douglass Women in Science Project lecture                              |
| December 1       | Temple Grandin visit and lecture                                       |
| December 8       | RUBEA meeting and Equine Science Update                                |

## **2010**

|              |                                                                                |
|--------------|--------------------------------------------------------------------------------|
| January 23   | Treadmill Lab Tour – Accelerated Youth                                         |
| January 31   | Breeders Award Luncheon – Spirit of the Horse Award given to Antoinette Nigito |
| February 7   | Horse Management Seminar                                                       |
| February 9   | NJ Ag Convention                                                               |
| March 20     | Junior Breeders Symposium                                                      |
| April 9      | Discovery Initiative Tour – Treadmill Lab                                      |
| April 11     | VIP Preview of Young Horses                                                    |
| April 24     | Rutgers Day – Ag Field Day                                                     |
| April 25     | Young Horse Teaching & Research Program Young Horse Auction                    |
| May 7 – 9    | Jersey Fresh – Three-Day Event                                                 |
| May 10       | Women of Influence Dinner                                                      |
| May 24       | Susan Richards Book Signing Fundraiser                                         |
| May 25       | Update to New Jersey Farm Bureau                                               |
| May 26       | Women’s League of Rutgers University                                           |
| June 1       | ARCH – Kickoff the Month of the Horse                                          |
| June 5       | DREAM Park Community Day                                                       |
| June 20 – 23 | American Horse Council Convention                                              |
| June 28      | RUBEA meeting                                                                  |
| June 30      | Center Retreat                                                                 |

## **Future Plans**

In 2011 the Equine Science Center will celebrate its tenth anniversary. Plans are underway to showcase the Center and its work in a big way! The Center's website and newsletter will have a new look and celebratory events are in planning stages. Public Relations Specialist, Tiffany Cody has prepared a plan for the Center to use as it engages its public in what will surely be an important year.

Programs currently funded by the Center are selected for their practical applications and promise of deliverables, their interdisciplinary and team approach, their sustainability over a two- to three-year period, their relevance to stakeholders and their adherence to accepted practices of scientific investigation. An emphasis for the Center and its faculty and staff in the immediate future and beyond will be to ramp up the amount of extramural funding in support of the on-going research currently in place in the areas of: horse health, environmental stewardship, land-use issues, integrity of equine sport and economic growth and sustainability for the industry. This is especially critical now since the state line item for Strategic Initiatives was zeroed out in the FY'11 State Budget.

Center faculty, students, and staff will look to corporations, foundations and private donations to assist us in continuing the excellent research and outreach programs that our constituents have come to expect.

To help the Center reduce costs in terms of actual dollars and labor, without sacrificing excellence, the website and its multi-media efforts will be enhanced. By the end of 2010 the Center will have a virtual tour of the Equine Exercise Physiology Laboratory online and will have new additions to the Responsible Horse Ownership portion of the website. Equine Science 4 Kids continues to expand and will include interactive games in place for all three teaching modules by the close of the current fiscal year.

The Center will continue to be recognized for its leadership in ensuring the horse industry's and agriculture's future in the Garden State. The Center serves as a voice for all equine interests as it carries out its mission of better horse care through research and education.

Social media will be used to a greater extent in order to communicate the programs and outcomes of the Center sufficiently and successfully to the administration, faculty and staff of Rutgers, the School of Environmental and Biological Sciences, the New Jersey Agricultural Experiment Station, RUBEA, stakeholders, other interested groups and the public at large. The Center will begin to expand the use of electronic delivery for the newsletter to reduce costs.

On the academic side the Center is developing the Masters of Business and Science degree (MBS) for Animal Sciences. This degree is an innovative graduate degree designed to allow students to pursue advanced training in both science and business without a Ph.D. or an MBA.

## NOTES

## NOTES

## Appendix A

### Faculty and Staff Contact Information 2010

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><u>Carol A. Bagnell, Ph.D.,</u></b></p> <p>is chair of and a professor in the Department of Animal Sciences at Rutgers' School of Environmental and Biological Sciences. Her research focus is on late-term pregnancy loss in horses and the challenge of finding a reliable biochemical marker of placental function and fetal well-being. She is a recognized expert in endocrinology and teaches undergraduate classes in animal reproduction and animal microtechniques and tissue culture. She also is principal investigator in an Equine Science Center-funded project aimed at developing an exercise-induced joint inflammation model in horses.</p> <p>Office 126 - Foran Hall<br/>Tel: 732-932-8165 x102<br/>Fax: 732-932-6996<br/><a href="mailto:bagnell@aesop.rutgers.edu">bagnell@aesop.rutgers.edu</a></p> | <p><b><u>William J. Bamka</u></b></p> <p>is the Agricultural Agent at Rutgers Cooperative Extension of Burlington County. He has worked extensively on the areas of forage quality, nutrient management, water quality and pasture management, the latter focusing on grazing practices that affect forage use, animal performance and natural resource protection.</p> <p>Cooperative Extension of Burlington County<br/>2 Academy Drive<br/>Westampton, NJ 08060-3826<br/>Phone: 609-265-5050<br/>Fax: 609-265-5613<br/><a href="mailto:bamka@njaes.rutgers.edu">bamka@njaes.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p><b><u>Donna Fennell, Ph.D.,</u></b></p> <p>is an assistant professor in the Department of Environmental Sciences. Her research focuses on bioremediation of sediments contaminated with dioxins and PCBs, identification and characterization of dechlorinating bacteria, and production of biofuels from wastes by anaerobic digestion. She is principal investigator in an Equine Science Center-funded project investigating the feasibility of converting horse waste into bioenergy.</p> <p>Department of Environmental Sciences<br/>14 College Farm Road<br/>Room 231 ENR<br/>Phone: 732-932-9800 ext 6204<br/>Fax: 732-932-8644<br/><a href="mailto:fennell@envsci.rutgers.edu">fennell@envsci.rutgers.edu</a></p>                                                                                                     | <p><b><u>Daniel Giménez, Ph.D.,</u></b></p> <p>is an associate professor in the Department of Environmental Sciences. His interests include monitoring and predicting movement of nutrients and pesticides from watersheds in response to hydrological events, groundwater-surface water pollution, and measurement and prediction of water movement in soils. He is principal investigator in an Equine Science Center-funded project examining the impact of horse manure and composted manure on soil and water quality.</p> <p>14 College Farm Road<br/>New Brunswick, NJ 08901<br/>732-932-9800, Ext. 6205<br/>Fax: 732-932-8644<br/><a href="mailto:gimenez@envsci.rutgers.edu">gimenez@envsci.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                                                     |
| <p><b><u>Paul D. Gottlieb, Ph.D.</u></b></p> <p>is chair of and an Associate Professor of Agricultural, Food and Resource Economics at Rutgers' School of Environmental and Biological Sciences, with statewide responsibilities related to smart growth, land use policy and economic development in rural communities. He is the Principal Investigator for the New Jersey Equine Industry 2007: Economic Impact study.</p> <p>55 Dudley Road<br/>New Brunswick, NJ 08901<br/>(732) 932-9155 x223<br/><a href="mailto:gottlieb@aesop.rutgers.edu">gottlieb@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                           | <p><b><u>Nancy E. Halpern, DVM</u></b></p> <p>is Director of the New Jersey Department of Agriculture's Division of Animal Health. Prior to her appointment, she served as assistant director of livestock disease control (1999 to 2002). Dr. Halpern has been owner of Large Animal Medical Associates since 1987, and has served as resident in theriogenology at the University of Illinois School of Veterinary Medicine and clinical instructor in ambulatory medicine at Virginia Tech's College of Veterinary Medicine. She has also served as an ambulatory medicine intern at Cornell; externships at both the National Zoo in Washington, D.C., and Metropolitan Toronto Zoo; and as a research fellow at the San Diego Zoo, Oklahoma City Zoo and Royal Rotterdam Zoological and Botanical Garden in the Netherlands.</p> <p>Dept. of Agriculture<br/>Div. of Animal Health<br/>P. O. Box 330<br/>Trenton, NJ 08625<br/>Telephone: (609) 292-3965<br/>Fax: (609) 777-8395<br/><a href="mailto:nancy.halpern@ag.state.nj.us">nancy.halpern@ag.state.nj.us</a></p> |

**Appendix A**  
**Faculty and Staff Contact Information 2010**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><u>George C. Hamilton, Ph.D.</u></b></p> <p>is chair of and Extension Specialist in pest management in the Department of Entomology. His area of interest is pesticides and pest control.</p> <p>Blake Hall Rm 217<br/> Phone: 732.932.9801<br/> Fax: 732.932.9751<br/> <a href="mailto:hamilton@aesop.rutgers.edu">hamilton@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                      | <p><b><u>Stephen E. Hart, Ph.D.</u></b></p> <p>is an Extension Specialist in weed management practices in turfgrass, ornamentals, and non-crop areas. He also plays a key role in developing and evaluating weed management systems, particularly those that integrate cultural and chemical strategies and reduce herbicide use.</p> <p>59 Dudley Road<br/> New Brunswick, NJ 08901-8520<br/> 732-932-9711, Ext. 166<br/> Fax: 732-932-9441<br/> <a href="mailto:hart@aesop.rutgers.edu">hart@aesop.rutgers.edu</a></p>                                                                                           |
| <p><b><u>Joseph R. Heckman, Ph.D.</u></b></p> <p>is the Extension Specialist in soil fertility and best nutrient management practices to minimize impact on the environment.</p> <p>59 Dudley Road - Foran Hall<br/> New Brunswick, NJ 08901-8520<br/> Phone: (732) 932-9711 ext.119<br/> Fax: (732) 932-9441<br/> <a href="mailto:heckman@aesop.rutgers.edu">heckman@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                   | <p><b><u>Zane R. Helsel, Ph.D.</u></b></p> <p>is the Extension Specialist in agriculture energy. He has led a program with USDA-NRCS in New Jersey to work on comprehensive nutrient management plans for horse and other livestock operations in the state. His agronomic Extension and research interests are in forage quality and pasture management and he has served as a liaison to the Northeast Pasture Research and Extension Consortium.</p> <p>59 Dudley Rd.<br/> Foran Hall/ Cook Campus<br/> New Brunswick, NJ 08901<br/> <a href="mailto:helsel@aesop.rutgers.edu">helsel@aesop.rutgers.edu</a></p> |
| <p><b><u>Larry S. Katz, Ph.D.,</u></b></p> <p>is Director of Rutgers Cooperative Extension; Associate Director, New Jersey Agricultural Experiment Station; and Professor in the Department of Animal Sciences. He is known for his work on the endocrine basis of sexual behavior of domesticated ruminants (cows, sheep, goats, and deer). He has worked extensively on animal rights and welfare issues and the management of wildlife populations, particularly deer.</p> <p>88 Lipman Drive<br/> Martin Hall Room 309<br/> Tel: 732-932-5000 x 581<br/> Lab: 732-932-3759<br/> Fax: 732-932-6633<br/> <a href="mailto:katz@aesop.rutgers.edu">katz@aesop.rutgers.edu</a></p> | <p><b><u>Stephen J. Komar</u></b></p> <p>is the Sussex County Agricultural Resource Management Agent with Rutgers Cooperative Extension, specializing in crop and nutrient management. He is working on nutrient waste management plans in his region, especially in the area of manure composting.</p> <p>County Agricultural Agent<br/> Rutgers Cooperative Extension, Sussex County<br/> 129 Morris Turnpike<br/> Newton, NJ 07860<br/> 229-732-2311 (T)<br/> 973-948-5582 (F)<br/> <a href="mailto:skomar@aesop.rutgers.edu">skomar@aesop.rutgers.edu</a></p>                                                  |

## Appendix A

### Faculty and Staff Contact Information 2010

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><u>Uta Krogmann, Ph.D.</u></b></p> <p>is Extension Specialist in Solid Waste Management at the Rutgers Cooperative Extension New Jersey Agricultural Experiment Station. Her research and outreach projects focus on managing biodegradable organic waste, including composting and land application of organic wastes such as food processing residuals, manure and sewage sludges, and food and yard waste. Recent research and outreach involve analyses used in policy-making in solid waste management.</p> <p>Dept. of Environmental Sciences<br/>ENRS Bldg., Rm. 246<br/>Rutgers, The State University of New Jersey<br/>14 College Farm Rd.<br/>New Brunswick, NJ 08901-8551<br/><b>Phone:</b> 732-932-9800, ext. 6207<br/><b>Fax:</b> 732-932-8644<br/><a href="mailto:krogmann@njaes.rutgers.edu">krogmann@njaes.rutgers.edu</a></p> | <p><b><u>David Lee</u></b></p> <p>is the Salem County Agricultural and Resource Management Agent with Rutgers Cooperative Extension. His expertise is in livestock (including equine) and field and forage, and he also has created financial management tools for farmers.</p> <p>South Jersey IPM Coordinator<br/>Salem County Cooperative Extension<br/>51 Cheny Road, Suite 1<br/>Woodstown, NJ 08098-9982<br/>856-769-0090<br/><a href="mailto:dlee@njaes.rutgers.edu">dlee@njaes.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b><u>Karyn Malinowski, Ph.D.</u></b></p> <p>is the Director of the Equine Science Center at the New Jersey Agricultural Experiment Station (NJAES). Her research and extension programs concentrate on improving the well being and quality of life of the equine athlete while ensuring the vitality and viability of the equine industry, both statewide and nationally. Her recent research focus has been investigating the endocrine and immune response to exercise in horses and how they are impacted by age. Malinowski has also published several white papers on the horse racing industry in New Jersey.</p> <p>Equine Science Center<br/>ASB II<br/>57 US Highway 1 South<br/>New Brunswick, NJ 08901<br/>(732) 932-9419<br/><a href="mailto:malinowski@aesop.rutgers.edu">malinowski@aesop.rutgers.edu</a></p>                     | <p><b><u>Kenneth H. McKeever, Ph.D., FACSM,</u></b></p> <p>is Associate Director-Research for the Rutgers Equine Science Center and Professor in Rutgers' School of Environmental and Biological Sciences. He has focused his basic research on comparative exercise and cardiovascular physiology with a particular interest in baroreceptor function as well as renal and neuroendocrine control of blood pressure, blood volume, and fluid and electrolyte balance. On an applied level, his research has focused on the effects of ergogenic (performance-enhancing) practices on the physiological responses of the equine athlete. Research in the lab is focused on basic physiology of the equine athlete. He has lectured on the many similarities between horses and humans and is using the horse as a model to study the effects of aging on a variety of physiological systems.</p> <p>Dept. Animal Sciences<br/>Bartlett Hall<br/>School of Env &amp; Biol Sciences<br/>New Brunswick, NJ 08901<br/>(732) 932-9390<br/><a href="mailto:mckeever@aesop.rutgers.edu">mckeever@aesop.rutgers.edu</a></p> |

**Appendix A**  
**Faculty and Staff Contact Information 2010**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><u>William A. Meyer, Ph.D.</u></b></p> <p>is director of the Turfgrass Breeding Project in the Department of Plant Biology and Pathology and also serves as director of the Adelphia Research Center in Freehold and Horticulture Farms I and II in North Brunswick and as associate director of the Center for Turfgrass Science.</p> <p>Department of Plant Biology &amp; Pathology<br/> Foran Hall/ Cook Campus<br/> 59 Dudley Rd.<br/> New Brunswick, NJ 08901<br/> Office: Room 296A Foran Hall<br/> 732-932-9711 x160<br/> <a href="mailto:wmeyer@aesop.rutgers.edu">wmeyer@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                      | <p><b><u>Robert C. Mickel</u></b></p> <p>is the Hunterdon County Agricultural Agent in the department of Agricultural and Resource Management Agents with Rutgers Cooperative Extension at the New Jersey Agricultural Experiment Station. He serves as the Regional Livestock Agent for northern New Jersey. His extension program focuses primarily on livestock, dairy, equine, field crops, forages (hay and pastures), and topics related to maintaining the sustainability and viability of agriculture, including alternative livestock and marketing.</p> <p>Rutgers Cooperative Extension of Hunterdon County<br/> Agriculture and Resource Development<br/> 6 Gauntt Place<br/> Building #2 - Lower Level<br/> Flemington, NJ 08822<br/> 9098.788.1338<br/> <a href="mailto:mickel@aesop.rutgers.edu">mickel@aesop.rutgers.edu</a></p>                                                                                                                       |
| <p><b><u>James Murphy, Ph.D.</u></b></p> <p>is a Rutgers Cooperative Extension Specialist in turf management and recently took a leading role in the rehabilitation of the Monmouth Park Racetrack turf course. The turf track project was part of a multimillion dollar refurbishment of the facility in preparation for the 2007 Breeders Cup thoroughbred races.</p> <p>Department of Plant Biology &amp; Pathology<br/> Foran Hall/ Cook Campus<br/> 59 Dudley Rd.<br/> New Brunswick, NJ 08901<br/> Office: Room 180 Foran Hall,<br/> 732-932-9711 x129<br/> <a href="mailto:murphy@aesop.rutgers.edu">murphy@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                           | <p><b><u>Stephanie Murphy, Ph.D.</u></b></p> <p>is the assistant director of the Plant Diagnostic and Soil Testing Labs at Rutgers. She is the co-principal investigator on an Equine Science Center-funded project examining the impact of horse manure and composted manure on soil and water quality.</p> <p><i>Laboratory Support Specialist</i><br/> Rm 120 ASB II, Soils Testing Laboratory<br/> 57 US Highway One (South)<br/> New Brunswick, NJ 08901<br/> Tel: (732) 932-7000 x4230<br/> Fax: (732) 932-9292<br/> <a href="mailto:smurphy@aesop.rutgers.edu">smurphy@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                                                                |
| <p><b><u>Christopher C. Obropta, Ph.D.</u></b></p> <p>is Extension Specialist in Water Resources for Rutgers Cooperative Extension at the New Jersey Agricultural Experiment Station. Dr. Obropta's background includes work in water quality modeling, hydrologic and hydraulic modeling, coastal engineering and watershed management. His specific experience includes watershed restoration, wasteload allocations and TMDL studies, stormwater management, wetland design, effluent dilution analyses, longshore sediment transport, computer-aided design and Geographic Information Systems (GIS).</p> <p>Dept. of Environmental Sciences<br/> ENRS Bldg., Rm. 232<br/> 14 College Farm Rd.<br/> New Brunswick, NJ 08901-8551<br/> Phone: 732-932-4917<br/> Fax: 732-932-8644<br/> <a href="mailto:obropta@njaes.rutgers.edu">obropta@njaes.rutgers.edu</a></p> | <p><b><u>Sarah L. Ralston, VMD, Ph.D., dACVN,</u></b></p> <p>is Associate Professor in the Department of Animal Sciences at Rutgers' School of Environmental and Biological Sciences specializing in equine nutrition. She has been Associate Director-Teaching of the Equine Science Center. Dr. Ralston currently teaches undergraduate courses in Horse Management and Equine Nutrition and serves as an advisor to undergraduate students. Dr. Ralston leads the Young Horse Teaching and Research Program. Her research is focused on glucose/insulin metabolism and developmental orthopedic disease in young horses with side interests in nutritional modulation of stress, metabonomics and pasture management.</p> <p>Department of Animal Sciences<br/> Office 209A - Bartlett Hall<br/> Tel: 732-932-9404<br/> Barn: 732-932-9348 or 732-932-1992<br/> Fax: 732-932-6996<br/> <a href="mailto:ralston@aesop.rutgers.edu">ralston@aesop.rutgers.edu</a></p> |

## Appendix A

### Faculty and Staff Contact Information 2010

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><u>Brian Schilling</u></b></p> <p>is associate director of the Food Policy Institute responsible for day-to-day administration within the Institute and research program development and implementation. His research has been focused on New Jersey farm viability, agricultural economic development at the urban-rural fringe, food system security and bioterrorism, and other policy issues in the food system. He is a principal investigator in the New Jersey Equine Economic Impact Study.</p> <p>Food Policy Institute<br/>3 Rutgers Plaza ASB III, Rm. 366<br/>New Brunswick, NJ 08901-8559<br/><b>Phone:</b> 732-932-1966, ext. 3106<br/><b>Fax:</b> 732-932-9544<br/><a href="mailto:schilling@aesop.rutgers.edu">schilling@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                      | <p><b><u>William J. Sciarappa, Ph.D.</u></b></p> <p>is the Monmouth County Agricultural Agent with the Rutgers Cooperative Extension New Jersey Agricultural Experiment Station. He is responsible for the field production, marketing and informational needs of agricultural clients, primarily in the areas of commercial vegetable crops, field crops, small fruit, equine pasture and natural resources.</p> <p>Agricultural and Resource Management Agents<br/><b>Phone:</b> 732-431-7260 x7278<br/><b>Fax:</b> 732-409-4813<br/><a href="mailto:sciarappa@aesop.rutgers.edu">sciarappa@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                                                   |
| <p><b><u>Michael V.K. Sukhdeo, Ph.D.</u></b></p> <p>is a professor in the Department of Ecology, Evolution and Natural Resources. A noted parasitologist, he works closely with the Equine Science Center faculty to investigate the parasite-environment interactions that lead to infestation on horse farms and to identify features of horse pastures that influence parasite distribution.</p> <p>84 Lipman Drive<br/>Cook College ,<br/>New Brunswick , New Jersey 08901<br/>732-932-9406 (office) - 732- 932-3760 (lab)<br/><a href="mailto:sukhdeo@aesop.rutgers.edu">sukhdeo@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b><u>Kevin Sullivan</u></b></p> <p>is an institutional research analyst with the New Jersey Agricultural Experiment Station. He performs economic impact analysis and research on key industries, government, and university programs and projects and provides economic impact analysis components in grant applications. He is a principal investigator in the New Jersey Equine Economic Impact Study.</p> <p>New Jersey Agricultural Experiment Station<br/>3 Rutgers Plaza<br/>New Brunswick, NJ 08901<br/>732-932-1966 ext. 3112 (T)<br/>732-932-9544 (F)<br/><a href="mailto:sullivan@aesop.rutgers.edu">sullivan@aesop.rutgers.edu</a></p>                                                                                                                                                                                                                                                                                                                    |
| <p><b><u>Michael L. Westendorf, Ph.D.</u></b></p> <p>is Associate Extension Specialist in Animal Sciences for Rutgers Cooperative Extension at the New Jersey Agricultural Experiment Station. He conducts research, writes and lectures on subjects such as animal nutrition, use of food wastes as animal feed, animal health and manure waste and management. Design of new methods of processing waste to minimize environment contamination and developing new methods of animal manure disposal are primary research areas. Dr. Westendorf has provided leadership to the state's livestock industries through his various statewide nutrient and waste management initiatives.</p> <p>Department of Animal Sciences<br/>Office 213F - Bartlett Hall<br/><b>Tel:</b> 732-932-9408<br/><b>Fax:</b> 732-932-6996.<br/><br/>84 Lipman Drive<br/>Cook College ,<br/>New Brunswick , New Jersey 08901<br/>732-932-9406 (office) - 732- 932-3760 (lab)<br/><a href="mailto:westendorf@aesop.rutgers.edu">westendorf@aesop.rutgers.edu</a></p> | <p><b><u>Carey Williams</u></b></p> <p>joined Rutgers University in July 2003 as its equine Extension Specialist, and the associate director of outreach with the Equine Science Center taking an active role in teaching, conducting research and working with the equine and academic communities to ensure the viability of the horse industry in New Jersey.</p> <p>At Rutgers, Dr. Williams maintains a herd of Standardbred horses for exercise physiology research; more specifically how we can decrease the stress of intense exercise. She also works with agricultural agents within Rutgers Cooperative Extension and the Natural Resource Conservation Service to carryout equine pasture management initiatives.</p> <p>Department of Animal Sciences<br/>Office: 213E<br/>Laboratory: 113/116 Bartlett Hall<br/><b>Tel:</b> 732-932-5529<br/><b>Fax:</b> 732-932-6996<br/><a href="mailto:cwilliams@aesop.rutgers.edu">cwilliams@aesop.rutgers.edu</a></p> |

## **APPENDIX B**

### **State Equine Initiative Grants 2009-10**

- **Effects of Age and Training on the Cytokine, Myokine, and Endocrine Regulation of Glucose Metabolism - PI Kenneth H. McKeever**
- **How Specific Gut-Derived Bacteria Could Influence Development of Laminitis – PI Janet Onishi**
- **Metabonomic and Genomic Determination of Metabolic Defects Associated with Development of Osteochondrosis in Young Horses – PI Sarah L. Ralston**
- **Influence of Diet and Bedding Characteristics on Manure Excretion, Manure Characteristics and Air Quality – PI Michael Westendorf**
- **Development, validation and application of a multi-compartmental, dynamic, *in vitro* gastrointestinal tract model of the horse (TIM-Horse) – PI R. Havenaar**
- **4-H Youth Development Horse Programs – PI Carol Ward**

# Horses *Neigh* neighbors make good



## *Can equine facilities flourish and still remain environmentally friendly?*

At the Rutgers Equine Science Center, the answer is YES – and we can show you how!

Agricultural best management practices are the key to environmental quality and better horse care. See them in action at the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm! You'll learn innovative ways to manage many of the critical environmental issues horse owners face, including:

*Preserving Water Quality  
Proper Nutrient and Waste Management  
Farm and Pasture Management  
Weed Control and Soil Enrichment*

***Now, you can experience the Ryders Lane farm in two exciting ways:  
in person or online! Stop by for a self-guided visit, or click through our  
new virtual tour from the comfort of your own home.***

The Ryders Lane farm is an example of the Equine Science Center's commitment to promoting research and education to advance the well-being and performance of horses and the equine industry.



**For more information:**

**CALL US:  
732-932-9419**

***esc.rutgers.edu***

Equine Science Center

Better Horse Care Through  
Research and Education

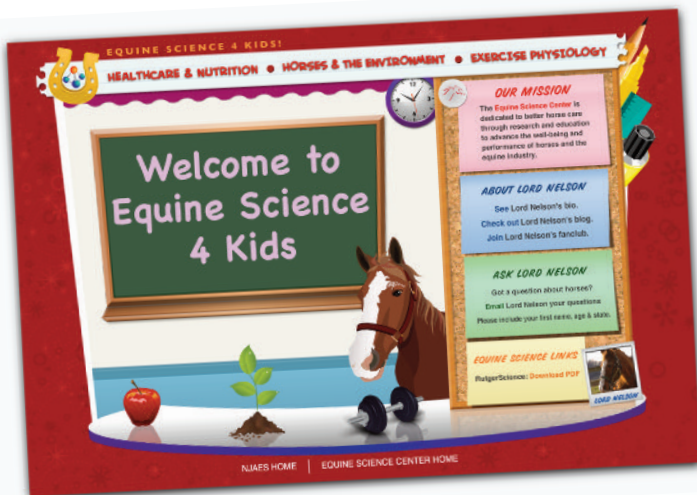


# Horses *Neigh* neighbors and Great Teachers!

make good



## Calling all kids: *Professor Lord Nelson is in!*



The Rutgers Equine Science Center introduces a new way for kids to horse around on the Web: ***Equine Science 4 Kids!*** This online classroom features games, interactive activities, and even a little horseplay for children of all ages.

Equine Science 4 Kids is headed by our very own "***Professor Emeritus, Lord Nelson***" – an American Quarter Horse with a storied history at Rutgers University and a *lot* of horse sense. Lord Nelson uses his years of experience to guide kids through the world of equine science, presenting fun facts and solid science about:

- ***Healthcare & Nutrition***   • ***Exercise Physiology***
- ***Horses & the Environment***

***Best of all, school's always in session*** – so stop by our Web site and horse around with Lord Nelson anytime! Visit [esc.rutgers.edu](http://esc.rutgers.edu) and click on "Equine Science 4 Kids!"

Equine Science 4 Kids is an example of the Equine Science Center's commitment to promoting research and education to advance the well-being and performance of horses and the equine industry.

**For more information:**

**CALL US:**  
**732-932-9419**

**[esc.rutgers.edu](http://esc.rutgers.edu)**

Equine Science Center

Better Horse Care Through  
Research and Education

