



WILD ANIMAL HEALTH
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NEWSLETTER



Julie Ellis, PhD, MS and Lisa Murphy, VMD

The importance of wild animal health

The health of wild animals is increasingly recognized as a fundamental aspect of wildlife conservation and management. In the past 20 years, Pennsylvania has dealt with introductions of several new infectious diseases and disease vectors that threaten the well-being of wildlife. For example, white nose syndrome has caused the deaths of millions of bats since its discovery in a NY cave in 2006.

Integration of statewide wildlife health activities into a single unified program

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Once the most common bat species in Pennsylvania, the little brown bat, is now a species of greatest conservation need, as its population has recently declined by 90%. Chronic wasting disease (CWD) continues to spread to new parts of Pennsylvania, infecting and killing deer and threatening hunting tradition.

When sick wild animals are observed, it may be an early warning sign of an infectious disease or environmental pollutant that has the potential to also harm other animals or people. For instance, West Nile Virus (WNV), first detected in wild birds in New York, spread to PA in 2000 and has contributed to significant declines in the ruffed grouse, the state bird. Human cases of WNV have also been observed nearly every year since its discovery. The introduction of new disease vectors in PA (e.g. Asian Longhorned Tick) that can be found on wildlife and companion animals, also pose a threat to the health of livestock and humans. A multi-disciplinary approach to disease surveillance and response that includes wildlife managers, scientists, and veterinarians is required to effectively address these complex disease threats.

Monitoring and Management of wildlife health through the Pennsylvania Wildlife Futures Program

To this end, PennVet and the Pennsylvania Game Commission (PGC) recently initiated the Pennsylvania **Wildlife Futures Program** (WFP), a new science-based, wildlife health program that will increase disease surveillance, management and innovative research aimed at better protecting wildlife across the Commonwealth. Under the co-leadership of **Drs. Julie C. Ellis and Lisa A. Murphy**, the WFP will integrate statewide wildlife health activities into a single unified program to address wildlife health issues, to prevent the introduction of disease, and to develop rapid disease response capacity. The Program will dedicate 12 employees, most of whom will work full-time out of New Bolton Center, to address wildlife diseases. These new staff and faculty will include a wildlife disease ecologist, board certified wildlife pathologist, diagnostic case coordinator (VMD), and a science communications specialist.

The goals of this new program include: 1) establishment of state-wide, innovative research and surveillance programs to identify diseases with the potential to infect wildlife, livestock, poultry, companion animals, and humans; 2) development and maintenance of a comprehensive wildlife health information system including a database of wildlife health cases, mapping, and data analysis to integrate real-time, disease response; 3) facilitation of cross-agency communication of existing and emerging wildlife disease, translation of applied-research for science and technical publication, and building of an external communications platform to ensure that timely information is available to the public; and, 4) enhancement of technical and staff capacity through a

Publications



Kristin L. Gardiner, AV
Cideciyan, M Swider, VL Dufour, A Sumaroka, AM Komáromy, WW Hauswirth, S Iwabe, SG Jacobson, **WA Beltran, GD Aguirre** (2019) Long-term Structural Outcomes of Late-stage RPE65 Gene Therapy. *Molecular Therapy* (epub ahead of print)



Jayesh Tandel, Elizabeth English, A Sateriale, JA Gullicksrud, DP Beiting, MC Sullivan, B Pinkston and **Boris Striepen** (2019) Life cycle progression and sexual development of the apicomplexan parasite *Cryptosporidium parvum* *Nature Microbiology* (2019) ePub ahead of print

Vignuzzi M. and **López CB.** (2019) Defective viral genomes are key drivers of the virus-host interaction. *Nature Microbiology* 4(7): 1075-1087.



comprehensive training and development program on disease surveillance, management, and animal health systems.

The WFP will generate numerous opportunities for collaborative research projects conducted by PennVet faculty, PGC biologists, and WFP staff. Further, we will develop a cadre of wildlife health professionals through certificate programs wherein veterinarians, biologists, and other professionals may obtain training in biosecurity protocols that would protect poultry, livestock, and wild animals from infectious pathogens. Ultimately, our vision is to safeguard the health of domestic animals, wildlife, and humans through enhanced disease surveillance and response, transdisciplinary research, and timely communications across agencies and organizations throughout the Commonwealth.

Dr. Julie C. Ellis (MS, PhD, senior research investigator), an ecologist, started working at PennVet in September 2018. Her PhD research at Brown University focused on marine birds and their effects on biological communities on islands and coastal shores in the Gulf of Maine. Julie joined the Cummings School of Veterinary Medicine at Tufts University in 2006 to manage the [Seabird Ecological Assessment Network](#) (SEANET), a citizen science program that brings together researchers and the public to identify and mitigate threats to marine birds. [Upon investigating a die-off of common eiders](#) (a type of sea duck) on Cape Cod, her efforts led to a collaborative project across 24 different organizations, which contributed to the discovery of a novel virus that affects these ducks. The eider project inspired a regional program to coordinate wildlife disease surveillance in the region, the Northeast Wildlife Disease Cooperative (NWDC). The NWDC, established in 2013, provides diagnostic services, expertise, training, and research support to state and federal agencies that manage wildlife populations in the Northeast. At PennVet, Julie continues to administer the NWDC, and with Dr. Murphy, is co-directing the PA Wildlife Futures Program (WFP).

Dr. Lisa A. Murphy (VMD, DABT, associate professor of toxicology-CE), graduated from Penn Vet and joined the Department of Pathobiology as a toxicologist in 2005. Part of the Pennsylvania Animal Diagnostic Laboratory System (PADLS) at New Bolton Center, the Toxicology Laboratory helps to diagnose and prevent poisonings in agricultural animals, pets, and wildlife and identifies nutritionally relevant compounds such as minerals and Vitamin E. Her research interests are related to environmental contaminants such as freshwater algal toxins, lead, mercury, and anticoagulant rodenticides that affect both wildlife and domestic animals and may also pose risks to food safety and public health. She became the PADLS New Bolton Center Resident Director in 2015.

Noteworthy



Alexis Rene Gibson, graduate student in Dr. Boris Striepen's laboratory was awarded the Junior Investigator Award at the FASEB Microbial Pathogenesis Conference: Mechanisms of Infectious Disease



Louis L, Clark M, Wise MC, Glennie N, Wong A, Broderick K, Uzonna J, Weiner DB, **Scott P.** (2019) Intradermal Synthetic DNA Vaccination Generates Leishmania-specific T Cells in the Skin and Protection against *Leishmania major*. *Infect Immun.* 87(8).



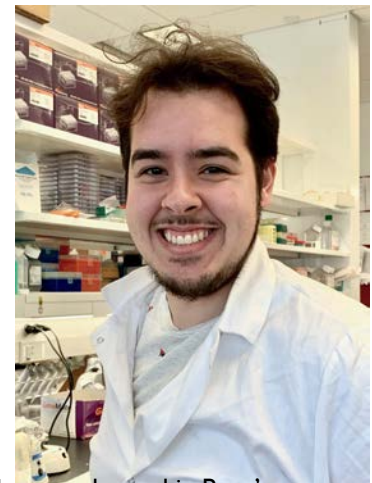
Weiner AI, Jackson SR, Zhao G, Quansah KK, Farshchian JN, Neupauer KM, Littauer EQ, Paris AJ, Liberti DC, Scott Worthen G, Morrissey EE, **Vaughan AE.** (2019) Mesenchyme-free expansion and transplantation of adult alveolar progenitor cells: steps toward cell-based regenerative therapies. *NPJ Regen Med.* 4:17.

Summer Student Research at Penn Vet

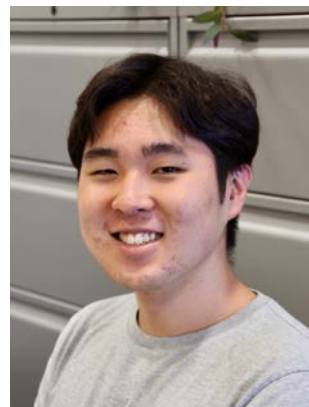
Students from various programs found their way to a Penn research laboratory during the summer of 2019. Some were participants in the **NIH/Boehringer Ingelheim Veterinary Scholars' program**. Others were part of Penn's **Summer Undergraduate Internship Program (SUIP)** and/or the **STEM PREP program** designed to provide an intense research experience to students interested in graduate study in the biomedical sciences. Undergraduates from a variety of universities as well as motivated high school students are able to find a laboratory and a mentor where they experience the world of laboratory and clinical research. Students select from a wide array of laboratories within the Penn biomedical community. Credit goes to faculty mentors in the summer research program and some are listed here: **Montserrat Anguera, Gus Aguirre, Daniel Beiting, William Beltran, Rumela Chakrabarti, Bruce Freedman, Oliver Garden, De'Broski Herbert, James Lok, Carolina López, Nicola Mason, Michael May, Erica Miller, Kyla Ortved, Cynthia Otto, Tom Parsons, Dipti Pitta, Michael Povelones, Jennifer Punt, Eileen Shore, Hansell Stedman, Lou Soslowsky, Boris Striepen, Andrew van Eps, Andrew Vaughan, and Susan Volk**. Whether they are veterinary or medical students, undergraduates or high school students—these students were inspired to investigate a career in research—basic, clinical or translational medicine. Shown here are some, but not all, of the student participants.



Vet student, **Leah Marks** worked with Dr. Erica Miller at **Tri State Bird Rescue** on Clinical and Pathologic Characterization of Neurologic Disease in House Sparrows —she will continue this project in analyzing the histopathology aspect.



Edwin Ovalle an undergrad in Penn's Summer Undergraduate Internship Program (SUIP), worked with Dr. Carolina López on identifying conditions to abolish generation of defective viral genomes during respiratory syncytial virus infection.



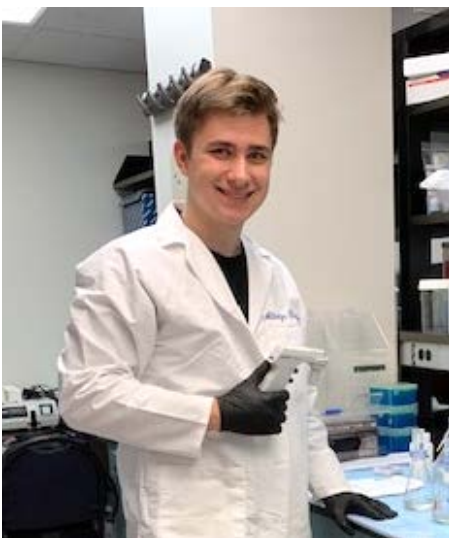
Joshua Whang, undergrad from Amherst College, worked in the De'Broski Herbert Laboratory on the role of Lingo 3 and TFF2 in enteropathogenic bacteria infection

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Vet Student Matthew Jedlinski worked with mentor Dan Beiting on optimization of portable sequencing for equine infectious diseases

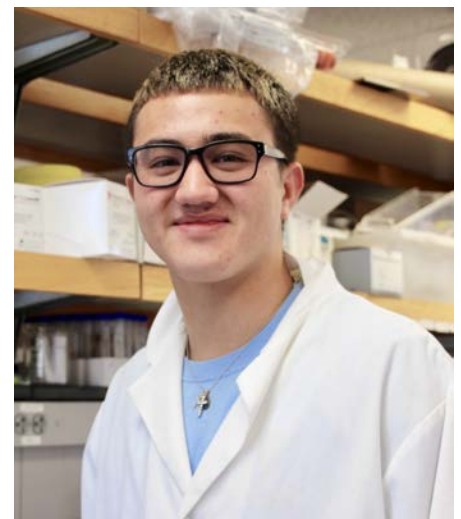
Clockwise Left to right: Vet Students: Alexis Gale worked on comparing the stability of recombinant utrophin as a potential therapeutic transgene for Duchenne Muscular Dystrophy (mentor Hansell Stedman); Elizabeth Edgerton worked on using the heritable immuno-stimulatory bacterium *Wolbachia* to block heart worm transmission by mosquitoes (mentor Michael Povelones); Andrea Clause worked on the effects of hyperactive ACVR1 signaling on skeletal bone with mentor Eileen Shore; and Kaitlyn Cassel's project was entitled "trust your gut: the microbiome impacts X inactivation maintenance in lymphocytes" (mentor Montserrat Anguera).



Roman Nikonov, undergrad from University of Pittsburgh worked on "Spike sorting analysis of MEA (micro electrode array)" with mentor Dr. William Beltran in an ophthalmology research laboratory.



Vet students Jeremy Braun and Abigaile Frerotte worked on analyzing clinical, behavioral, optical coherence tomography, and electroretinogram data in Norwegian Elkhounds with early retinal degeneration (mentor Dr. Gustavo Aguirre).

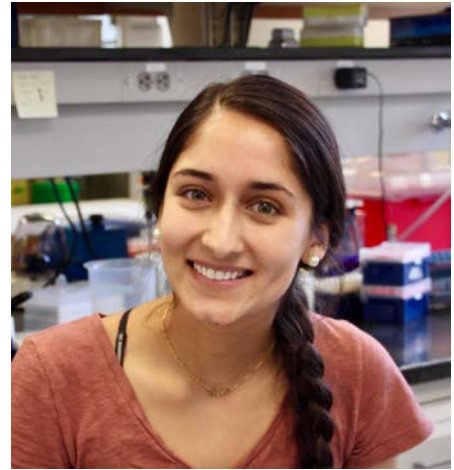


Joshua Worth, a high school student from the Kamehameha School in Maui in the STEM PREP Program. He worked with De'Broski Herbert and Ray Saunders on the roles of LINGO-1 receptor and its co-receptor, TROY, in wound healing in lung epithelial cells

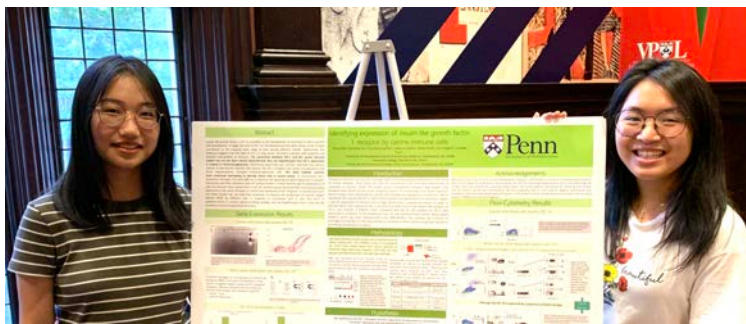
Student summer research *continued*.....



Vet Student Matthew Boulanger worked with Dr. Tom Parsons on an application of time of flight cameras for sow lameness detection at Swine Teaching and Research, New Bolton Center.



Nisha Vora, an undergrad from Drexel University worked with Dr. De'Broski Herbert on evaluating cytokine expression in mice lacking intestinal epithelial specific Interleukin 33 expression



Penn Vet CANINE (Canine Immunity in Education) team members and Penn undergrads (Xiaotong Zhu and Tracy Tran) at the CURF Expo (Center for Undergraduate Research & Fellowships) in September. Over



Diane Gaertner named Associate Vice Provost for University Laboratory Animal Resources—Vice Provost for Research Dawn Bonnell announced that Diane J. Gaertner, DVM, Professor of Laboratory Animal Medicine, leader of the Division of Laboratory Animal Medicine in the Department of Pathobiology in the School of Veterinary Medicine, and Director of University Laboratory Animal Resources (ULAR), has been named Associate Vice Provost for University Laboratory Animal Resources. Dr. Gaertner, a Diplomate in the American College of Laboratory Animal Medicine (ACLAM), is a nationally recognized leader in her specialty and has

led the University's laboratory animal resources for more than 16 years. Under Dr. Gaertner's dedicated leadership, the University recently received a campus-wide accreditation from AAALAC, in recognition of Penn's high-quality program of animal care and use. This accreditation includes the laboratory animal programs of five schools housed at both the Philadelphia and New Bolton Center campuses. The expanded AAALAC accreditation was a result of collaborative planning and implementation efforts led by Dr. Gaertner. Dr. Gaertner's accomplishments at Penn include ensuring regulatory compliance in the quality of animal housing and veterinary care for research and teaching animals, providing the highest level of service to the University's research community, and establishing a residency program to train professionals in the field of laboratory animal medicine. Dr. Gaertner joined Penn in 2003. She received her DVM from the University of Missouri at Columbia in Missouri in 1979, completed a Postdoctoral Fellowship in Comparative Medicine at the University of Alabama at Birmingham in 1985, served on the faculty of Yale University for 10 years and led the animal care and use program at Albert Einstein College of Medicine for 8 years before joining Penn.

Some Recent Awards (direct costs)

Nicola Mason

V Foundation
Unravelling mechanisms of resistance to checkpoint inhibition in canine urothelial carcinoma
10/1/19—9/30/21 \$500,000

Nicola Mason

NIH U54 Rationale design of Universal CAR T cells
9/1/20—8/31/24 \$767,629

P Jeremy Wang

NIH/NICHD R01 Genetic Control of Retrotransposon Mobilization in the Mouse Germline
8/2/2019-6/30/2024 \$1,037,500

Lisa Murphy/Julie Ellis

Pennsylvania Game Commission Comprehensive Wildlife Health Program for PA
5/1/19—4/30/24 \$6,773,595.00

Laurel Redding

PA Dept Agriculture
Clostridium difficile on dairy farms and farm workers
1/1/19—6/30/20 \$16,467

Kyla Ortved

Grayson Jockey Research FDN
Robotic CT for assessing of bone morphology
4/1/19—3/31/21 \$22,468

Shelley Rankin

FDA
Companion Animal and Animal Food Diagnostic Sample Analysis
6/15/19—5/31/230 \$38,000

Shelley Rankin

PETS TOO: Carbapenem Resistant Enterobacteriaceae Colonization
9/5/19—8/31/20 \$28,125

Rumela Chakrabarti

NIH R01—Deciphering the function of DNp63 and MDSCs in tumor promotion and metastasis of TNBCs
6/1/19— 5/31/24 \$1,215,000

Chris Lengner

NIH R01 Identification and preclinical evaluation of novel therapeutic approaches to Dyskeratosis congenita
7/1/19—6/30/23 \$1,964,583

Jennifer Mahoney

American Kennel Club
Inflammatory Bowel Disease
7/1/19—6/30/22 \$75,242

Cynthia Otto

PEMA— Penn Vet Working Dog Center
Operational support for our FEMA and law enforcement missions
1/1/19—6/30/20 \$500,000

Charles Vite

ARA Parseghian Med. Research FDN
Improving extracerebellar NPCI Disease using Intravenous 2-Hydroxypropyl Beta-Cyclodextrin 7/1/19-6/30/20 \$68,182

Igor Brodsky

NIH/R01
Lymphothrombosis in gut health and disease
9/15/19—6/20/24 \$ 686,108



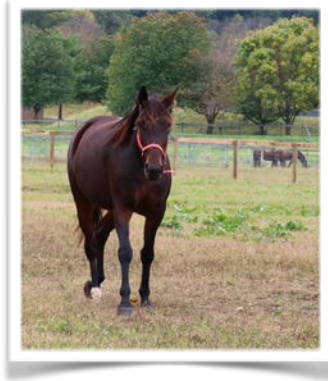
Congratulations to **Dr. Jorge Alvarez** for receiving the 2019 Grant for Multiple Sclerosis Innovation (GMSI)! His proposal will use a novel therapy to target B cells in the CNS and potentially treat progressive Multiple Sclerosis. The Innovation (GMSI) grant was awarded to Dr. Alvarez in the town hall of Stockholm (Stockholms Stadshuset), where the awards are presented to Nobel Laureates. Sponsor: EMD Serono \$278,000 from 12/01/2019 - 11/30/2021

IRM/Penn Vet: Frontiers of Germ Cell Research—

More than 100 participants were in attendance in August to mark an anniversary of Dr. Ralph Brinster’s 1994 publication of his landmark discovery of Spermatogonial Stem Cell (SSC) transplantation, thereby transforming the fields of reproductive biology and regenerative medicine. Faculty organizers were: Marisa Bartolomei, Christos Coutifaris, Kotaro Sasaki, and Jeremy Wang. The talks fell within the global one health initiative: “one health, many species”, featuring research in mice, domestic large animals, primates, and humans.



Dean Andrew Hoffman with Professor Ralph Brinster



On October 10th a **Laminitis Research Symposium** was held on the New Bolton Center Campus. Faculty, residents/interns, and students attended a full program of talks including Drs. **Hannah Galantino-Homer, Darko Stefanovski, Tom Parsons, and Andrew van Eps**. Some of the invited speakers included **De'Broski Herbert**, Department of Pathobiology who presented his work examining interactions between inflammatory and wound healing processes in the intestinal/lung epithelium and **Chris Pollitt, University of Queensland, Australia**, contributed to a session on microvascular perfusion relevant to supporting limb laminitis. **Lynne Cassimeris**, Lehigh University, spoke on the IL-17 pathway activation in supporting limb laminitis and **Dianne McFarlane**, Oklahoma State, spoke on the endocrinopathic laminitis-pars.intermedia dysfunction connection.

On Tuesday, October 22nd SAVMA hosted a **Meet-a-Mentor night**. The goal of this annual event was to connect research mentors with 1st and 2nd year Penn Vet students hoping to work on a research project during the summer of 2020.



Faculty who are interested in hosting a summer research student for basic, translational, or clinical research enjoyed a good dinner and a chance to meet students interested in doing a summer research project. A committee headed by **Emily Jones** organized the event.



The **Penn Vet Research Newsletter** is distributed quarterly. Suggestions, comments, requests and story ideas may be directed to: resnews@vet.upenn.edu

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