



CENTER OF EXCELLENCE

in

Livestock Diseases & Human Health

2024 ANNUAL REPORT



THIS REPORT IS PRODUCED BY

THE UNIVERSITY OF TENNESSEE
College of Veterinary Medicine

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TO BE EDITED



About the Institute

Through its colleges, county extension offices, Veterinary Medical Center, Veterinary Diagnostic Laboratories, and research and education centers, the University of Tennessee Institute of Agriculture (UTIA) serves the people of Tennessee and beyond through discovery, communication, and application of knowledge. The University of Tennessee, Knoxville, is committed to providing undergraduate, graduate, and professional veterinary education programs in a diverse learning environment that prepares students to be leaders in a global society. UTIA's delivery of education, discovery, and outreach contributes to the economic, social, and environmental well-being of all Tennesseans. The Institute's units focus on developing real life solutions to contemporary, emerging, and forecasted problems faced by Tennessee, the nation, and the world.

The College of Veterinary Medicine is one of only 34 fully accredited veterinary colleges in the nation. The central mission of the College is educating Doctor of Veterinary Medicine (DVM) students seeking a career in one of many aspects of the profession ranging from clinical practice to research. The College also serves the public in providing referral medicine services to pet owners, zoos, and the livestock industry through the UTCVM Veterinary Medical Center. In addition, the College protects public health, enhances medical knowledge through research and education of graduate students, and generates economic benefits to the state and nation. Outreach programs engage an array of citizens and their animals in learning programs that explore the human-animal bond and promote wellbeing.

The Herbert College of Agriculture welcomes students from across Tennessee, the nation, and the world. The College offers academic programs in a variety of natural and social science-based disciplines that apply to the food, fiber, and natural resources systems. For students in the College, learning is personal and often hands-on. Student teams provide opportunities for self-directed study, leadership development, and a lot of fun. An honors and creative achievements program challenges students to excel, as do undergraduate research opportunities. International study abroad mini-courses and internships give graduates an edge in the increasingly connected world of global markets.

UT AgResearch has been the central incubator and economic engine that develops "Real. Life. Solutions." so farmers and agricultural industries can supply affordable and wholesome products to the citizens of Tennessee and the world for more than 140 years. Its dedicated workforce of research faculty, staff members, and graduate students maintains a diverse and balanced program supporting Tennessee's \$81 billion economy built on agriculture and forestry industries. Ten field locations, known as AgResearch and Education Centers, capture the state's diverse environment and serve as outdoor laboratories where scientists can demonstrate innovative developments for stakeholders and clients to see first-hand the research results that can benefit their operations.

UT Extension often called "every citizen's front door to the University of Tennessee" because it maintains an office and staff of educators in each of the state's 95 counties. UT Extension Agents deliver research-based education designed to improve the lives and livelihoods of each citizen by enhancing agricultural production, building stronger families, and strengthening communities. These educational programs are accomplished by partnering with local, state, and national agencies to conduct hands-on learning events, certification programs, field research, local demonstrations, and assistance in agriculture, natural resources, community economic development, family and consumer sciences, and 4-H youth development. UT Extension agents are continually trained on the most current research-based information by faculty in each of the UTIA departments who specialize in the translation of science into application, inform the work of UT AgResearch faculty, and conduct translational research themselves.

ADMINISTRATION

Dr. David E. Anderson

Associate Dean for Research and Graduate Studies

Dr. Agricola Odoi

Assistant Dean for Research and Graduate Studies

Dr. Paul J. Plummer

Dean, College of Veterinary Medicine

Dr. Keith S. Carver, Jr.

*Interim Senior Vice President/Senior Vice Chancellor,
University of Tennessee Institute of Agriculture*

OUR MISSION

1. To promote interdisciplinary activities designed to improve the quality of human life through better animal health.
2. To expand livestock disease research capabilities.
3. To identify and characterize animal diseases that are similar to human disease.
4. To develop new strategies for the diagnosis, treatment, and prevention of disease.

Letter from the Dean

As the Dean of the College of Veterinary Medicine, I am pleased to present the 2024 annual report for the Center of Excellence in Livestock Diseases and Human Health (“the Center”). The Center of Excellence is based in the College of Veterinary Medicine (the College), which is one of four units in the UT Institute of Agriculture (the Institute) at the University of Tennessee, Knoxville (UTK). The Center was formed for the purpose of advancing human and animal health through promotion of exploratory, translational and interdisciplinary research. This annual report serves to inform our stakeholders of the important work done by faculty, staff, and students engaged in research and discovery in pursuit of solutions to ever more complex problems.



Activities in the Center follow the One Health approach established by the Quadripartite agencies: Food and Agriculture Organization of the United Nations Environment Programme (UNEP), the World Health Organization (WHO), and the World Organization for Animal Health (WOAH). The One Health approach meets the challenges of today and looks towards the future to ensure sustainability of health and wellness throughout the inextricably connected ecosystems of people, animals, and the environment.

Within this report, you will find a comprehensive overview of faculty and student activities supported by the Center to advance the Center’s missions: 1) Promotion of interdisciplinary activities designed to improve the quality of human life through advances in animal health; 2) Expand livestock disease research capabilities; 3) Identify animal diseases that affect people and which may serve as models for human disease; 4) Develop new strategies for the diagnosis, treatment, and prevention of disease. I am pleased to report that faculty in the College continue to increase proposal submissions, the amount of requested funds for proposals, and the value of successful awards.

Within this Center report, research and productivity of faculty benefitting from COE funding during FY24 are highlighted. This includes faculty who received seed grants, new faculty who received start-up funding, new equipment purchases, and details of our student scholar programs during 2024. These faculty members have made significant advancements to grow research across the spectrum of science from mechanism-based exploration to clinical translation of solutions. Metrics used to assess annual return on investment show extramural funding and research expenditures remain strong. In FY24, COE faculty received \$1,335,607 in new funding and were managing over \$7.8 million in active funding awards, resulting in a return on investment in the Center exceeding 13:1 – for every \$1 invested in the COE, faculty generated over \$13 from federal, state, industry partners, and foundations.

I am proud of the dedication and efforts of our faculty, staff, and students. The College is actively recruiting new research engaged faculty who will continue to build on the missions of the Center. We hope you enjoy this summary presentation of Center activities and accomplishments.

A handwritten signature in black ink, appearing to read "Paul J. Plummer". The signature is fluid and cursive, written on a white background.

Dr. Paul J. Plummer, *Dean*

UT College of Veterinary Medicine

Summary of Accomplishments

The Center of Excellence for Livestock Diseases and Human Health (the Center) plays a vital role in advancing the health of people and animals through research, training future scientists, dissemination of knowledge, and leading innovation for the betterment of society. The Center supports its mission by providing resources to develop research infrastructure, acquire state-of-the-art research equipment, provide start-up funds for new faculty, fund seed grants, sponsor the Phi Zeta Research Day annual conference, and assist with funding for travel to scientific meetings for presentation to national and international audiences.

The Center of Excellence in Livestock Diseases and Human Health continues to serve its mission to promote interdisciplinary activities designed to:

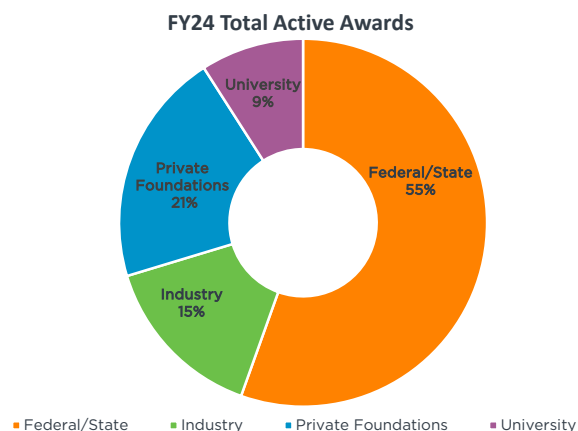
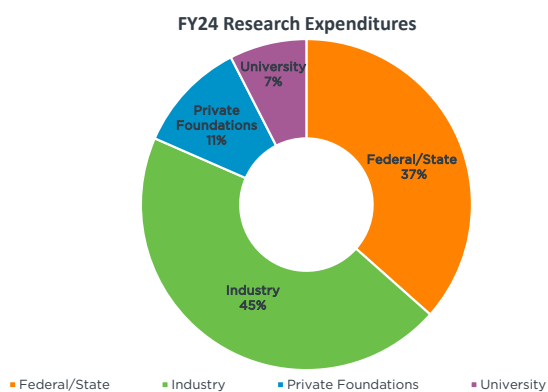
- Improve the quality of human life through the research for betterment of animal health
- Expand livestock disease research capabilities
- Identify and characterize animal diseases that are similar to human disease
- Develop new strategies for the diagnosis, treatment, and prevention of disease

In FY 2024, 16 faculty received support from the Center in areas ranging across a spectrum of science including cancer, pneumonia, osteoarthritis, wildlife as sentinels for disease, immunology, obesity, infectious disease, vector borne disease, and viral diseases. Discoveries made by these faculty and their students will drive advances in the understanding of disease pathogenesis, diagnosis, treatment, and prevention of diseases and disorders. These discoveries bring real life solutions to make life and lives better for people and animals and help to ensure sustainability of the livestock industry.

In FY24, the Center provided \$324,532 in start-up funds to support 10 faculty in establishing their laboratories, purchase equipment, support research staff and graduate students, fund pilot studies, and promote collaboration across UT and the state. Also, the Center provided \$143,000 in research seed grants to 12 faculty to support research and to develop preliminary data to increase competitiveness for extramural funding.

Faculty engaged in Center activities disseminate their research findings through presentations, publications, and scholarly writings. Center faculty presentations included local, national, and international audiences. Center of Excellence faculty accounted for 79 peer-reviewed journal articles, 4 book chapters, and 114 presentations. Of the 114 presentations, 46 were provided at the local and state level, 28 were presented in national forums, 40 were presented in international forums. COE faculty published an average of 3 journal articles and 7.5 scientific presentations, in the form of oral, poster, and abstract presentations.

Benchmark	2023 (16 Faculty)	2024 (16 Faculty)
	N ¹	N ²
Publications	62	83
<i>Peer-Reviewed Articles</i>	51	79
<i>Book Chapters/Abstracts/Proceedings</i>	11	4
Presentations/Posters/Abstracts	131	114
<i>International</i>	3	40
<i>National</i>	59	28
<i>State or Local</i>	69	46
Invention Disclosures	2	4
Patent Filings	None	2
Research Funding³		
<i>Total Active Awards</i>	\$1,544,725.00	\$7,887,448.71
<i>New Externally Funded Awards</i>	-	\$1,355,607.00
<i>New Internally Funded Awards</i>	\$126,087.00	\$786,750.00
<i>Total Research Expenditures</i>	\$1,670,812.00	\$1,137,832.54
Return on Investment (Total Active Awards)⁴	3.2:1	13.5:1
Return on Investment (New Awards)⁵	-	2.3:1



¹ Publications and presentations for COE faculty during calendar year 2023.

² Publications and presentations for COE faculty during calendar year 2023.

³ Research funding and expenditures for COE faculty during FY24.

⁴ Return on investment based on ratio of total extramural funding to COE allocation for FY24.

⁵ Return on investment based on ratio of new extramural funding to COE allocation for FY24.

PROGRAM REPORT

Introduction

The Center of Excellence (COE) in Livestock Diseases and Human Health was founded in 1984 in the College of Veterinary Medicine for the purpose of promoting research in livestock diseases and human health. The Center of Excellence serves a critical role in the UT Institute of Agriculture and the University of Tennessee, Knoxville to serve the missions of research, education, and service to the state of Tennessee and promote advances in the health and wellbeing of people and animals.

Faculty collaborate with research scientists throughout Tennessee, UT system, and with national and global communities to advance science for the betterment of society through research in the prevention, treatment, diagnosis, and prediction of livestock diseases and improvement of human health. Faculty participating in the Center of Excellence programs meet these responsibilities by conducting original research for the purpose of discovering new knowledge and translating that knowledge into practice for the benefit of animals, people, and society. This includes training undergraduate, professional, and graduate students as they gain knowledge and skills to become valuable members of the future workforce including veterinarians, scientists, and leaders in agriculture and healthcare. Further, faculty and students disseminate knowledge through publications, presentations, and outreach activities with stakeholders including livestock producers, veterinarians, physicians, animal owners, governmental and regulatory agencies, and the community.

Faculty engaged in the COE have research strengths in multiple areas. These scientific programs are enhanced through interdisciplinary and multidisciplinary collaboration in the pursuit of extramurally funded research. Areas of research emphasis by FY24 COE faculty include cancer, pneumonia, osteoarthritis, immunology, obesity, infectious disease, vector borne disease, viral diseases and wildlife as sentinels for disease.

The faculty supported by the Center further engage with the mission of the Institute, University, and UT system to amplify the impact of new knowledge and its application for the betterment of livestock and human health. These research programs intertwine for the purpose of advancing agriculture and the environment through betterment of human and animal health. Among others, some of these collaborative programs include the UTK Human Health and Wellness Program, UTIA Genomics Center for the Advancement of Agriculture, UT One Health Initiative, Tennessee One Health Committee, UT Oak Ridge Innovation Institute, and the Center for Precision Health.

Personnel



Dr. David Anderson
Director of the Center of Excellence



Dr. Agricola Odoi
Director of Center of Excellence student programs



Dr. Girish Neelakanta
Chair of Research Committee



Emily Ford
Annual report production

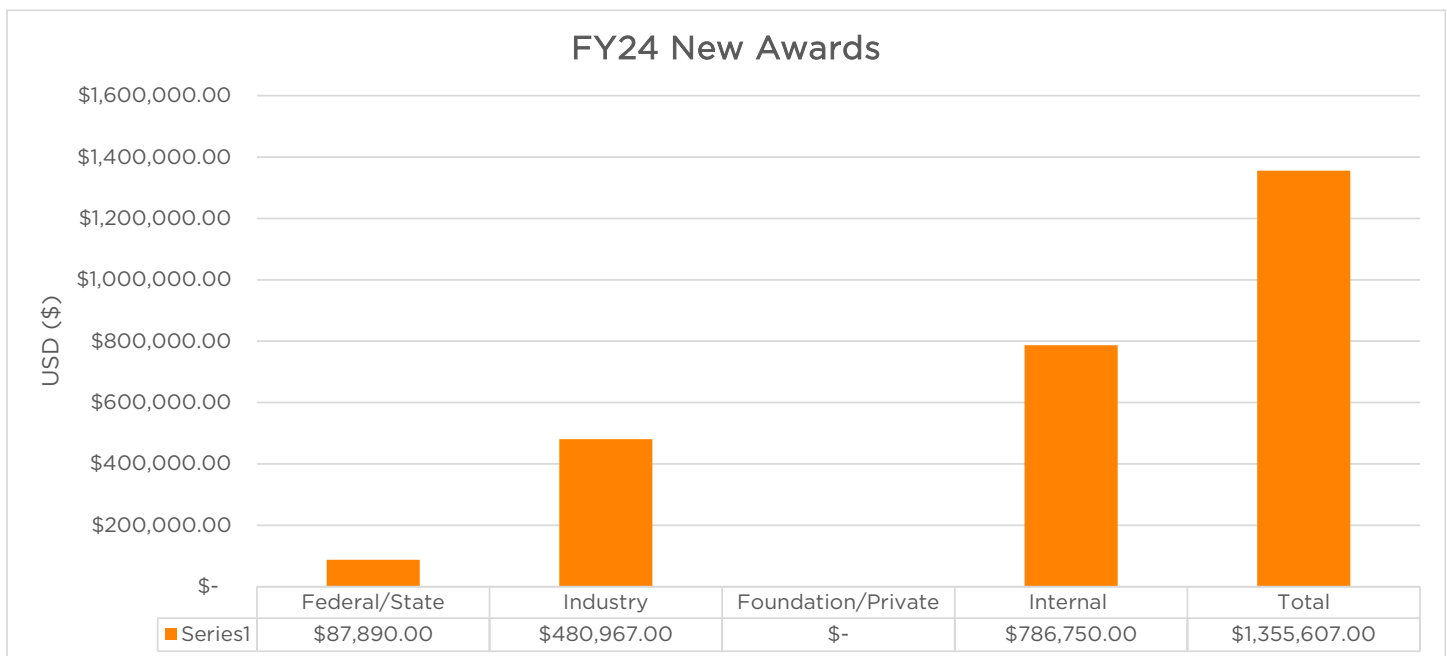


Morgan Tolbert
Oversees submissions of faculty proposals

FY24 Research Funding: New Awards

Total Value of New Awards for FY24

Lead Investigator	Federal/State	Industry	Foundation/Private	Total
Dr. Mohammed Abouelkhair	-	-	\$7,500.00	\$7500.00
Dr. Julia Albright	-	\$12,751.00	-	\$12,751.00
Dr. Madhu Dhar	\$342,411.00	-	-	\$342,411.00
Dr. Cassio Ferrigno	-	-	-	-
Dr. Kimberly Gwinn	\$459,375.00	-	-	\$459,375.00
Dr. Chiara Hampton	-	-	\$1,500.00	\$1,500.00
Dr. Andrea Lear	\$296,000.00	-	-	\$296,000.00
Dr. Sarah Linn-Periano	-	-	-	-
Dr. Michael Mahero	-	-	-	-
Dr. Darryl Millis	-	\$480,967.00	-	\$480,967.00
Dr. Girish Neelakanta	\$1,305,865.28	-	-	\$1,305,865.28
Dr. Sarah Schmid	-	-	-	-
Dr. Wesley Sheley	\$596,149.00	-	-	\$596,149.00
Dr. Nora Springer	-	\$794,871.84	\$1,210.00	\$796,081.00
Dr. Hameeda Sultana	\$1,811,761.59	-	-	\$1,811,761.59
Dr. Brian Whitlock	-	-	\$1,777,087.00	\$1,777,087.00
TOTALS	\$4,811,561.87	\$1,288,589.84	\$1,787,297.00	\$7,887,448.71

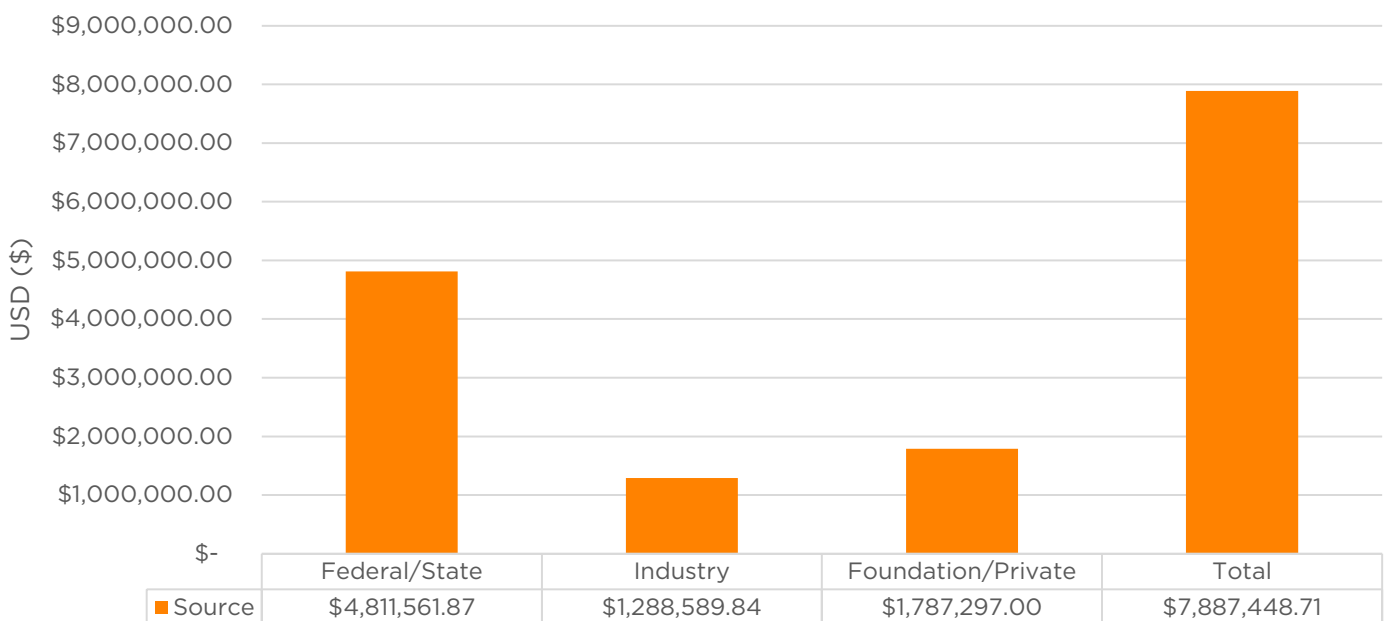


FY24 Research Funding: Active Awards

Total Value of Active Awards for FY24

Lead Investigator	Federal/State	Industry	Foundation/Private	Internal	Total
Dr. Mohammed Abouelkhair	-	-	-	\$42,500.00	\$42,500.00
Dr. Julia Albright	-	-	-	-	-
Dr. Madhu Dhar	-	-	-	\$570,000.00	\$570,000.00
Dr. Cassio Ferrigno	-	-	-	\$7,500.00	\$7,500.00
Dr. Kimberly Gwinn	-	-	-	-	-
Dr. Chiara Hampton	-	-	-	-	-
Dr. Andrea Lear	\$77,985.00	-	-	\$5,000.00	\$77,985.00
Dr. Sarah Linn-Periano	-	-	-	-	-
Dr. Michael Mahero	-	-	-	\$5,000.00	-
Dr. Darryl Millis	-	\$480,967.00	-	-	\$480,967.00
Dr. Girish Neelakanta	-	-	-	-	\$1,305,865.28
Dr. Sarah Schmid	-	-	-	-	-
Dr. Wesley Sheley	-	-	-	-	\$596,149.00
Dr. Nora Springer	-	-	-	-	\$796,081.00
Dr. Hameeda Sultana	-	-	-	-	\$1,811,761.59
Dr. Brian Whitlock	\$9,905.00	-	-	\$156,750.00	\$1,777,087.00
TOTALS	\$87,890.00	\$480,967.00	-	\$786,750.00	\$1,355,607.00

FY24 Active Awards

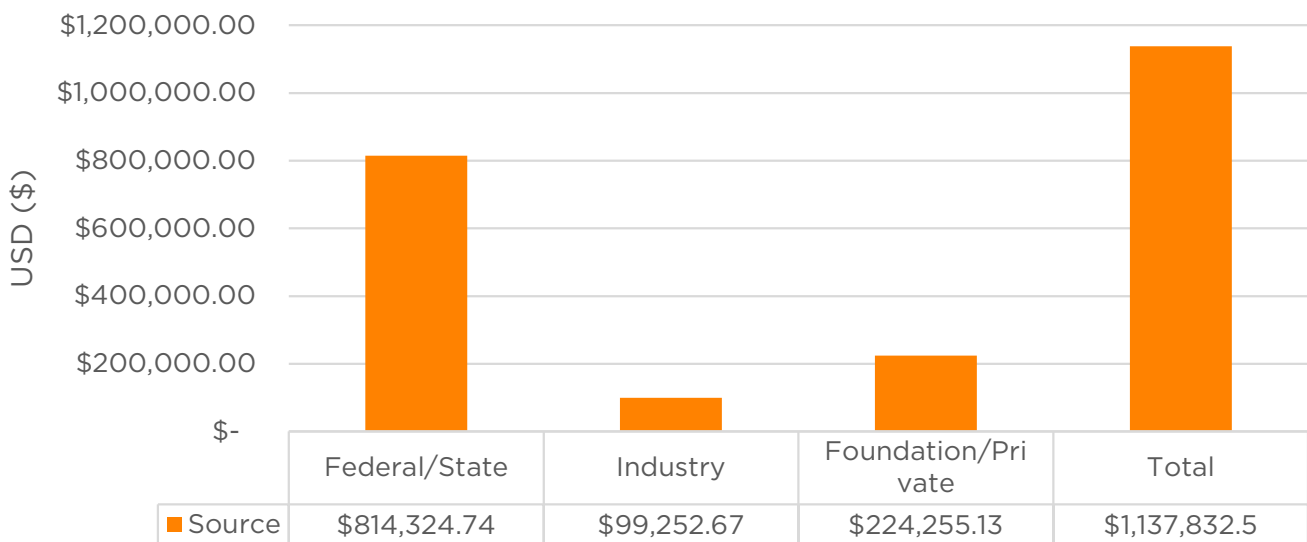


Research Expenditures

FY24 Research Expenditures

Lead Investigator	Federal/State	Industry	Foundation/Private	Total
Dr. Mohammed Abouelkhair	-	-	\$7,500.00	\$7,500.00
Dr. Julia Albright	-	\$8,045.12	-	\$8,045.12
Dr. Madhu Dhar	\$23,638.33	-	-	\$23,638.33
Dr. Cassio Ferrigno	-	-	-	-
Dr. Kimberly Gwinn	\$99,394.93	-	-	\$99,394.93
Dr. Chiara Hampton	-	-	-	-
Dr. Andrea Lear	\$80,554.55	-	-	\$80,554.55
Dr. Sarah Linn-Periano	-	-	-	-
Dr. Michael Mahero	-	-	-	-
Dr. Darryl Millis	\$3,364.64	\$8,304.00	-	\$11,668.64
Dr. Girish Neelakanta	\$285,924.42	-	-	\$285,924.42
Dr. Sarah Schmid	-	-	-	-
Dr. Wesley Sheley	\$964.51	-	-	\$964.51
Dr. Nora Springer	-	\$82,903.55	\$8,278.21	\$91,181.76
Dr. Hameeda Sultana	\$320,483.36	-	-	\$320,483.36
Dr. Brian Whitlock	-	-	\$208,476.92	\$208,476.92
TOTALS	\$814,324.74	\$99,252.67	\$224,255.13	\$1,137,832.54

FY24 Research Expenditures



Allocation of Funding

Allocation of funding within the Center of Excellence (COE) in Livestock Diseases and Human Health promotes research for faculty and students to support discovery and advance knowledge. Funding supports a variety of activities including faculty startup packages associated with the recruitment of new faculty and seed grants for faculty to develop necessary data to support extramural grant submissions and foster new collaborative research initiatives. COE funding also works to ensure professional, graduate, and undergraduate students are engaged in research with faculty and have the necessary resources to achieve their goals.

Center of Excellence faculty include faculty at all stages of career development. Startup funds assigned to newly hired tenure-track faculty ensure these faculty members have sufficient resources to establish a research program and develop data and publications that will contribute to their competitiveness as principal investigators on extramural grant submissions.

Other Center of Excellence funds are used to promote faculty research through the COE seed grant program. Seed grants are awarded annually through the Center's call for research proposals. The UTCVM research committee reviews each proposal and makes recommendations to the College's Associate Dean for Research and Graduate Studies regarding which proposals are best aligned with the objectives of the Center of Excellence and are most likely to contribute to the faculty member's ability to successfully compete for extramural funding.

A number of special requests occur during the year with respect to COE faculty needs associated with their laboratories and research. The College's Associate Dean for Research and Graduate Studies addresses these requests on a case-by-case basis including purchasing new equipment to advance and expand research capabilities of COE faculty. Also, COE funding is utilized to update laboratories to ensure facilities are modern and sufficient for the recruitment and continued success of COE faculty.



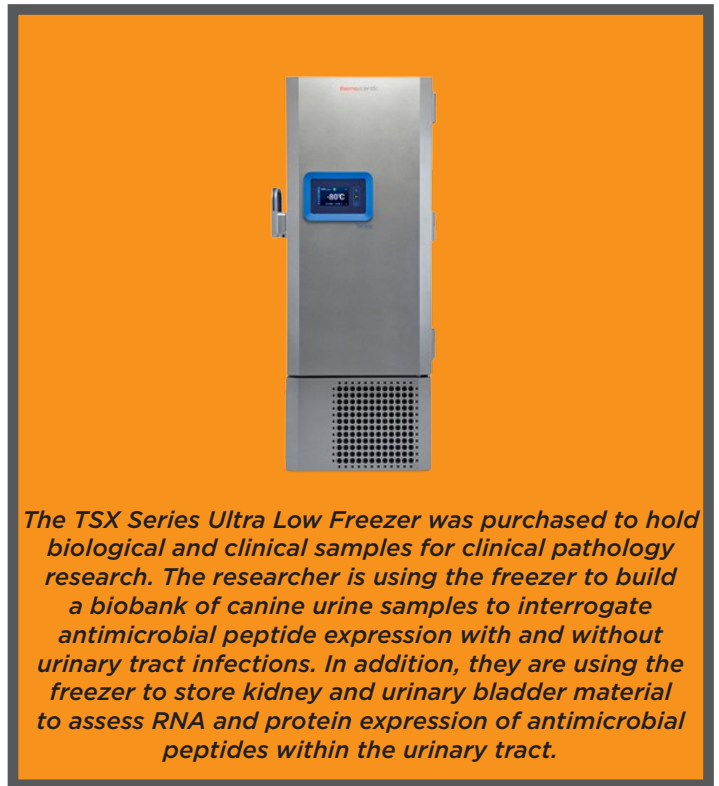
Pictured above are faculty and graduate students working together on research projects.

Infrastructure and Supplies

Center of Excellence funds support research infrastructure needed by faculty in the College of Veterinary Medicine and include the purchase of equipment, maintenance of shared essential research equipment, and other needs for support in shared laboratories. Requests for funds are evaluated by the Associate Dean for Research and Graduate Studies and the CVM research advisory committee. This committee reviews funding requests and recommends supporting or denying requests based on justification. The committee works to ensure that requests are not redundant relative to existing resources. The committee also considers the number of faculty who are likely to benefit from the resources and equipment requested. The Department Heads are asked to approve equipment requests to ensure that there is a long-term commitment to maintenance and use of the equipment.

Equipment

During FY24, equipment purchases included cost shares with departments and other collages for a total of \$469,818. The Center provided a total of \$69,040.39 toward these purchases. This equipment was associated with a variety of research laboratories, including the cancer, immunology, kinesiology, and radionucleotide imaging unit. New equipment purchased included a Cryogenic monitor, TSX Ultralow Freezer, Delsys-Trigno Avanti Digital base station, Isotemp ultra low freezer, and a Lablogic PET/CT (Positron Emission Tomography and Computed Tomography).

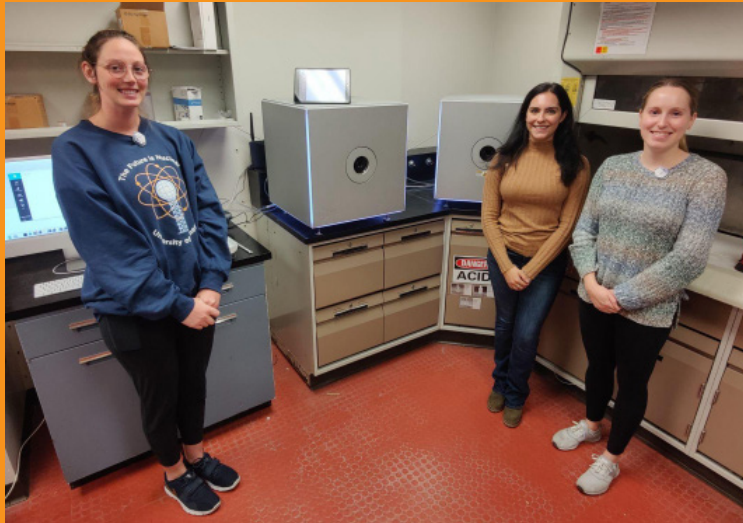




The Delsys-Trigno Avanti Digital Base Station is an inertial motion unit combined with an EMG (electromyography) system that synchronizes with the Vicon motion capture system for complete biomechanical analysis. This device is used in the Equine Performance and Rehabilitation Center to study movement in equine athletes to advance the science of locomotion disorders.



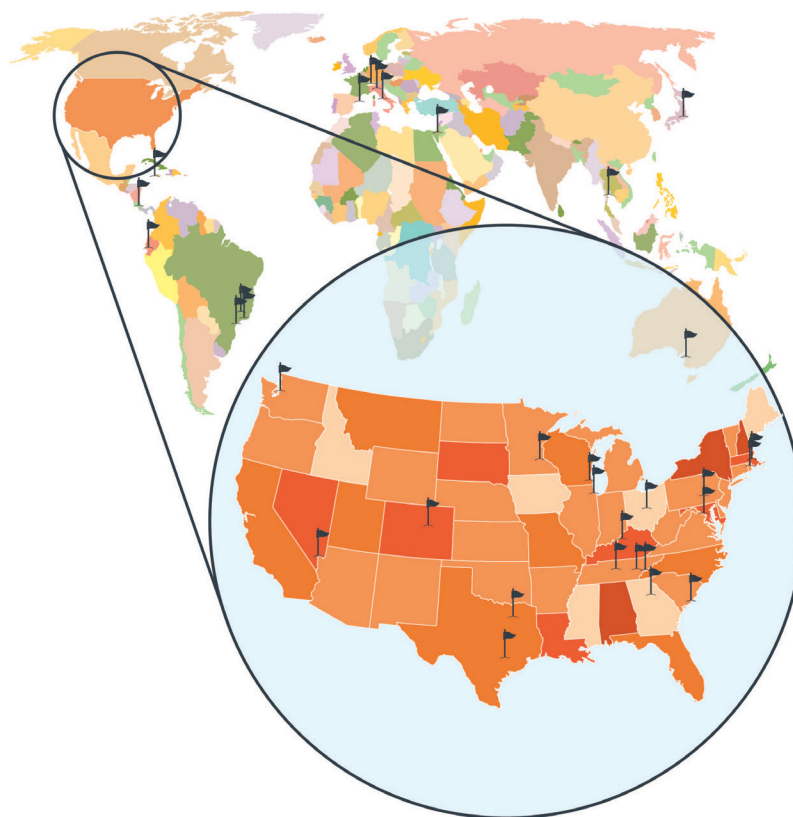
The Isotemp Ultra Low Freezer is used for storing clinical samples and reagents for the research projects within the bacteriology research laboratory.



The X-CUBE is a high throughput preclinical CT imager enabling in-vivo tissue quantification. The X-CUBE allows for fast whole body mouse and rat CT imaging at extremely low dose and excellent soft tissue contrast. Light weighted thanks to a self-shielded imaging unit it is a truly mobile in vivo scanner. CT imaging enables a wide range of non-invasive and longitudinal tissue measurement applications in your preclinical models. These include orthotopic and subcutaneous tumour volume, tumour metastases volume, lung volume, heart ejection fractions and blood pool volume, and more.

Dissemination of Research

Center of Excellence faculty are strongly encouraged to disseminate their research discoveries through peer-reviewed publications, published abstracts, presentations at scientific meetings, presentations of posters, and participation in scientific panels. The 16 funded faculty members of the Center of Excellence had a total of 83 publications. Of these publications, 79 were peer-reviewed scientific articles and 4 were book chapters. In addition to these published works, Center of Excellence Faculty participated in 114 presentations including oral, abstract, and poster presentations. Below, you will see a world map indicating the locations of meetings at which faculty presented their work. In addition to these scholarly works, four new invention disclosures and two new patents were filed during fiscal year 2024.



FY24 Invention Disclosures		
Inventors	Title	Status
Dr. Brian Whitlock	Systems & Methods for Protein Biomarker Detection	Provisional Patent
Dr. Madhu Dhar	Methods, Systems, and Compositions of Tissue Engineering	Provisional Patent
Dr. Madhu Dhar	Human Mesenchymal Stem Cells Directed Differentiation by Lignin-Derived Carbon Quantum Dots	Invention Disclosure
Dr. Madhu Dhar	Wearable Perfusion Bioreactor for Skin Tissue Regeneration	Invention Disclosure
Dr. Sreekumari Rajeev	<i>Ehrlichia canis</i> and <i>Anaplasma platys</i> Peptide Epitopes as Vaccine and Diagnostic Targets	Invention Disclosure
Dr. Brian Whitlock	Point of Care Immunoassay for Female Reproductive Health Monitoring	Invention Disclosure

Veterinary Summer Scholars (VSS) Research Program



Through the 2024 Veterinary Summer Scholars (VSS) research program, veterinary students were provided an opportunity to explore careers in research through participation in a hypothesis-driven project, group training activities, and attendance at research symposia. Co-directed by Drs. Andrea Lear and Sreekumari Rajeev, the program was designed to stimulate veterinary students' interest in research through hands-on exposure to the research environment. The objectives of the program were for students to learn about study design, identify specific objectives for their project, receive meaningful research experience, develop an understanding of research careers and opportunities, develop a basic understanding of the scientific method, develop skills in one or more research techniques, learn about data analysis and interpretation, obtain experience creating and delivering a research presentation, learn about ethical issues involved in research, receive an introduction to responsible conduct of research, and develop camaraderie with other student researchers.

Twenty-two students participated in laboratory and field-based research and attended professional development seminars where speakers addressed topics such as career opportunities in research, compliance issues in laboratory animal care, data visualization, science writing, scientific presentations, and the grant proposal process. Near the end of the ten-week program, the students presented their research findings to their colleagues and to University of Tennessee College of Veterinary Medicine faculty and staff in the format of a poster session. Six students (Natalie Azzolini, Danielle Bradford, Sydney Craig, Samuel Calabrese, Haley Richardson, and Micah Roberts) attended and presented their work at the 2024 National Veterinary Scholars Symposium held in St. Paul, Minnesota.

The summer scholars also receive an opportunity to present their work to a broad audience and earn awards at the College's annual Phi Zeta Research Day which was held on September 16, 2024. This year, five Veterinary Summer Scholars (Selina Boone, MaCayla Clements, Haley Richardson, Micah Roberts, Annalisa Wager, and Evie Yazbec) won awards in the veterinary student presentation category. The Center of Excellence in Livestock Diseases and Human Health (COE) fully funded 16 student stipends for the Summer Scholar Research Program. A grant from Boehringer Ingelheim funded six more student stipends for the program (Danielle Bradford, Sydney Craig, Samuel Calabrese, Natalie Azzolini, Haley Richardson, and Micah Roberts). The College continues to encourage participation of faculty in mentoring DVM students in research and discovery. More information about the awards these students received can be found on pages 24-27 of this report.

Laura Antizzo

Faculty Mentor: Dr. Andrew Cushing

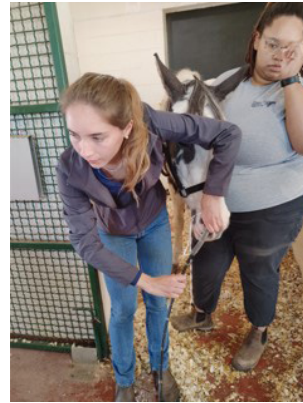
Summer Project: A retrospective review of pancreatic islet cell neoplasia in non-domestic felids



Natalie Azzolini

Faculty Mentor: Dr. Elizabeth Collar

Summer Project: Pharmacodynamics of intravenous and oral esomeprazole in horses administered phenylbutazone and dexamethasone



Selina Boone

Faculty Mentors: Drs. Alejandro Esteller-Vico and Luca Giori

Summer Project: Performance evaluation of a developing analyzer for measuring canine total thyroxine (TT4)



Danielle Bradford

Faculty Mentor: Dr. Richard Gerhold

Summer Project: Investigation of fertilization rates in wild turkeys



Chessa Brown

Faculty Mentor: Dr. Elizabeth Collar

Summer Project: Subchondral bone disease and treatment outcomes in non-racing horses



Samuel Calabrese

Faculty Mentor: Dr. Sarah Linn-Periano

Summer Project: Evaluating Lyme nephritis diagnostic criteria: A retrospective case-control analysis



MaCayla Clements

Faculty Mentor: Dr. Rick Gerhold

Summer Project: Using blow flies as biological drones to remotely detect outbreaks of *Histomonas meleagridis* in wild turkey populations in Tennessee



Sydney Craig

Faculty Mentors: Drs. Julia Albright, Alejandro Esteller-Vico, and Luca Giori

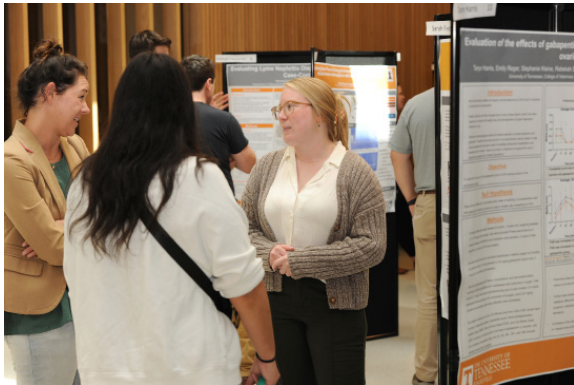
Summer Project: Biological variation of basal cortisol levels in healthy canines



Sarah Fiedler

Faculty Mentor: Dr. Richard Gerhold

Summer Project: Comparison of serological and histological findings in the diagnosis of *Toxoplasma gondii* in various wildlife species



Taryn Harris

Faculty Mentor: Dr. Stephanie Kleine

Summer Project: Evaluation of the effects of gabapentin on stress and pain in shelter cats undergoing ovariohysterectomy



Rachel Hofer

Faculty Mentor: Dr. DeNae LoBato

Summer Project: Canine plasmalipomas: A retrospective study



Ellie Lewis

Faculty Mentor: Dr. Elizabeth Collar

Summer Project: Equine thoracolumbar anatomy and pathology investigation



Jessica Lynch

Faculty Mentor: Dr. Joseph Smith

Summer Project: Therapies to get behind: the effect of rectal fluid therapy on biochemical analytes in the hospitalized porcine



Elizabeth Ragland

Faculty Mentor: Dr. Julia Albright

Summer Project: Impact of gabapentin on shelter cat behavior and URD



Haley Richardson

Faculty Mentor: Dr. Andrea Lear

Summer Project: An investigation into alternative forages for grazing sheep



Micah Roberts

Faculty Mentors: Drs. Darryl Millis and Pierre-Yves Mulon

Summer Project: Biomechanical evaluation of VetWelding resorbable pin and plates on cadaveric simulated metatarsal fractures



Rylynn Russell

Faculty Mentor: Dr. Debra Miller

Summer Project: Evaluating the toxicity of the plant-derived fungicide, curcumin, in freshwater invertebrates, fish, and amphibians



Heather Smith

Faculty Mentor: Dr. Debra Miller

Summer Project: Cracking the shell: How climate change impacts neonatal loggerhead (caretta caretta) health through blood analysis



Leo Spadafino

Faculty Mentor: Dr. Ashley Hartley

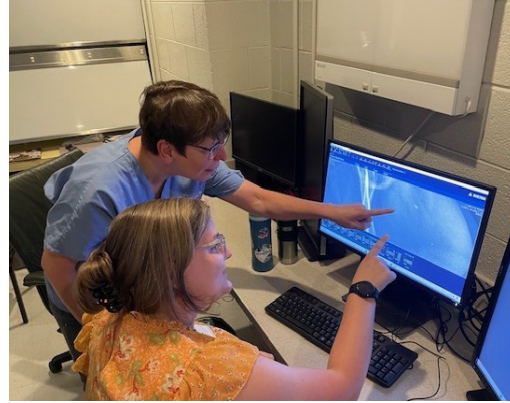
Summer Project: Canine blastomycosis: A retrospective study of 126 cases



Annalisa Wager

Faculty Mentor: Dr. Silke Hecht

Summer Project: Incidence and radiographic appearance of the os clitoridis (baubellum) in female domesticated ferrets (*Mustela putorius furo*)



Logan White

Faculty Mentor: Dr. Michelle Dennis

Summer Project: Investigation of brown pigmented lesions in Mountainous Star Coral (*Orbicella faveolata*)



Evie Yazbec

Faculty Mentors: Dr. Emi Knafo

Summer Project: Hematological and biochemical parameters in Mexican Axolotls (*Ambystoma mexicanum*)



Six Veterinary Summer Scholar Research Program students, along with program co-director, Dr. Sreekumari Rajeev, attended and presented their work at the 2024 National Veterinary Scholars Symposium held in St. Paul, Minnesota.



Research Day

The Center was a major sponsor of the University of Tennessee College of Veterinary Medicine's Phi Zeta Research Day held on September 16, 2024. This event serves as a venue for students to gain experience in research presentation skills through both oral and poster presentation opportunities. Students learn to critically evaluate research while networking and collaborating with other researchers throughout the day. Phi Zeta Research Day presentations were delivered by graduate students, professional students, residents, and post-doctoral fellows.

Twenty-one graduate students, 19 professional veterinary students, three clinical residents, and three post-doctoral scholars presented at this year's Phi Zeta Research Day. In addition, a new presenter category was introduced for Dual-degree (DVM-MS/PhD) students. In this category, four dual-DVM/MS students and two dual-DVM/PhD students presented. Student presentations were judged by faculty with a rubric based on their performance. Travel awards were provided to 1st, 2nd, and 3rd place winners. The award winners of Phi Zeta Research Day are highlighted below.

2024 UTCVM Research Day Awards

Resident and Post-Doc Category

Top Resident Presentation - Dr. Lily Davis, Small Animal Clinical Sciences

"Comparison of the effects of hydromorphone alone and combined with medetomidine-vatinoxan or dexmedetomidine on the induction dose of alfaxalone and selected cardiopulmonary variables in healthy dogs anesthetized with sevoflurane"

Mentor: Dr. Chiara Hampton

Top Post-Doc Presentation - Dr. Prachi Namjoshi, Biomedical and Diagnostic Sciences

"Tick vesicular-associated membrane proteins assist in the entry and survival of rickettsial pathogen in the arthropod vector"

Mentor: Dr. Girish Neelakanta

Graduate Student Category

1st Place - Caroline Moses, Comparative & Experimental Medicine

"Enhanced membrane composition for lipid nanoparticle vascular drug delivery"

Mentor: Dr. Deidra Mountain

Travel award: \$500.00

2nd Place (tied) - Lichao Liu, Comparative & Experimental Medicine

"Rickettsia parkeri infection in human endothelial cells is affected by NAD⁺ and a NAD-dependent enzyme"

Mentor: Dr. Girish Neelakanta

Travel award: \$300.00



A group of veterinary students pose using the Phi Zeta Research Day selfie frame.

Graduate Student Category (Continued)

3rd Place – Amy Webb, Comparative & Experimental Medicine

“Histopathology of corals showing tissue loss during an unusual coral mortality event in Jamaican north coast reefs”

Mentor: Dr. Michelle Dennis

Travel award: \$300.00



Dual Degree (DVM/MS or DVM/PhD) Student Category

Graduate students present their research presentations at Phi Zeta Research Day.

1st Place and Phi Zeta Award for Excellence in Human Health – Grace Malla, DVM-MS Class of 2026

“The pharmacokinetics, relative bioavailability, and pilot pharmacodynamics of subcutaneous levamisole in goats”

Mentor: Dr. Joseph Smith

Travel award: \$400.00 and a \$250.00 cash award from Phi Zeta

2nd Place – Lindsey Rice, DVM-MS Class of 2026

“Tick-borne pathogen prevalence and the standardization of necropsy protocols In southeastern North American black bears (Ursus americanus)”

Mentor: Dr. Richard Gerhold

Travel award: \$300.00

3rd Place – Olivia Escher-Price, DVM-PhD Class of 2028

“The bioavailability and pharmacokinetics of intravenous and subcutaneous famotidine in domestic goats (Capra aegagrus hircus)”

Mentor: Dr. Joseph Smith

Travel award: \$200.00



Students and faculty pose together in the hallway at Phi Zeta Research Day.

Veterinary Student Category

1st Place – MaCayla Clements, Class of 2027

“Using blow flies as biological drones to remotely detect outbreaks of Histomonas meleagridis in wild turkey populations in Tennessee”

Mentors: Drs. Richard Gerhold and Charity Owings

Travel award: \$200.00

2nd Place (Tied) – Selina Boone, Class of 2026

“Performance evaluation of a developing analyzer for measuring canine total thyroxine (TT4)”

Mentor: Drs. Alejandro Esteller-Vico and Luca Giori

Travel award: \$200.00

2nd Place (Tied) – Haley Richardson, Class of 2027

“An investigation into alternative forages for grazing sheep”

Mentor: Dr. Andrea Lear

Travel award: \$200.00

2nd Place (Tied) – Micah Roberts, Class of 2026

“Biomechanical evaluation of VetWelding resorbable pin and plates on cadaveric simulated metatarsal fractures”

Mentor: Dr. Darryl Millis

Travel award: \$200.00

3rd Place (Tied) – Annalisa Wager, Class of 2026

“Incidence and radiographic appearance of the os clitoridis (baubellum) in female domesticated ferrets (Mustela putorius furo)”

Mentor: Dr. Silke Hecht

Travel award: \$200.00

3rd Place (Tied) – Evie Yazbec, Class of 2027

“Hematological and Biochemical Parameters in Mexican Axolotls (Ambystoma mexicanum)”

Mentor: Dr. Emi Knafo

Travel award: \$200.00



Students present their research presentations at Phi Zeta Research Day.

Faculty Awards



In addition to the student awards, two faculty awards were also presented at Research Day. The Boehringer Ingelheim Faculty Research Mentoring Award was awarded to Dr. Sreekumari Rajeev, and the Zoetis Award for Veterinary Research Excellence was awarded to Dr. Joseph Smith.



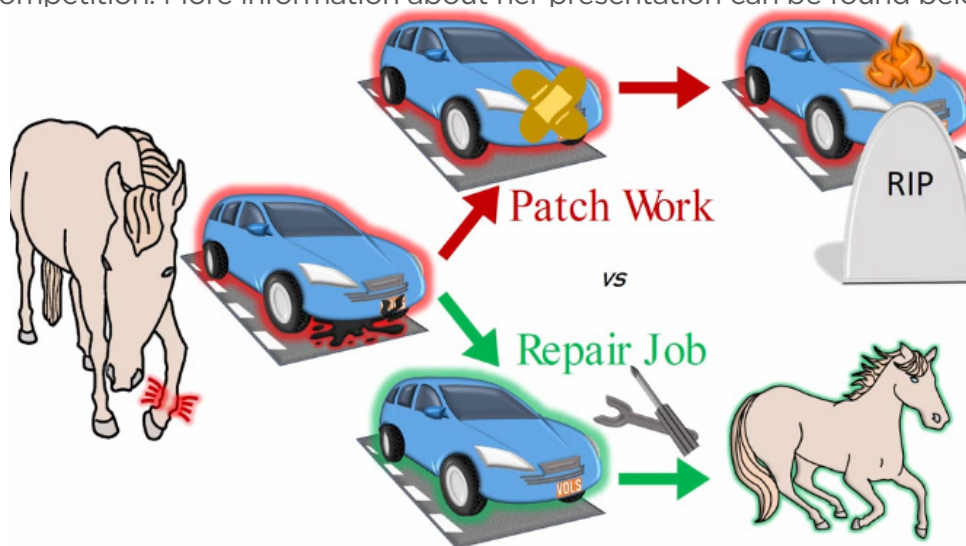
Associate Dean for Research and Graduate Studies, Dr. David Anderson (pictured left in both photos) poses with Dr. Sreekumari Rajeev (pictured right on left photo) and Dr. Joseph Smith (pictured right on right photo) with their faculty awards at Phi Zeta Research Day.



Students and faculty participate in Phi Zeta Research Day activities.

Three Minute Thesis

On April 3rd, 2024, twelve graduate students presented at the seventh annual University of Tennessee Three Minute Thesis (3MT) competition. The 3MT event is held as a part of the University of Tennessee's Graduate and Professional Student Appreciation Week. This competition challenges master's and doctoral students to communicate their unique thesis or dissertation to an audience unfamiliar with the subject. Competitors have three minutes to explain their research using only one slide or photo. One student from the College of Veterinary Medicine Comparative and Experimental Medicine graduate program, Alexandra Carlson, participated in the finals of the 3MT competition. Alexandra placed 3rd overall in the competition. More information about her presentation can be found below.



Above, you can view a photo of Alexandra's 3MT presentation slide. Her presentation discussed a novel treatment using soluble epoxide hydrolase inhibitors that prolonged the wellbeing of horses experiencing joint disease. Current treatments block the formation of inflammatory mediators, which only temporarily relieves the animal of pain by reducing inflammation, but it does not solve the overarching problem being faced by the horse. The treatment Alexandra discussed prevents the rapid breakdown of a protein involved in not only blocking the formation of inflammatory mediators, but also in advancing healing towards tissue regeneration, which restores the injured tissue.





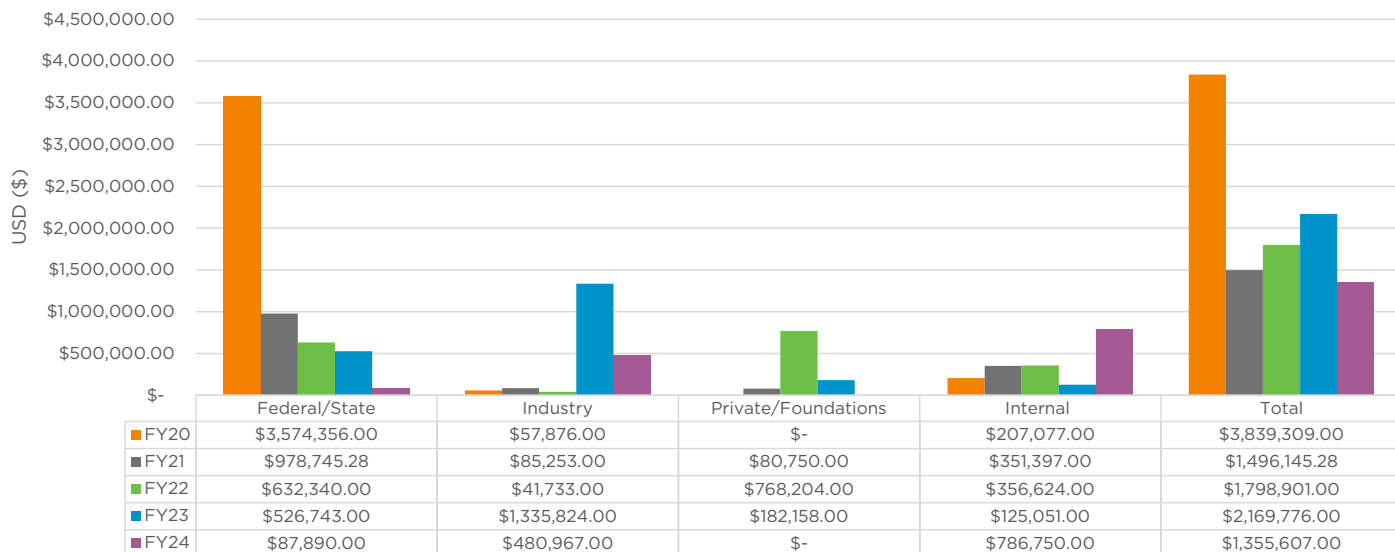
Five-Year Benchmark Data and Summary

The Center of Excellence for Livestock Diseases and Human Health remains a vibrant Center to support faculty and students in their path to discovery and pursuit of new knowledge that will bring real life solutions to people and animals for the betterment of society. The breadth and depth of their research exemplifies the value that the Center brings to the state of Tennessee to ensure sustainability of society through advancing healthy populations and agriculture industries.

Center funding is vital to ensuring that the faculty and students have access to state-of-the-art equipment, facilities, and resources to carry out their work. The return on investment is measured by research expenditures, extramural funding, and funding sources. The impact of this investment is measured by the dissemination of knowledge that make lives better. This is evident through the lens of success of the people engaged with the Center and their impact on the research community, society, and the people and animals who depend on scientific advancements that keep pace with the needs of a rapidly changing world.

Center faculty received \$1,355,607 in new awards in FY24, and the total value of active, extramurally funded research awards peaked at over \$7.8 million in FY24. This was attributed to multiple faculty receiving substantial awards. Grant proposals were most often submitted to federal agencies and industry partners, with a smaller number of proposals being awarded by foundations. Additionally, COE faculty were awarded a combined \$786,750 in internal funds from various University of Tennessee entities. This increase in funding is expected to result in significant increases in research awards and expenditures in FY25.

5-Year Review of New Awards and Funding Sources



Future Plans: Looking Forward

The Center of Excellence in Livestock Diseases and Human Health (COE) is dedicated to continued development of interdisciplinary and multidisciplinary activities designed to promote the advancement of human and animal health, expand research capacities for livestock research, explore commonalities between animal diseases and human diseases that have mutual benefit for the advancement of both, and develop new strategies for the diagnosis, treatment, and prevention of disease. The Center continues to invest in faculty, students, research, and infrastructure to support its mission.

Faculty supported by the Center continue to be productive in submitting proposals and successfully competing for grant awards. Grant award successes speak to the dedication of the faculty, renewed research culture for discovery, and advancing science for the benefit of livestock and human health.

During FY24, new faculty were hired with significant research appointments and start-up support from the Center of Excellence. These faculties represent an important investment in the future of research in infectious disease, cancer biology and therapy, epidemiology, and immunology important to animal and human health. Infrastructure enhancements have been necessary to support the research programs of these faculty. These faculty will have key roles in dissemination of new knowledge to stakeholders including scientists, practitioners, producers, and the public.

During the next five years, we will work toward renovation of additional laboratories in CVM and will continue to develop collaborations with UTIA AgResearch, UT-Knoxville, UT Oak Ridge Innovation Institute, and UT Health Science Center to expand translational and human health research. Additional collaborations among institutions will be important, including Oak Ridge National Laboratory and other campuses in the UT System and the state. This will include continuing discussions for strategic planning for future biomedical research facilities and multispecies vivaria aimed to expand translational and animal-intensive research activities. Of particular importance are creation of biosafety laboratories (BSL-3) and expansion of animal facilities sufficient for infectious disease and radioisotope research (ABSL-3).

START-UP FACULTY RESEARCH SUMMARIES

Dr. Mohamed Abouelkhair

ASSISTANT PROFESSOR OF VIROLOGY AND IMMUNOLOGY
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

About Dr. Abouelkhair

PhD
University of Tennessee

MS
University of Sadat City

*Peer-Reviewed
Publications:*
6 in 2023

Presentations:
3 in 2023



RESEARCH INTERESTS

Microbial bioinformatics; development of new molecular assays for direction of existing and emerging infectious diseases; and immunology.

Dr. Cassio Ferrigno

ASSISTANT PROFESSOR OF ORTHOPEDIC SURGERY
UTCVM SMALL ANIMAL CLINICAL SCIENCES

About Dr. Ferrigno

PhD
University of São Paulo, Brazil

DVM
Universidade Estadual

Presentations:
27 in 2023

Peer-Reviewed Publications:
3 in 2023

Book Chapters:
3 in 2023

*Posters, Abstracts, and
Proceedings:*
1 in 2023



RESEARCH INTERESTS

Limb deformity corrections; complex fractures treatment; orthopedic implant biomechanics; patellar luxation; and cruciate disease.

Dr. Chiara Hampton

ASSISTANT PROFESSOR OF VETERINARY ANESTHESIA AND ANALGESIA
UTCVM LARGE ANIMAL CLINICAL SCIENCES

About Dr. Hampton

DVM
University of Messina, Italy

MS
Oregon State University

*Peer-Reviewed
Publications:*
7 in 2023

Presentations:
1 in 2023

*Posters, Abstracts, and
Proceedings:*
8 in 2023



RESEARCH INTERESTS

Pathogenesis and diagnosis of natural disease with special interest in aquatic animals and wildlife.

Dr. Andrea Lear

ASSISTANT PROFESSOR OF FOOD ANIMAL FIELD SERVICES
UTCVM LARGE ANIMAL CLINICAL SCIENCES

About Dr. Lear

MS
Colorado State University

PhD
University of Tennessee

DVM
Auburn University

Honors:
2 in 2023

Presentations:
7 in 2023

*Posters, Abstracts, and
Proceedings:*
2 in 2023



RESEARCH INTERESTS

Maternal-fetal interactions, including placental immunology and reproductive physiology.

Dr. Sarah Linn-Periano



ASSISTANT PROFESSOR OF ANATOMIC PATHOLOGY
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

About Dr. Linn-Periano

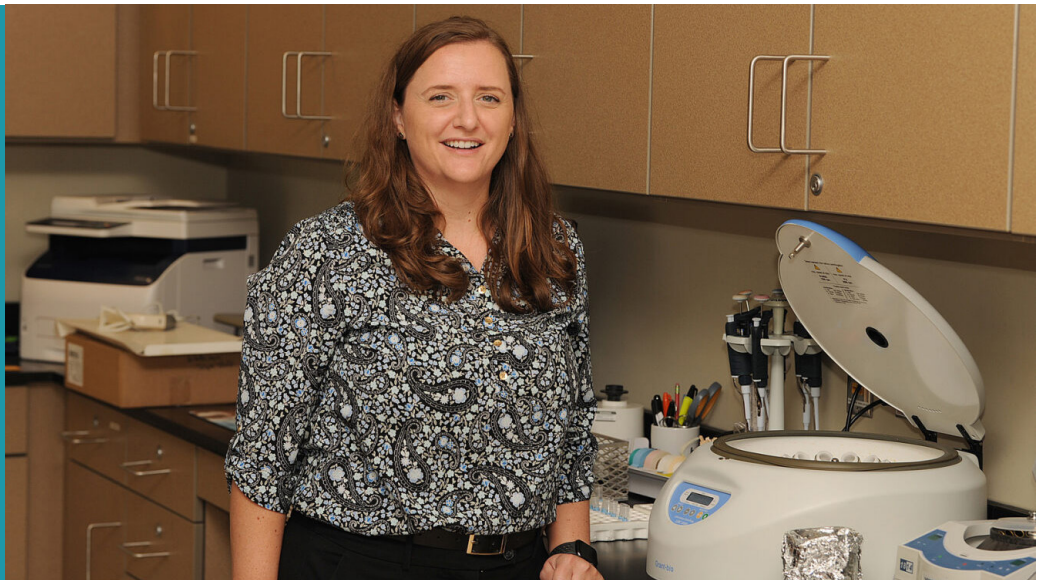
DVM
The Ohio State University

PhD
The Ohio State University

*Peer-Reviewed
Publications:*
2 in 2023

Presentations:
3 in 2023

*Posters, Abstracts, and
Proceedings:*
3 in 2023



RESEARCH INTERESTS

Urinary tract infection pathogenesis in domestic species, with an emphasis on the innate immune response and urinary tract antimicrobial peptide expression.

Dr. Michael Mahero

ASSISTANT PROFESSOR OF INFECTIOUS DISEASE EPIDEMIOLOGY AND PUBLIC HEALTH
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

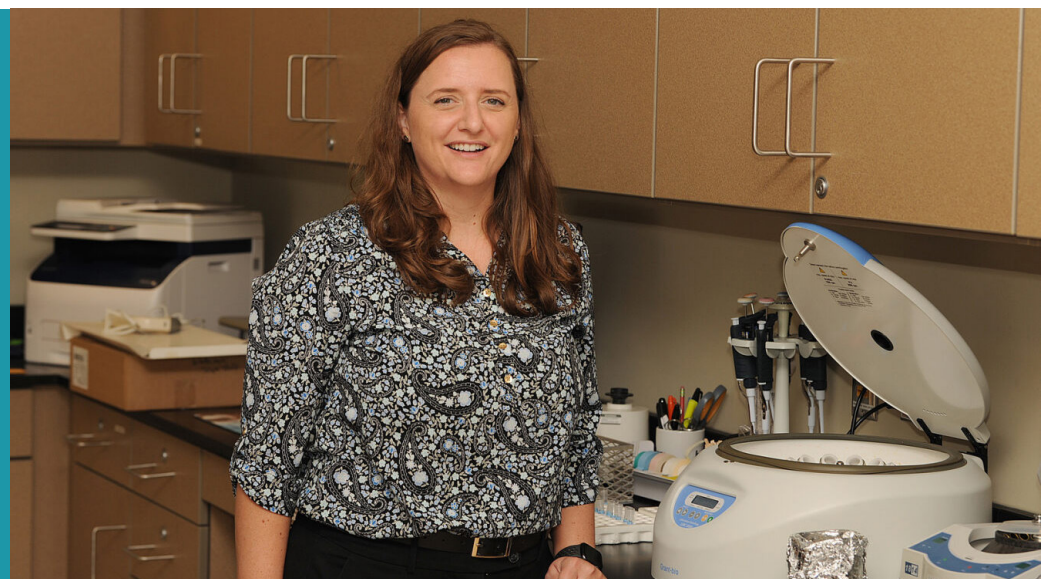
About Dr. Mahero

PhD
University of Georgia

DVM
University of Georgia

*Peer-Reviewed
Publications:*
2 in 2023

Presentations:
2 in 2023



RESEARCH INTERESTS

Characterizing and mitigating health risks along the human, animal and environment interface using socioecological and epidemiological methods and One Health partnership approaches.

Dr. Girish Neelakanta

ASSOCIATE PROFESSOR OF INFECTIOUS DISEASES
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

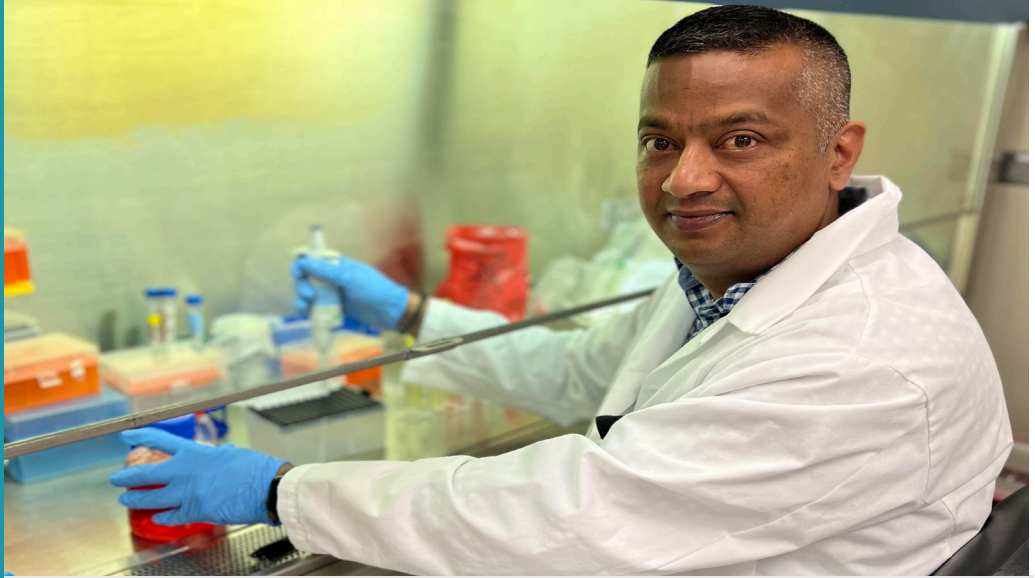
About Dr. Neelakanta

PhD
University of Cologne,
Germany

MSc
Bangalore University, India

*Peer-Reviewed
Publications:*
4 in 2023

Presentations:
12 in 2023



RESEARCH INTERESTS

Vector-borne diseases and molecular aspects of host-pathogen interactions; and development of transmission-blocking vaccines.

Dr. Sarah Schmid

ASSISTANT PROFESSOR OF INTERNAL MEDICINE
UTCVM SMALL ANIMAL CLINICAL SCIENCES

About Dr. Schmid

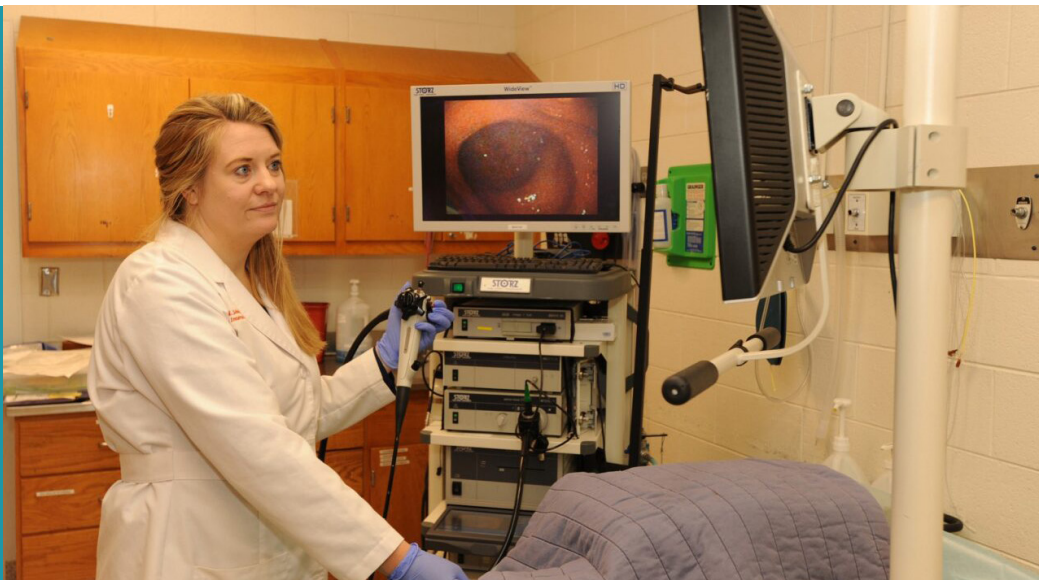
DVM
University of Wisconsin-
Madison

*Peer-Reviewed
Publications:*
3 in 2023

Book Chapters:
1 in 2023

Presentations:
8 in 2023

*Posters, Abstracts, and
Proceedings:*
4 in 2023



RESEARCH INTERESTS

Gastroenterology; states of hypoalbuminemia; endoscopy; and veterinary education.

Dr. Wesley Sheley

ASSISTANT PROFESSOR OF ANATOMIC PATHOLOGY
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

About Dr. Sheley

PhD
University of Tennessee

DVM
University of Tennessee

*Peer-Reviewed
Publications:*
4 in 2023

Presentations:
2 in 2023



RESEARCH INTERESTS

Histology; histopathology, anatomic pathology, surgical pathology; *Batrachochytrium salamandrivorans*; necropsy; and wildlife and fisheries.

Dr. Nora Springer

ASSISTANT PROFESSOR OF CLINICAL PATHOLOGY
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

About Dr. Springer

PhD
Cornell University

DVM
Kansas State University

*Peer-Reviewed
Publications:*
5 in 2023

Presentations:
12 in 2023



RESEARCH INTERESTS

Naturally occurring diseases and cancers in companion animals; veterinary clinical pathology; cancer biology; tumor microenvironment; translational medicine; and comparative oncology.

Dr. Hameeda Sultana

ASSOCIATE PROFESSOR OF INFECTIOUS DISEASES
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

About Dr. Sultana

PhD
University of Cologne,
Germany

MS
Bangalore University

*Peer-Reviewed
Publications:*
3 in 2023

*Posters, Abstracts, and
Proceedings:*
3 in 2023



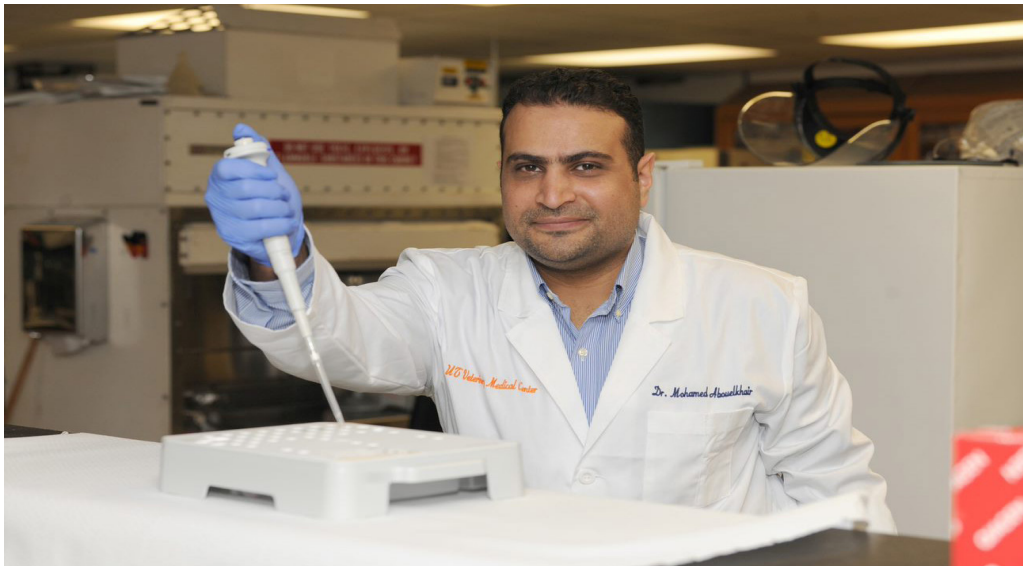
RESEARCH INTERESTS

Arthropod-derived exosomes in mediating flavivirus transmission; vector-borne viral diseases involving flaviviruses; and identifying treatments for pan-flaviviral infections in humans and animals.

FUNDED FACULTY RESEARCH SUMMARIES

Dr. Mohamed Abouelkhair

ASSOCIATE PROFESSOR OF VIROLOGY AND IMMUNOLOGY
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES



About Dr. Abouelkhair

PhD
University of Tennessee

MS
University of Sadat City

*Peer-Reviewed
Publications:*
6 in 2023

Presentations:
3 in 2023

COE SEED FUND RESEARCH:

Investigate the potential use of plasma cell-free DNA (cfDNA) concentrations and cancer-associated mutations as a surrogate marker for multiple indications in canine B-cell lymphoma, including diagnosis, prognosis, and monitoring.

Canine lymphoma is the most common canine cancer and resembles non-Hodgkins lymphoma in humans. Lymphoma is usually multi-centric, meaning that multiple lymph nodes and organs are affected at the time of diagnosis. B-cell lymphoma is a heterogeneous group of lymphoid malignancies, which comprise the majority of lymphomas. So far, lymphoma diagnosis has relied on the analysis of the tissue biopsy, which does not reflect the entire molecular heterogeneity of lymphomas from a molecular standpoint. In each patient, lymph nodes may be located in different anatomical sites, and each area of an individual lymph node may have a different genetic profile. Because of this, molecular analysis of genomic DNA extracted from a single lymph node biopsy may not recapitulate the mutational landscape of the disease. Dr. Abouelkhair's research seeks to compare cfDNA from dogs with B-cell lymphoma to cfDNA from healthy dogs to show the potential use of cfDNA as a surrogate marker for multiple indications in B-cell lymphoma, including diagnosis, prognosis, and monitoring.

Dr. Julia Albright

ASSISTANT PROFESSOR OF VETERINARY BEHAVIOR
UTCVM SMALL ANIMAL CLINICAL SCIENCES

About Dr. Albright

MA
Vanderbilt University

DVM
University of Tennessee

*Peer-Reviewed
Publications:*
6 in 2023

Presentations:
5 in 2023



COE SEED FUND RESEARCH:

Mycotoxins in cannabis: Implications for One Health

Consumers desire natural products, such as cannabidiol (CBD) because of the belief that natural is safer. Medicinal and recreational uses of *Cannabis sativa*, commonly known as cannabis or hemp, has increased following its legalization in certain regions of the world. Cannabis and hemp plants interact with a community of microbes (i.e., the phytobiome), which can influence various aspects of the host plant. The fungal composition of the *C. sativa* phytobiome (i.e., mycobiome) currently consists of over 100 species of fungi, which includes phytopathogens, epiphytes, and endophytes. This mycobiome has often been understudied in research aimed at evaluating the safety of cannabis products for humans. Medical research has historically focused instead on substance use and medicinal uses of the plant. Because several components of the mycobiome are reported to produce toxic secondary metabolites (i.e., mycotoxins) that can potentially affect the health of humans and animals and initiate opportunistic infections in immunocompromised patients, there is a need to determine the potential health risks that these contaminants could pose for consumers. This research seeks to further research mycotoxins in the CBD space.

Dr. Madhu Dhar

RESEARCH PROFESSOR
UTCVM LARGE ANIMAL CLINICAL SCIENCES



COE SEED FUND RESEARCH:

Fused deposition modeling or stereolithography: Which 3D printing technology is optimal for the treatment of oralmaxillofacial bone injuries

3D printing has the ability to produce complex geometries that would be otherwise infeasible to construct by hand. Fused deposition modeling (FDM) and stereolithography (SLA) are the two 3D printing technologies commonly used in tissue engineering. FDM uses a continuous filament of a thermoplastic material, which is extruded through a nozzle. SLA requires a liquid resin which is cured by a highly precise laser as soon as a layer is deposited. SLA printing is thus, known for its fine features, smooth surface finish, ultimate part precision, and accuracy. For an optimal tissue engineering project, both methods should be investigated. The key feature of 3D printing is the ink. In the last few years, Dr. Dhar's research team has demonstrated that graphene nanoparticles (GNPs) generate an osteoinductive and osteoconductive environment for MSCs to undergo osteogenesis in vitro and in vivo. Dr. Dhar's lab is currently using FDM 3D printing process to generate graphene-based scaffolds with 0.05-1% graphene for bone healing and repair. Due to the hydrophobic nature of graphene and its immiscibility in various organic solvents, it gets challenging to develop graphene - based FDM ink with concentrations greater than 1%. In collaboration with an organic chemist, Dr. Dhar's research team, seeks to develop biodegradable, mechanically stable, polymeric resin with >1% GNPs for SLA printing.

About Dr. Dhar

MS
University of Pune, India

PhD
University of Pune, India

Peer-Reviewed Publications:
3 in 2023

Presentations:
8 in 2023

Posters, Abstracts, and Proceedings:
2 in 2023

Dr. Andrea Lear

PROFESSOR OF INFECTIOUS DISEASES
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

About Dr. Lear

MS
Colorado State
University

PhD
University of Tennessee

DVM
Auburn University

Honors and Awards:
2 in 2023

Presentations:
7 in 2023

*Posters, Abstracts, and
Proceedings:*
2 in 2023



COE SEED FUND RESEARCH:

Biomarker discovery in pregnant cattle infected with bovine viral diarrhea virus

The placenta is a transient organ, critical for the growth and protection of the developing fetus. Trophoblasts from the fetal placenta produce a variety of products, including pregnancy associated glycoproteins (PAGs) and extracellular vesicles (EV) that can function as cellular messengers. EVs are released from various types of cells and can serve as communication channels between the dam and fetus. EV cargo is comprised of proteins, lipids, and nucleic acids. Once released from the parent cell, EVs can cause a functional change in recipient cells dependent on their content. In both pregnant humans and ruminants (i.e. sheep and cattle), the production of EVs is associated with progesterone production, with higher numbers of vesicles isolated during pregnancy compared to non-pregnant cohorts. Studies in human pregnancy have linked EV content with placental dysfunction, leading to health complications for the fetus and mother. Examination of EV content in livestock is limited, thus far only evaluating normal, uncomplicated pregnancies. In susceptible, pregnant cattle exposed to bovine viral diarrhea virus (BVDV), fetal infection is common can result in an array of fetal consequences while the pregnant dam remains asymptomatic. The overall goal of this research was to identify non-invasive circulating biomarkers in maternal blood that are associated with fetal BVDV infection.

Dr. Darryl Millis

PROFESSOR OF ORTHOPEDIC SURGERY
UTCVM SMALL ANIMAL CLINICAL SCIENCES



COE SEED FUND RESEARCH:

Comparison of osteogenesis between peri-operative autologous PRP implantation and post-operative autologous PRP injection in canine long bone fracture repair

Bone fracture repair can rarely result in delayed healing, abnormal healing, or absence of healing. Platelet-rich plasma (PRP) derives from blood and can be applied to bone fractures to improve on the repair process. It contains high concentrations of important cell signaling molecules like growth factors (GFs) and inflammatory mediators that stimulates bone growth. However, it also contains pro-inflammatory mediators that may be deleterious to cartilages. PRPs are currently used at the time of the initial bone fracture repair; however, because of the pro-inflammatory mediators, PRPs may contribute to worsening inflammation, which may ultimately lead to cell death. This research sought to compare the time to reach bone healing in dogs implanted with PRP during the initial fracture repair surgery compared to those with PRP injected after the surgery. We hypothesized that dogs treated with PRP at the time of the initial repair surgery may require longer healing time compared to those treated with PRP postoperatively.

About Dr. Millis

MS
Cornell University

DVM
University of Florida

Peer-Reviewed Publications:
3 in 2023

Book Chapters:
1 in 2023

Presentations:
23 in 2023

Posters, Abstracts, and Proceedings:
5 in 2023

Dr. Girish Neelakanta

ASSOCIATE PROFESSOR OF INFECTIOUS DISEASES
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES

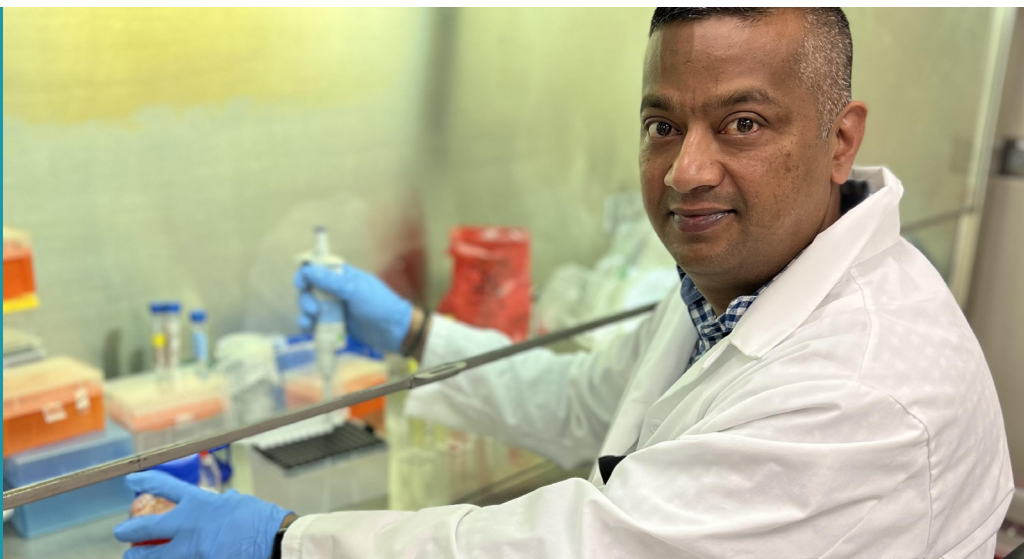
About Dr. Neelakanta

PhD
University of Cologne,
Germany

MSc
Bangalore University,
India

*Peer-Reviewed
Publications:*
4 in 2023

Presentations:
12 in 2023



COE SEED FUND RESEARCH:
Tick lipocalin modulates cytokine response

In the United States, soft tick *Ornithodoros turicata* transmits *Borrelia turicatae*, the causative agent of relapsing fever in humans. These ticks transmit spirochetes to humans via blood feeding. Molecular analysis of proteins that are important in blood feeding may help to develop novel strategies to target these ticks. Lipocalins are members of a family of low molecular weight molecules that are abundantly secreted both by hard and soft ticks in their saliva during feeding. Lipocalins are immunomodulators that perform multiple functions including binding to small molecules such as histamine, serotonin, and prostaglandins. The release of histamine would lead to vascular permeability and infiltration of monocytes and neutrophils to the injury site. These host molecules induce pain and itching that result in host grooming activity leading to rejection of tick infestations. Some of these lipocalins have a biogenic amine-binding (BAB) motif. The BAB motif is reported to be important for lipocalin binding to histamine and/or serotonin at the tick bite site during blood feeding. The research team recently identified a BAB motif-containing lipocalin-like molecule in *O. turicata americanus*, designated as Otlip. The researchers also purified recombinant Otlip and provided preliminary data that shows binding of Otlip to histamine. So far, studies that have addressed role of lipocalins in modulating host cytokine responses are limited. Through this study, the researchers sought to test whether Otlip modulates cytokine response from murine macrophages.

Dr. Hameeda Sultana

ASSOCIATE PROFESSOR OF INFECTIOUS DISEASES
UTCVM BIOMEDICAL AND DIAGNOSTIC SCIENCES



COE SEED FUND RESEARCH:

Maternal exosomes in transmission of viruses to fetus/neonates

Mosquitoes transmit several pathogens including flaviviruses and bunyaviruses that cause severe diseases in human and domestic animals. The molecular determinants and mechanisms for mosquito-borne virus transmission to the vertebrate host are poorly understood. Previous research conducted by laboratory researchers has elucidated that mosquito-borne flaviviruses, such as West Nile virus (WNV) and Zika virus (ZIKV), use arthropod exosomes for transmission from mosquito to human-skin keratinocytes and umbilical vein endothelial cells. Full-length viral RNA genomes, and proteins/polyproteins were detected inside exosomes derived from mosquito cells. Previous studies revealed that mosquito cell-derived exosomes are important means of flavivirus transmission from vector to the vertebrate host. Previous research conducted by the lab has shown that mammalian exosomes facilitate the dissemination of flaviviruses from periphery to the brain. The preliminary results from this research provide a strong foundation for addressing and characterizing the role of maternal exosomes in viral transmission from placental barrier cells to fetus. Several approaches for the identification of molecular markers that could play important roles in mother-fetal transmission are envisioned as immediate prospective studies. Researchers hypothesize that exosomes serve as secured vesicles for the transmission of mosquito-borne viruses from mother to fetus and also lead to the future identification of molecular repertoire that may aid in the development of better strategies to treat and control viral transmission.

About Dr. Sultana

PhD
University of Cologne,
Germany

MS
Bangalore University

*Peer-Reviewed
Publications:*
3 in 2023

*Posters, Abstracts, and
Proceedings:*
3 in 2023

Dr. Brian Whitlock



ASSISTANT PROFESSOR OF FIELD SERVICES
UTCVM LARGE ANIMAL CLINICAL SCIENCES

About Dr. Whitlock

MS
Michigan State
University

DVM
Auburn University

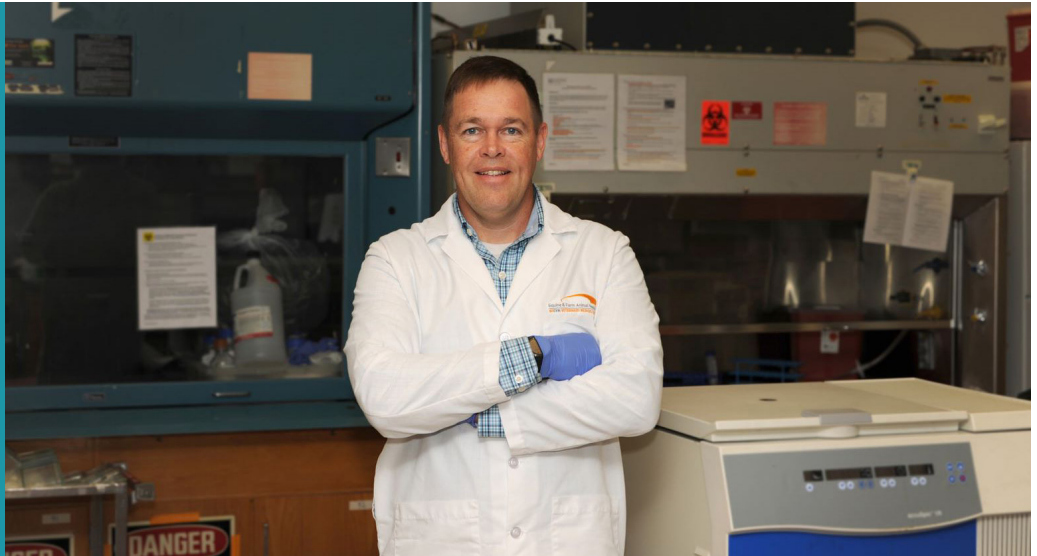
PhD
Auburn University

Honors and Awards:
2 in 2023

**Peer-Reviewed
Publications:**
1 in 2023

Presentations:
1 in 2023

**Posters, Abstracts, and
Proceedings:**
2 in 2023



COE SEED FUND RESEARCH:

Effects of Streptococcus-induced inflammation on hypothalamic control of reproduction

Reproduction is tightly regulated by the internal and external environments presented to an animal as it is vital for the species survival but not for the individual's survival. In turn, inflammation is one of the various stressors that will impair reproductive physiology and capacity in animals. Specifically, bacterial infections are a common source of chronic inflammation. Kisspeptin-neurokinin B-dynorphin neurons are a part of the "black box" within the brain that controls pulsatile gonadotropin releasing hormone (GnRH), and subsequently, luteinizing hormone secretions important for the onset of puberty and reproductive capability. Specifically, kisspeptin is the direct stimulator of GnRH neurons. Evaluation of central reproduction following an infection with chronic inflammation is limited, especially in regard to Gram-positive bacterial infections such as *Streptococcus pneumoniae* and Group B *Streptococcus*. This study sought to infect non-pregnant mice with bacteria that are commonly found in the respiratory tract (*Streptococcus pneumoniae*) or reproductive tract (Group B *Streptococcus*) of humans in order to evaluate the changes that occur to neurons important for reproduction and the immune responses associated with infection. Researchers hypothesize the increase in stress and inflammatory markers will lead to a decrease in the neuropeptides important for successful reproduction. This research provides invaluable information that will assist in developing treatments and preventions for humans and animals.

RESEARCH FUNDING, EXPENDITURES, AND BUDGETING

SCHOLARLY ACTIVITY CITATIONS

Dr. Mohamed Abouelkhair

PEER-REVIEWED PUBLICATIONS

- Abouelkhair, M.A., Roozitalab, A. & Elsakhawy, O.K. Molecular characterization of a reptarenavirus detected in a Colombian Red-Tailed Boa (*Boa constrictor imperator*). *Virology* 20, 265 (2023). <https://doi.org/10.1186/s12985-023-02237-2>
- Ashkan Roozitalab, Ola K. Elsakhawy, Mohamed A. Abouelkhair*. (2023). Complete coding sequence of two feline panleukopenia virus strains isolated from domestic cats (*Felis catus*) in Tennessee, USA. *ASM Journals Microbiology Resource Announcements* Vol. 12, No. 10 <https://doi.org/10.1128/MRA.00431-23>
- Lufuno Phophi, Mohamed A. Abouelkhair, Rebekah Jones, Jordan Zehr, Stephen A. Kania. Temporal changes in antibiotic resistance and population structure of methicillin-resistant *Staphylococcus pseudintermedius* between 2010 and 2021 in the United States, *Comparative Immunology, Microbiology and Infectious Diseases*, Volume 100, 2023. <https://doi.org/10.1016/j.cimid.2023.102028>.
- Phophi L, Abouelkhair M, Jones R, Henton M, Qekwana DN, Kania SA (2023) The molecular epidemiology and antimicrobial resistance of *Staphylococcus pseudintermedius* canine clinical isolates submitted to a veterinary diagnostic laboratory in South Africa. *PLoS ONE* 18(8): e0290645. <https://doi.org/10.1371/journal.pone.0290645>
- Ashkan Roozitalab, Ola Elsakhawy, Lufuno Phophi, Stephen A. Kania, Mohamed A. Abouelkhair*. Complete Genome Sequences of 11 *Staphylococcus pseudintermedius* Isolates from Dogs in the United States. *ASM Journals Microbiology Resource Announcements* Vol. 12, No. 4 <https://doi.org/10.1128/mra.00002-23>
- Sarkar S, Souza MJ, Martin-Jimenez T, Abouelkhair MA, Kania SA, Okafor CC. Tetracycline, Sulfonamide, and Erythromycin Residues in Beef, Eggs, and Honey Sold as “Antibiotic-Free” Products in East Tennessee (USA) Farmers’ Markets. *Veterinary Sciences*. 2023; 10(4):243. <https://doi.org/10.3390/vetsci10040243>

PRESENTATIONS

- Meaghan Harley-Troxell, Madhu Dhar, and Mohamed Abouelkhair. Evaluating long-term systemic toxicity of graphene nanoparticles and xenogeneic human mesenchymal stem cells using a sciatic nerve defect rat model. *Comparative & Experimental Medicine and Public Health Research Symposium*. Knoxville, TN. Oral presentation.
- Frank Rodriguez and Mohamed Abouelkhair. PCR for antigen receptor rearrangement: Benchmarking performance of a clonality assay in diverse canine sample types. 2023 Summer Veterinary research presentations. Knoxville, TN. Oral presentation.
- Yuting Huang and Mohamed Abouelkhair. Characterization of Canine Natural Killer Cells from canine leukemia and lymphoma. 2023 Summer Veterinary research presentations. Knoxville, TN. Oral presentation.

Dr. Julia Albright

PEER-REVIEWED PUBLICATIONS

- Spano V, Springer CM, Albright JD. Effects of transdermal mirtazapine and oral gabapentin as pre-veterinary visit pharmaceuticals for shelter cats. *Journal of Veterinary Behavior*, 2023; 65: 47-53
- Maffeo, N., Springer C., and Albright JD. A retrospective study on the clinical use and owner perception of venlafaxine efficacy as part of a multimodal treatment for canine fear, anxiety, and aggression. *Journal of Veterinary Behavior*, 2023; 64:54-59.
- Davis KM., Burghardt GM, and Albright JD. A Descriptive Methodology for Studying the Ontogeny of Object Play and Breed Differences in Dogs (*Canis lupus familiaris*). *Animals* 13.8; 2023: 1371
- Pennington E, Springer C, Albright J, Castel A. Evaluation of different methods of environmental to control anxiety in dogs undergoing hemilaminectomy after acute intervertebral disc extrusion: a randomized double-blinded study. *Frontiers in Veterinary Science*. 2023;10:112498
- Owen MA, Sirr CG, Albright JD, Fransson BA. Canine Laparoscopic-assisted Ovary Sparing Hysterectomy Does Not Increase Risk of Stump Pyometra. *Journal of American Veterinary Medicinal Association* 261(8):1166-1173.
- Albright JD, Pflaum K. Aggression in dogs: Etiology, signalment, and management. *Today's Veterinary Practice*.

PRESENTATIONS

- Albright, Julia. Feline Behavior Workshop. Western Veterinary Conference. Las Vegas, NV. 2 hours. Oral presentation.
- Albright, Julia. Canine Behavior Workshop. Western Veterinary Conference. Las Vegas, NV. 2 hours. Oral presentation.
- Albright, Julia. Fear Free Certification Workshop. Western Veterinary Conference. Las Vegas, NV. 1 hour lecture and 4 hour lab. Oral presentation.
- Albright, Julia. Fear Free Vet Visits. Integrating dietary supplements into your treatment plans: How and when to use them? October 16, 2023. Oral presentation.
- Albright, Julia. Fear Free Vet Visits. Gut Reactions: Impact of the gut microbiome on canine and feline health. Oral presentation.

Dr. Madhu Dhar

PEER-REVIEWED PUBLICATIONS

- Harley-Troxell ME, Steiner R, Advincula RC, Anderson DE, Dhar M. Interactions of Cells and Biomaterials for Nerve Tissue Engineering: Polymers and Fabrication. *Polymers (Basel)*. 2023 Sep 7;15(18). doi: 10.3390/polym15183685. Review. PubMed PMID: 37765540; PubMed Central PMCID: PMC10536046.
- Harley-Troxell ME, Dhar M. Assembling Spheroids of Rat Primary Neurons Using a Stress-Free 3D Culture System. *Int J Mol Sci*. 2023 Aug 31;24(17). doi: 10.3390/ijms241713506. PubMed PMID: 37686310; PubMed Central PMCID: PMC10488062.
- Newby SD, Forsynth C, Bow AJ, Bourdo SE, Hung M, Cheever J, Moffat R, Gross AJ, Licari FW, Dhar MS. Xenogenic Implantation of Human Mesenchymal Stromal Cells Using a Novel 3D-Printed Scaffold of PLGA and Graphene Leads to a Significant Increase in Bone Mineralization in a Rat Segmental Femoral Bone Defect. *Nanomaterials (Basel)*. 2023 Mar 23;13(7). doi: 10.3390/nano13071149. PubMed PMID: 37049243; PubMed Central PMCID: PMC10097331.

PRESENTATIONS

- Madhu Dhar. "Are we there yet? Successes and challenges in veterinary regenerative medicine" International Conference on Veterinary Research and Development. Virtual. April 26, 2023.
- Madhu Dhar. "Material-Guided Control of Stem Cell Fate: Implications for Precision Regenerative Medicine" 5th International Conference on PharmScience Research and Development. Las Vegas Feb 22-24, 2023 (Virtual).
- Madhu Dhar. "Bioengineered Systems: Implants and Devices for Orhtopedic Applications (Webinar-Virtual). MDPI April 20.
- Madhu Dhar "Regenerative medicine tools for neural tissue engineering" 11th Annual NeuroNET Retreat. Nov 3, 2023.
- David Anderson, Madhu Dhar "Biomedical Innovations in SMART tendon technologies using novel additive manufacturing" Human Health and Wellness meeting. Aug 18, 2023.
- Dustin Crouch, Devina Sanjaya, Madhu Dhar. "Novel in perfusion system for regenerating skin over artificial implants". Human Health and Wellness meeting. Aug 18, 2023.
- Madhu Dhar "Regenerative medicine and tissue regeneration program at UTK". Virtual SPARKS: Medical Research. May 3rd, 2023.
- Madhu Dhar "Multiscale, poly-topographic platforms for complex, multifunctional tissue regeneration using precision engineering: A prelude to organogenesis. OneHealth Rally by the University of Tennessee. April 17, 2023.

ABSTRACTS, POSTERS, AND PROCEEDINGS

- F. Cantarero-Rivera, D. D'Souza, M. Dhar, J. Chen. Characterization of the dynamic viscosity of cell cultures and its effect on mixing performance in a spinner flask bioreactor. IFT FIRST, Annual Event and Expo. Chicago, IL, USA, July 15 - 17, 2023.
- Eli Christoph, SD Newby, Lu Yu, Jakob Scroggins, Michael Orsini, David Keffer, MS Dhar, David Harper. Lignin derived carbon quantum dots as a novel material for tissue engineering. TERMIS Americas Annual Conference and Exhibition. Boston, MA, April 11-14, 2023.

Dr. Chiara Hampton

PEER-REVIEWED PUBLICATIONS

- Smith, J.S., Gebert, J.E., Ebner, L.S., Bennett, K.O., Collins, R.J., Hampton, C.E., Kleine, S.A., Mulon, P.Y., Smith, C.K., Seddighi, R. and Bussieres, G., 2023. Pharmacokinetics of intramuscular maropitant in pigs (*Sus scrofa domestica*). *Journal of Veterinary Pharmacology and Therapeutics*, 46(3), pp.158-164.
- Hampton C.E., Dehghanpir S, Armstrong C, Scully C, Baker RE, Mitchell M. Prevalence of AO blood group and level of agreement for AO blood-typing methods in pet pigs from Louisiana. *J Vet Emerg Crit Care*. 2023; 33: 549-558. <https://doi.org/10.1111/vec.13266>
- Hampton C.E., Zhu X, Giori L. Validation of a human paper-based blood typing method for use in pet pigs. *J Vet Emerg Crit Care*. 2023; 33: 619-623. <https://doi.org/10.1111/vec.13323>
- Kleine, S., Hampton, C. E., Smith, C., Bussieres, G., Mulon, P.-Y., Seddighi, R., Cox, S., & Smith, J. (2023). Pharmacokinetics of a single oral dose of grapiprant in juvenile pigs (*Sus scrofa domestica*). *Journal of Veterinary Pharmacology and Therapeutics*, 46, 269-275. <https://doi.org/10.1111/jvp.13402>
- Hampton C.E., da Cunha A, Desselle A, Queiroz-Williams P, Hofmeister EH (2023) The effect of age on the induction dose of propofol for general anesthesia in dogs. *PLoS ONE* 18(7): e0288088. <https://doi.org/10.1371/journal.pone.0288088>
- Bowers, K.M., Wright, E.M., Terrones, L.D., Sun, X., Rifkin, R., Grzeskowiak, R., Croy, E., Seddighi, R., Kleine, S., Hampton, C.E., Hecht, S., 2023. In vitro analysis and in vivo assessment of fracture complications associated with use of locking plate constructs for stabilization of caprine tibial segmental defects. *Journal of Experimental Orthopaedics*, 10(1), p.38.
- Castro-Cuellar, G., Cremer, J., Liu, C.C., Queiroz-Williams, P., Hampton, C. and Leise, B.S., 2023. Buprenorphine has a concentration-dependent cytotoxic effect on equine chondrocytes in vitro. *American Journal of Veterinary Research*, 1, pp.1-8.

PRESENTATIONS

Hampton, C.E. (2023). "What happens when a small animal clinician falls in love (professionally) with pigs?". Farm Animal Club, University of Tennessee, College of Veterinary Medicine, Knoxville, TN, USA (April, 2023). Oral Presentation. Invited Presentation. 1 hour.

ABSTRACTS, POSTERS, AND PROCEEDINGS

- Diaz, V. (Veterinary Student and Presenter), Schaefer, D., Mulon, P.Y., Giori, L., Smith, J.S., Hampton, C.E. (Mentoring Author), 2023. "In vitro feasibility of commercially-prepared canine whole blood and packed red blood cells as a source of xenotransfusion in swine". Research Day 2023, University of Tennessee, Knoxville, TN, USA. Proceedings of the Research Day 2023. Awarded 2nd place in the Veterinary Student category.
- Diaz, V. (Veterinary Student and Presenter), Schaefer, D., Mulon, P.Y., Giori, L., Smith, J.S., Hampton, C.E. (Mentoring Author), 2023. In vitro feasibility of bovine whole blood as a source of xenotransfusion in swine. Research Day 2023, University of Tennessee, Knoxville, TN, USA. Proceedings of the Research Day 2023.
- Pisack, E., Kleine, S.A., Hampton, C.E., Smith, C.K., Weisent, J., DeBolt, R., Schumacher, C., Bussieres, G., Seddighi, R., "Evaluation of the analgesic efficacy of grapiprant compared to robenacoxib in cats undergoing elective ovariohysterectomy". Research Day 2023, University of Tennessee, Knoxville, TN, USA. Proceedings of the Research Day 2023.
- Pisack, E., Kleine, S.A., Hampton, C.E., Smith, C.K., Weisent, J., DeBolt, R., Schumacher, C., Bussieres, G., Seddighi, R., "Evaluation of the analgesic efficacy of grapiprant compared to robenacoxib in cats undergoing elective ovariohysterectomy". Proceedings of the American College of Veterinary Anesthesia and Analgesia Annual Meeting, Louisville, KY, USA (October, 2023).
- Case D. (Veterinary Student and Presenter), Kleine S.A., Abouelkhair M.A, Hampton C.E., Smith C.K., Mulon P.Y., Bussieres G., Seddighi, R., "The effects of butorphanol on expression of cartilage breakdown markers in porcine cartilage: an in vitro study". Poster presented at the Annual Meeting of the American College of Veterinary Surgeons 2023, Louisville, KY, USA (October, 2023).
- Gebert, J.; Smith, J.S.; Ebner, L.; Bennett, K.; Collins, R.; Hampton, C.E.; Kleine, S.A.; Mulon, P.Y.; Smith, C.K.; Seddighi, R.; Bussieres, G.; Mochel, J.; Knych, H.. "Pharmacokinetics of extravascular maropitant citrate in swine". Paper presented at the AASV Annual Meeting. AASV Annual Meeting 2023; Be There! Student Seminar. Aurora, Colorado, 3/4/2023.
- Shanks, G.A. (Veterinary Student and Presenter), Hampton, C.E. (Mentoring Author), Kleine, S.A., Smith, J., Xiaojuan, Z., Mulon, P.Y., Smith, C.K., Giori, L., Cox, S., Seddighi, R., 2022. Pharmacokinetics of oral clonazepam and its effect on selected stress markers in growing commercial pigs (*Sus Scrofa Domestica*). Paper presented at the AASV Annual Meeting. AASV Annual Meeting 2023; Be There! Student Seminar. Aurora, Colorado, 3/4/2023.
- Hampton, C.E. (2023). "What happens when a small animal clinician falls in love (professionally) with pigs?". Farm Animal Club, University of Tennessee, College of Veterinary Medicine, Knoxville, TN, USA (April, 2023). Oral Presentation. Invited Presentation. 1 hour.

Dr. Andrea Lear

HONORS AND AWARDS

The Zoetis Award for Veterinary Research Excellence, University of Tennessee
Sandra G. Powell Endowed Distinguished Faculty Award for Livestock Wellness

PRESENTATIONS

- Lear AS (2023) "Clinical Skills: fluid therapy in calves," "Pregnancy toxicity SR." AABP/AASRP Annual Conference. Milwaukee, WI (2 hr)
- Thomasovich H, Beever J, Lear AS (2023). "Biomarker Discovery in Pregnant Cattle infected with BVDV." UT College of Veterinary Medicine Research Day. Knoxville, TN.
- Lear AS (2023) "Field based anesthesia." American Association of Bovine Practitioners' Recent Graduate Conference. Knoxville, TN (45 mins)
- Lear AS (2023) "Managing the Peri-Parturient Small Ruminant. UT Extension Veterinary Nutrition and Health CE Conference. (1 hr)
- Speaker. Master Small Ruminant Program. "Lamb and Kid Management" (1 h, 2023)
- Invited speaker. Virtual Science Club, UTK (1 hr, 2023)
- Invited speaker. Tennessee Alpaca Association. (1 hr, 2023)

ABSTRACTS, POSTERS, AND PROCEEDINGS

- Thomasovich H, Beever J, Lear AS (2023). "Biomarker Discovery in Pregnant Cattle infected with BVDV." UT College of Veterinary Medicine Research Day. Knoxville, TN.
- Lear AS, Adkins M, Caldwell M, Beever J (2023). Evaluation of neonatal immune cell function and immuno-epigenetic modulation following in-utero infection with Bovine Viral Diarrhea Virus. CRWAD, Chicago IL.

Dr. Sarah Linn-Periano

PEER-REVIEWED PUBLICATIONS

- Li M, Robles-Planells C, Liu D, Graves SA, Vasquez-Martinez G, Mayoral-Andrade G, Lee D, Rastogi P, Marks BM, Sagastume EA, Weiss RM, Linn-Periano SC, Johnson FL, Schultz MK, Zepeda-Orozco D. Pre-clinical evaluation of biomarkers for the early detection of nephrotoxicity following alpha-particle radioligand therapy. *Eur J Nucl Med Mol Imaging*. 2023 Dec 14. doi: 10.1007/s00259-023-06559-9.
- Linn-Periano SC, Hepworth-Warren K, Kinsella H, Diaz-Campos D, Brenseke BM, Cianciolo RE, Schroeder E, Schreeg ME. Ingesta-associated choledocholithiasis in horses: 2 cases and literature review. *J Vet Diagn Invest*. 2023 Jul;35(4):417-424. doi: 10.1177/10406387231177251. PMID: 37232550.

PRESENTATIONS

- Texas A&M University College of Veterinary Medicine Veterinary Anatomic Pathology Residency Gross Rounds. "Phase II Interpretation Section Rounds". November 2023.
- American Society of Veterinary Nephrology and Urology Renal Pathology Virtual Rounds. Metastatic plasmacytic neoplasia in a kidney with concurrent renal abscess. July 2023.
- University of Tennessee Companion Animal Club Lunch Seminar. "The 5 W's and 1 H of Biopsy". September 2023.

ABSTRACTS, POSTERS, AND PROCEEDINGS

- Veterinary Scholars Symposium, AAVMC / Boehringer Ingelheim, Calabrese S, Mahero M, Hokamp J, Nability M, Linn-Periano SC*. Evaluating Lyme Nephritis Diagnostic Criteria: A Retrospective Case-Control Analysis. St. Paul, Minnesota. August 2023 *Served as primary mentor
- American College of Veterinary Pathologists Annual Meeting, Agrawal A, Linn-Periano SC*. Oxalate Nephrosis in a Serval (*Leptailurus serval*). Chicago, IL. November 2023. *Served as primary mentor.
- American College of Veterinary Pathologists Annual Meeting, Cox H, Linn-Periano SC*, Cushing A, Dennis M. Glomerular lipid emboli in black and spotted leopards (*Panthera pardus*). Chicago, IL. November 2023. *Served as co-mentor.

Dr. Michael Mahero

PEER-REVIEWED PUBLICATIONS

- Varela, K., Goryoka, G., Suwandono, A., Mahero, M., Valeri, L., Pelican, K., & Salyer, S. J. (2023). One health zoonotic disease prioritization and systems mapping: An integration of two One Health tools. *Zoonoses and Public Health*, 70(2), 146-159.
- Tum, S., Chea, R., Phannara, T., Bun, C., Siek, S., Chhim, V., ... & Mahero, M. W. (2023). Strengthening Veterinary Workforce in Cambodia for Infectious Disease Detection and Response. Available at SSRN 4479757.

PRESENTATIONS

- Oluwaseun Akinyede, DVM, MPH, Mary El-Afandi, Katey Pelican, Michael Mahero, Janice Mladonicky, Michelle Willette, Victoria Hall, Jeff B. Bender, Joni Scheftel; One Health, Many Hands: Overlapping Jurisdiction and Responsibility Gaps in Animal Surveillance. One Health | One Global Environment Conference (JAPHI / IFEH Americas Region Conference on Environmental Health) October 02-05, 2023. Hilton Rose Hall Resort & Spa Montego Bay, Jamaica.
- Maurine C. Chepkwony, Dennis N. Makau, Colin Yoder, Marie Culhane, Maria Sol Perez Aguirreburualde, Andres Perez, Cesar Corzo and Michael Mahero. Beliefs, behaviors and practices of farm biosecurity in the US swine industry, Feb 25th AASV Nashville Tennessee.

Dr. Darryl Millis

PEER-REVIEWED PUBLICATIONS

- Millis DL, Berg A. A systematic literature review of complementary and alternative veterinary medicine: Laser therapy. *Animals* 2023,13(4),667. <https://doi.org/10.3390/ani13040667>
- Rosenblum SH, McCarthy A, Millis DL, Odoi A. Use of a colorimeter is a viable method to measure melanin and erythema content in the context of laser beam attenuation by use of a class IV laser in different tissues in dogs. 261(7) 2023 doi.org/10.2460/javma.22.11.0493
- Montoya J, Ferrigno C, Tobias K, Millis D. Canine hip dysplasia: When to refer to surgery. Submitted to *Canine Brief*, October, 2023.

BOOK CHAPTERS, ABSTRACTS, POSTERS, AND PROCEEDINGS

- Levine D, Millis D. Physical Therapy and Rehabilitation, in Ettinger's Textbook of Veterinary Internal Medicine, 9th ed, Cote 3, Ettinger SJ, and Feldman EC, eds, Elsevier, Philadelphia.
- Darryl Millis, Rebecca Noel, Krysta Janas, Leann Shaw, Nicholas Millis. Effect of kinesiology taping on gait and selected exercises in dogs. *Acta Veterinaria Scandinavica* 2023, 65(Suppl 1):O.03 <https://doi.org/10.1186/s13028-023-00706-w>
- Darryl Millis, Marti Drum, Jennifer Carr. Evaluation of class IV laser treatment for the management of stifle osteoarthritis in dogs. *Acta Veterinaria Scandinavica* 2023, 65(Suppl 1):O.06. <https://doi.org/10.1186/s13028-023-00706-w>
- Nick Millis, David Levine, Darryl Millis, Henry Spratt. Bacterial contamination of the environment of veterinary rehabilitation clinics. *Acta Veterinaria Scandinavica* 2023, 65(Suppl 1):O.08 <https://doi.org/10.1186/s13028-023-00706-w>
- Darryl Millis, Molly Werder, Elizabeth Sutherland, Sang Woo, Cassio Ferrigno, Marti Drum. Audioarthrology - a potentially useful tool for assessing joint disease. *Acta Veterinaria Scandinavica* 2023, 65(Suppl 1):PO. 11 <https://doi.org/10.1186/s13028-023-00706-w>
- Millis DL, Drum M, Rector DH. Preliminary study of the effect of pulsed electromagnetic field on recovery from TPLO surgery. *VCOT Open* 2023; 06(S 01): A1-A11 DOI: 10.1055/s-0043-1768899

PRESENTATIONS

- Preliminary study of the effect of pulsed electromagnetic field on recovery from TPLO surgery. *VCOT Open* 2023; 06(S 01): A1-A11 DOI: 10.1055/s-0043-1768899 1. Polyester-based Artificial Tendon Preserves Muscle Mass And Length In Rabbits. Fidelis OP, Easton KL, Bowers KM, Millis DL, Greenacre CB, Anderson DE, Crouch DL. 2023 Annual Meeting of the Orthopedic Research Society. Dallas, February 2023
- Preliminary study of the effect of pulsed electromagnetic field on recovery from TPLO surgery. Millis DL, Drum M, Rector DH. American College of Veterinary Sports Medicine and Rehabilitation Annual Meeting. Charleston, SC, April, 2023.
- Brazilian Veterinary Rehabilitation Conference, online presentation June 2023. Topics: Preoperative rehabilitation, Por Loco Gatos - Guayaquil, Ecuador, Orthopedic exam part 1 - Pelvic Limb, Orthopedic exam part 2 - Forelimb, Arthritis, Hip Dysplasia, CCLR, Feline orthopedics, Feline arthritis, Rehab in cats
- CCRP Courses II, III, IV in Bangkok, Thailand; Tel Aviv, Israel; Milan, Italy; Mallorca, Spain; Adelaide, Australia; Yokohama, Japan; Knoxville, TN
- American College of Veterinary Sports Medicine and Rehabilitation Monthly Online Rounds Challenging Cases, May, 2023
- University of Tennessee Resident Angular Limb Deformity Course October 2023, Knoxville, TN

Dr. Girish Neelakanta

PEER-REVIEWED PUBLICATIONS

- Mahesh PP, Namjoshi P, Sultana H and Neelakanta G*. (2023). Immunization against arthropod protein impairs transmission of rickettsial pathogen from ticks to the vertebrate host. *NPJ vaccines (Nature press)*, 8(1):79. doi: 10.1038/s41541-023-00678-y
- Nandy K, Tamakloe C, Sonenshine DE, Sultana H and Neelakanta G* (2023). Antitick vaccine candidate subolesin is important for blood feeding and innate immune gene expression in soft ticks. *PLoS Negl Trop Dis*. 17(11):e0011719. doi: 10.1371/journal.pntd.0011719.
- Mazuecos L, Alberdi P, Hernández-Jarguín A, Contreras M, Villar M, Cabezas-Cruz A, Simo L, González-García A, Díaz-Sánchez S, Neelakanta G, Bonnet SI, Fikrig E and de la Fuente J. (2023). Frankenbacteriosis targeting interactions between pathogen and symbiont to control infection in the tick vector. *iScience (Cell press)*. 26(5):106697. doi: 10.1016/j.isci.2023.106697.
- Sultana H and Neelakanta G. (2023). Isolation of Exosomes or Extracellular Vesicles from West Nile Virus-Infected N2a Cells, Primary Cortical Neurons, and Brain Tissues. *Methods Mol Biol*. 2585:79-95. Epub 2022/11/05. doi: 10.1007/978-1-0716-2760-0_9.

PRESENTATIONS

- Neelakanta G. (2023). An anti-vector vaccine targeting rickettsial pathogen transmission from ticks. American society for Rickettsiology, Snowbird, Utah, USA, Poster presentation.
- Neelakanta G. (2023). Rickettsial pathogen modulates intercellular communication in ticks. American Society for Intercellular Communication, Potomac, MD. Oral presentation.
- Neelakanta G. (2023). Immunization against tick protein impairs rickettsial pathogen transmission. NIAID/NIH-ATCC sponsored international webinar on vector research. Invited oral presentation.
- Katzmarek M, Turck J, Richards J, Wyrosdick H, Schaefer J, Gerhold R, Sultana H and Neelakanta G. (2023). Prevalence of bacterial pathogens in ticks collected from deer in Tennessee. CEM Research Day conference, UTCVM. Student oral presentation.

- Liu L, Karim S, Paddock C, Sultana H and Neelakanta G. (2023). Role of Rickettsia parkeri membrane assembly protein in the interactions of this bacterium with mammalian and tick cells. CEM Research Day conference, UTCVM. Student oral presentation.
- Namjoshi P, Lubembe D, Sultana H and Neelakanta G. (2023). Blocking of arthropod transporter reduces Anaplasma phagocytophilum replication in Haemaphysalis longicornis tick. CEM Research Day conference, UTCVM. Postdoc oral presentation.
- Nandy K, Sonenshine DE, Sultana H and Neelakanta G. (2023). Modulation of 26 macrophage cytokine response from tick proteins. CEM Research Day conference, UTCVM. Student oral presentation.
- P P Mahesh, Sultana H and Neelakanta G. (2023). The role of organic anion transporting polypeptide in tick immunity and in the interactions with Anaplasma phagocytophilum. CEM Research Day conference, UTCVM. Postdoc oral presentation.
- Turck JW, Sultana H and Neelakanta G. (2023). Anaplasma phagocytophilum modulates SHP-2/mTOR signaling for its survival in ticks. CEM Research Day conference, UTCVM. Student oral presentation.
- Neupane D, Ahmed W, Neelakanta G and Sultana H. (2023). Tetraspanins mediate flaviviral infection in mosquitoes. CEM Research Day conference, UTCVM. Student oral presentation.
- Bhowmick B, Neelakanta G and Sultana H. (2023). Tick secrets: Decoding the role of aromatic L-amino acid decarboxylase, dopamine receptor, and dopamine in exosome biogenesis and during tick-borne flavivirus infection. CEM Research Day conference, UTCVM. Postdoc oral presentation.
- Basak S, Neelakanta G and Sultana H. (2023). Long-term infectivity of dengue virus in mosquito cells revealed implications for persistent viral replication in the vector host. Research Day conference, UTCVM. Student oral presentation.

Dr. Sarah Schmid

PEER-REVIEWED PUBLICATIONS

- McAtee R., Schmid SM., Tolbert MK., Hetzel S., Suchodolski JS., Prichard JC. Effect of esomeprazole with and without a probiotic on fecal dysbiosis, intestinal inflammation, and fecal short-chain fatty acid concentrations in healthy dogs. *J Vet Intern Med.* 2023 Nov-Dec; 37 (6): 2109-2118. Mentoring author for internal medicine resident.
- Forsyth KK., McCoy BM., Schmid SM., Promislow DEL., Snyder-Mackler N., DAP Consortium, Creevy KE. Lifetime prevalence of owner-reported medical conditions in the 25 most common dog breeds in the Dog Aging Project pack. *Front Vet Sci.* 2023 Nov 3; 10:1140417. Coauthor.
- Ogrodny AJ., Mani R., Schmid SM., Gould EN., Fellman CL., DeStefano I., Shropshire S., Haines JM., Bolton TA., Jablonski SA., Jess N., Cridge H. Multi-institutional retrospective study investigating blood culture protocols and test positivity in 701 dogs. *Front Vet Sci.* 2023 Dec 11; 10:1301018. Coauthor, reviewed and contributed data for >50% of cases (376 cases).

PRESENTATIONS

- Comparative Gastroenterology Society, GutSea, Costa Rica. Occurrence of owner-reported gastrointestinal disease in 33,172 dogs in the Dog Aging Project Pack. 15-minute oral presentation. 80 participants.
- Forum, Philadelphia, PA, Pilot Evaluation of Inflammatory Markers in Aging Dogs. 15-minute oral presentation, 50 participants.
- ACVIM Forum, Philadelphia, PA, Occurrence of owner-reported gastrointestinal disease in 33,172 dogs in the Dog Aging Project Pack. 15-minute oral presentation, 100 participants.
- ACVIM Forum, Philadelphia, PA, Esomeprazole with and without Probiotics in Healthy Dogs. Poster. Mentoring (resident). Resident won 2023 ACVIM Resident Research Abstract Award in Internal Medicine.
- Veterinary Nutrition and Health CE Conference for Livestock and Equids, University of Tennessee, Knoxville, TN. How to say no: Preventing Burnout in Veterinary Medicine. January 2023. 1 hour, oral, 30 participants.
- East Tennessee Veterinary Medical Association 2023 Annual Conference, Gatlinburg, TN. When Urine Trouble: Diagnostic approach to polyuria and polydipsia. October 2023. 90 minutes, oral, invited, 110 participants.
- East Tennessee Veterinary Medical Association 2023 Annual Conference, Gatlinburg, TN. Management of chronic enteropathies in dogs and cats. October 2023. 90 minutes, oral, invited, 110 participants.
- Henton Veterinary Conference, University of Tennessee, Knoxville, TN. Rational use of immunosuppressant therapy. December 2023. 1 hour, oral, 120 participants

ABSTRACTS, POSTERS, AND PROCEEDINGS

- Schmid S., Hoffman J, Prescott J, Ernst H, Promislow D, Creevy K, DAP Consortium; Pilot evaluation of inflammatory markers in aging dogs [Abstract]. 2023 ACVIM Abstract Program. Abstract GI27. *J Vet Intern Medicine.* 2023 Nov 10. doi: 10.1111/jvim.16913.
- Schmid S., Hoffman J., Gould E., Moon A., Creevy K., DAP Consortium. Occurrence of Owner-Reported Gastrointestinal Disease in 33,172 Dogs in the Dog Aging Project Pack [Abstract]. 2023 ACVIM Abstract Program. Abstract GI27. *J Vet Intern Medicine.* 2023 Nov 10. doi: 10.1111/jvim.16913.

- McAtee R., Schmid S., Tolbert K., Hetzel S., Prichard J. Effect of esomeprazole administration with and without a probiotic on fecal dysbiosis in healthy dogs [Abstract]. 2023 ACVIM Abstract Program. Abstract GI36. J Vet Intern Medicine. 2023. Nov 10. doi: 10.1111/jvim.16913.
- Ogrodny A., Cridge H., Mani R., Schmid S., Gould E., Fellman C., Destefano I., Shropshire S., Haines J., Bolton T., Jablonski S., Jess N. Multi-institutional retrospective study investigating blood culture protocols and test positivity in 701 dogs [Abstract]. 2023 ACVIM Abstract Program. Abstract ID12. J Vet Intern Medicine. 2023. Nov 10. doi: 10.1111/jvim.16913.

Dr. Wesley Sheley

PEER-REVIEWED PUBLICATIONS

- Sheley WC, Cray C, Wilber MQ, Carter ED, Kumar R, Hardman RH, Towe AE, Gray MJ, Miller DL. A pilot study investigating plasma protein electrophoresis in one anuran and six urodelan species. *Journal of Wildlife Diseases*. 2023; 59(4): 796-803. DOI: 10.7589/JWD-D-23-00004.
- Kim S, Moore BA, Parker C, Siniard WC, Ang J, Teixeira LBC, Thomasy SM, Murphy CL, Soto E. Clinical and histopathological features of proliferative corneal lesions in Cyprininae fishes: Implications for treatment and insights into corneal tumors. *Veterinary Ophthalmology*. 2023; 00:1-14. DOI: 10.1111/vop.13133.
- Gray MJ, Carter ED, Piovia-Scott S, Cussac PW, Peterson AC, Whetstone RD, Hertz A, Muniz-Torres AY, Bletz MC, Woodhams DC, Romansic JM, Sutton WB, Sheley W, Pessier A, McCusker CD, Wilber MQ, Miller DM. Broad host susceptibility of North American amphibian species to *Batrachochytrium* salamandrivorans suggests high invasion potential and biodiversity risk. *Nature Communications*. 2023; 14(3270). DOI: 10.1038/s41467-023-38979-4.
- Vuong KS, Metral C, Sheley W, Liu M, Carlson AK, Jones MP. Chromatophoromas on the tail of a pet axolotl (*Ambystoma mexicanum*) with presumptive metastasis. *Journal of Exotic Pet Medicine*. 2023; 45: 8-13. DOI: 10.1053/j.jepm.2023.02.002.

PRESENTATIONS

- Foley A*, Smith J, McCormick K, Sheley WC. Recurrent free-gas bloat secondary to pyloric lipomatosis in a Jersey cow. (2023, October). Poster presentation. American College of Veterinary Pathologists conference, Chicago, IL
- Hoskins E*, Sheley WC. Islet cell Carcinoma (Malignant Insulinoma) in a rabbit. (2023, May). Southeastern Veterinary Pathology Conference, Tifton, GA. Reproductive & Hematopoietic Systems. Davis Thompson Foundation Current Literature and Image Interpretation Course, June 26-30, 2023, Knoxville, TN. 37 attendees. Instructors: Craig L, Dennis M, LoBato D, Newkirk K, Sheley W.

Dr. Nora Springer

PEER-REVIEWED PUBLICATIONS

- Kumar D, Anderson Reeve AV, Pittman JS, Springer NL, Mallen K, Roman-Sosa G, Sangewar N, Casey-Moore MC, Bowen MD, Mwangi W, Marthaler DG. Role of pre-farrow natural planned exposure of gilts in shaping the passive antibody response to rotavirus A in piglets. *Vaccines* 2023;11:1866. PMID: 38140269
- Frohlich M*, Knights K, Springer NL. Determination of optimal storage time and temperature for the detection of red blood cell and platelet surface-associated immunoglobulin by flow cytometry in healthy horses. *Vet Immuno Immunopathol* 2023;26:110643. PMID: 37595493
- Hayes A*, Kastl B, Perry E, Moore AR, Springer NL. Multiple myeloma presenting as blepharitis in a horse. *Vet Clin Pathol* 2023;52:514-520. PMID: 37248209
- Townsend K, Johnson P, Connelly L, LaCarrubba A, Latimer J, Havis B, Springer NL, Dae-Young K. Concurrent chronic lymphocytic leukemia and primary hyperparathyroidism in a mule. *J Vet Intern Med* 2023;37:1250-1255. PMID: 37118906
- Kastl B* and Springer NL. Serum biochemical changes in cats with naturally acquired feline cytotoxicosis. *J Am Vet Med Assoc* 2023;261:517-525. PMID: 36656676

PRESENTATIONS

- Hauck, A*, Kastl B, Schneider S, Springer NL. Evaluating chemokine and sphingolipid receptor expression in canine diffuse large B cell lymphoma (DLBCL). Poster presentation: American College of Veterinary Pathologists/American Society for Veterinary Clinical Pathology Annual Meeting, Chicago, IL, October 2023
- Wakeman J*, Miles A, Springer NL. Exploring the role of childhood obesity in cancer: structural changes in adipose tissue stroma. Poster presentation: American College of Veterinary Pathologists/American Society for Veterinary Clinical Pathology Annual Meeting, Chicago, IL, October 2023

Caldwell S, Baker E, Gerhold R, Su C, Neufang L, Springer NL, Salzman J, Smith J, Harley A. Canine cholecystitis secondary to *Hammondia* spp. tachyzoite infection. Oral abstract presentation: American College of Veterinary Internal Medicine Forum, Philadelphia, PA, June 2023

Wakeman J*, Miles A, Springer NL. Exploring the role of childhood obesity in cancer: structural changes in adipose tissue stroma. Poster presentation: Veterinary Scholars Symposium, San Juan, Puerto Rico, August 2023

Advanced fluid analysis: choose your own adventure! (1 hr). Invited/plenary oral presentation for Veterinary Laboratory Professionals Session: American College of Veterinary Pathologists/American Society for Veterinary Clinical Pathology Annual Meeting, Chicago, IL, October 2023

Springer NL. Building a better model: Utilizing natural disease in dogs to enhance translation of basic cancer research. Invited presentation: Department of Biochemistry and Molecular Biology Seminar Series, University of Tennessee, October 2023

Springer NL. People resemble their pets: Leveraging companion animals as models of human disease. Invited presentation: Health and Human Wellness Colloquium, Office of Research, Innovation, and Economic Development, University of Tennessee-Knoxville and University of Tennessee Medical Center, October 2023

Wakeman J*, Miles A, Springer NL. Exploring the role of childhood obesity in cancer: structural changes in adipose tissue stroma. Oral abstract presentation: University of Tennessee College of Veterinary Medicine Research Day, September 2023

American Society for Veterinary Clinical Pathology Online Rounds Case Presentations (1hr). April 2023.nRegenerative anemia: is it hemorrhage or hemolysis? (1 hr)

University of Tennessee College of Veterinary Medicine Annual Conference, April 2023. Level up on lymph node cytology. (1 hr)

Dr. Hameeda Sultana

PEER-REVIEWED PUBLICATIONS

Isolation of Exosomes or Extracellular Vesicles from West Nile Virus-Infected N2a Cells, Primary Cortical Neurons, and Brain Tissues. Sultana, H., Neelakanta, G. *Methods Mol Biol.* 2023;2585:79-95. Epub 2022/11/05. doi: 10.1007/978-1-0716-2760-0_9.

Immunization against arthropod protein impairs transmission of rickettsial pathogen from ticks to the vertebrate host. Mahesh, P.P., Namjoshi, P., Sultana, H., Neelakanta, G #. *NPJ Vaccines (Nature Press)*. 2023 May 30;8(1):79. doi: 10.1038/s41541-023-00678-y.

Anti-tick vaccine candidate subolesin is important for blood feeding and innate immune gene exoression in soft ticks. Nandy, K., Tamakloe, C., Sonenshine, D.E., Sultana, H., and Neelakanta, G #. *PLoS Negl Trop Dis.* 2023 (Nov) 7;17(11):e0011719.

ABSTRACTS, POSTERS, AND PROCEEDINGS

Sultana, H., Addressing vector-borne viral diseases with the cutting-edge tool of arthropod exosomes. 3rd Annual meeting of the American Society for Intercellular Communication (ASIC), Bolger Center, Potomac, MD, USA (Oct) (Invited Talk; In-Person)

Sultana, H., Arthropod exosomes in controlling vector-borne viral diseases, 2023 American Society for Virology, Athens, GA, USA (June), (Abstract Selected), In-Person

Sultana, H., Targeting vector-borne viral diseases with arthropod exosomes, a novel route for transmission blocking vaccines, 2023 International Society of Extracellular Vesicles (ISEV), Seattle, WA, USA (May)

Dr. Brian Whitlock

HONORS AND AWARDS

J.E. Moss Service Achievement Award
Charles and Julie Wharton Professor of Food Animal Field Services

PEER-REVIEWED PUBLICATIONS

Okafor CC, Collins SL, Daniel JA, Coetzee JF, and Whitlock BK. Assessment of seroprevalence and associated risk factors for anaplasmosis in North Carolina, USA, beef and dairy cattle. *Applied Animal Science.* 2023; 39:202-212.

PRESENTATIONS

Heritable Congenital Defects of Livestock. VIN CE: Theriogenology Rounds Lecture Series. October 26, 2023

ABSTRACTS, POSTERS, AND PROCEEDINGS

Renwick A, Whitlock BK, Freeman T, Beever J. Unraveling the Impact of Endotoxin-Induced Hypothalamic Changes Using a Large Animal Model: A Neuroimmune Perspective. UTK Neuronet Retreat. November 2023.

Larsen EM, Kirby L, Renwick A, Millet LJ, Whitlock BK. Species cross-reactivity for magnocellular neuron hybridoma antibodies. UTK, Research Experience for Undergraduates. Summer 2023. Sample collection and editing.

Dr. Cassio Ferrigno



PEER-REVIEWED PUBLICATIONS

Otaviano do Rego R, Dias BM, Manassero M, de Souza AF, De Zoppa AL do V, Ferrigno CRA. Locking conical coupling plates in small animal orthopedics: A review. Top Companion Anim Med [Internet]. 2023 Oct;100827. Available from: <https://doi.org/10.1016/j.tcam.2023.100827>

Marinho PVT, Ferrigno CRA, Costa RC da, Pereira CAM, Rego MAF, Bregadioli T, et al. Comparison of Cervical Stabilization with Transpedicular Pins and Polymethylmethacrylate versus Transvertebral Body Polyaxial Screws with or without an Interbody Distractor in Dogs. Vet Comp Orthop Traumatol [Internet]. 2022 Jun 30; Available from: <http://www.thieme-connect.de/DOI/DOI?10.1055/s-0042-1744490>

Ferrigno, CRA, Diggs G, Lewis DD, and Banks SA (2023). An assessment of the fixin tplo jig to generate effective compression using a transverse fracture model. Plos one, 18(10), e0286937.

BOOK CHAPTERS, ABSTRACTS, POSTERS, AND PROCEEDINGS

Ferrigno, CRA, AO Surgery Reference, Dog tibia shaft, (<https://surgeryreference.aofoundation.org/vet/dog/tibial-shaft>), re-edit content in 2023

Ferrigno, CRA, AO Surgery Reference, Cat tibia shaft, (<https://surgeryreference.aofoundation.org/vet/cat/tibial-shaft>) re-edit content in 2023

Ferrigno, CRA, Rego, RO Fixadores Esqueleticos externos circulares In: TRATADO DE ORTOPEDIA DE CÃES E GATOS - 2VOL, 1 ed. ISBN 9786587442228, pg 354 - 372, 2022

FERRIGNO CRA, DAL-BÓ IS; PEREIRA, CAM; FERREIRA M.P In Vitro Evaluation of Experimental Acetabular Osteotomy Reduction with Three Different Methods of Osteosynthesis in Domestic Cats. ACVS Surgery Summit, October 11th - 14th, 2023 Louisville, Kentucky, USA

PRESENTATIONS

Henton Conference, Knoxville, TN. Presentations included, "Types of bone plates, characteristics, instrumentation, and brief biomechanical implications nurses" and "Exploring the origins of Patellar luxation to anticipate the results of surgery."

Course in principle deformity correction at UT. Topics included introduction of limb deformity, one-plane, two-plane, and multiple-plane deformities: A mathematic overview, indotriktion of Center of Rotation of Angulation, CORA Concept and glossary of terms, and Graphical method of deformity plane

AO Principle Course in Columbus, OH. Topics included Principles and clinical application of clerclage wiring, Interactive panel discussion: How would you handle this fracture?, Epiphyseal and physeal fracture management (part II): Discussion of humeral condylar fractures, Fracture and patient care: Surgical approach and soft tissue handling

AO Advance Ribeirao Preto, Baszil. Topics include classification and biomechanics of fractures, Locking plate, Principles of joint fractures

AO Principle course in Ribeirao Preto, Bazil. Topics include Mechanical and biological considerations in long bon fractures, Locking plate systems, Combining implant systems - plate/rod and double plating, Complex fractures of the femoral head and neck, Complex distal humerus fractures, Diagnosis of carpal instability

Intrauma Congress in Rome, Italy. Is the old way of thinking holding us back when it comes to fracture compression? Let's take a closer look at the use of neutral plates in bone healing

Brazilian Veterinary Orthopedic Congress in Curitiba, Brazil Topics include "How to treat steep slope TPA dogs with cruciate rupture," "TTA vs. TPLO," "Tackling difficult deformities cases," and "Mathematical concepts in limb deformity planning."

Brazilian Veterinary Orthopedic Adfvance TPLO practice Course. Topics include "TPLO with CCWO technique," "CBLO pros and cons," "Doble cut TPLO. When should it be used," and "TPLO-M to treat medial patellar luxation."



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