In this packet, you will see the project proposals for the Summer 2023 Veterinary Research Program. **Keep in mind, this program is ONLY OPEN to current 1st and 2nd year veterinary students at the University of Tennessee, College of Veterinary Medicine.**

You can find information, the schedule, the project proposals, due dates, etc. on our website here: [https://vetmed.tennessee.edu/research/veterinary-summer-scholars/](https://vetmed.tennessee.edu/research/veterinary-summer-scholars/)

Student applications can be found by [clicking here](https://vetmed.tennessee.edu/research/veterinary-summer-scholars/). Students will be required to list their potential mentors in preference order. Students may list up to 5 mentors. Only list those projects that you are willing to work on. **Student applications for Summer 2023 are due February 27, 2023 at 5pm. Match results will be announced via email on March 6, 2023.**

**It is YOUR responsibility as the student to reach out to the mentors via their email address to state your interest in the project and ask any necessary questions.** When emailing, make sure to email the “Head Mentor” and you can copy the co-mentors as well if you’d like. Make sure to tell them the title of the project that you are interested in, as some mentors have multiple projects.

When emailing your prospective mentors, make sure to tell them the title of the project, why you are interested in the project, any experience you might have, etc. to make your case. They may ask to meet you in person, etc. as well to further discuss the project. Some of the questions you may ask your mentor may be about working hours (part or full time, days of the week, hours, etc.), make them aware of already planned vacations, etc. so you can gauge if the project is a “good fit.” Make sure you are fully aware of the FAQ document attached as well as the details listed on the project proposals.

Please let us know if you have any questions,

Morgan Tolbert – Administrative Assistant for the Office of Research and Graduate Studies [mtolber4@utk.edu](mailto:mtolber4@utk.edu)

Dr. Sree Rajeev – Summer Program Director [srajeev@utk.edu](mailto:srajeev@utk.edu)

Dr. Agricola Odoi – Assistant Dean for the Office of Research and Graduate Studies [aodoi@utk.edu](mailto:aodoi@utk.edu)
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 — Email to Morgan Tolbert mtolber4@utk.edu

PRIMAR Y MENTOR
Dr. Mohamed Abouelkhair

PRIMAR Y MENTOR EMAIL
mabouelk@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
BDS

CO-MENTOR(S) (IF APPLICABLE)

CO-MENTOR(S) EMAIL (IF APPLICABLE)

PROJECT DESCRIPTION

Title: Validation of a PARR assay for detecting clonality in canine lymphoid malignancies.

PARR stands for PCR for Antigen Receptor Rearrangements. This is a clonality assay that helps to distinguish neoplastic from inflammatory lymphoid cells. Lymphoid neoplasms are monoclonal expansions of malignant lymphoid cells, whereas inflammatory lymphoid cells are usually polyclonal. The results tell us if the majority of cells in the sample are derived from a single clone (most consistent with neoplasia), or from multiple clones (most consistent with a reactive process). In this project, we will validate and assess the diagnostic sensitivity, accuracy, and specificity of the PARR assay in detecting clonality in canine lymphoid malignancies in a variety of clinical samples (clinical fresh blood (n=50), lymph node aspirates (n=50), and fixed tissue samples (n=50)).

STUDENT’S ROLE IN PROJECT

With guidance from the overseeing mentor, the student will be involved with all aspects of the study including nucleic acid purification, melting curve assay verification and validation on approximately 150 clinical fresh blood and fixed tissue samples, data collection, data analysis, and manuscript preparation. Depending on the student’s interest, opportunity for presentation of their research findings at a national conference will be both encouraged and supported.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)


Is IACUC or IRB approval required for your project? □ YES ✓ NO
If yes, has the IACUC or IRB been submitted? □ YES □ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
Title: Characterization of natural killer cell populations in dogs with lymphoma or leukemia

NK cells are non-T, non-B lymphocytes, which are part of the innate immune system and are constitutively able to kill target cells without prior activation. NK cells play important roles in tumor immunity, viral disease and pregnancy. The ability to kill tumor cells while maintaining an acceptable safety profile makes NK cells promising assets for cancer therapy.

Methods
Peripheral Blood Mononuclear Cells (PBMC) from dogs with lymphoma or leukemia will be collected for flow cytometry analysis of circulating NK cell frequency, NK cell subsets, and NK cell receptors expression in response to different tumors.

STUDENT'S ROLE IN PROJECT
With guidance from the overseeing mentor, the student will be involved with all aspects of the study including samples processing, antibodies staining, flow analysis, data collection, data analysis, and manuscript preparation. Depending on the student's interest, opportunity for presentation of their research findings at a national conference will be both encouraged and supported.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Is IACUC or IRB approval required for your project? ☑️ NO

If yes, has the IACUC or IRB been submitted? ☐ YES ☐ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
# MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

**DUE DATE:** January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

<table>
<thead>
<tr>
<th>PRIMARY MENTOR</th>
<th>PRIMARY MENTOR EMAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Julia Albright</td>
<td><a href="mailto:jalbrig1@utk.edu">jalbrig1@utk.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPARTMENT OF PRIMARY MENTOR (for student payroll)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SACS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CO-MENTOR(S) (IF APPLICABLE)</th>
<th>CO-MENTOR(S) EMAIL (IF APPLICABLE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kimberly Anderson</td>
<td><a href="mailto:kander84@utk.edu">kander84@utk.edu</a></td>
</tr>
</tbody>
</table>

**PROJECT DESCRIPTION**

**Title:** Efficacy of white noise as a part of a multimodal anxiolytic and analgesic protocol to treat post-operative pain following hemilaminectomy in dogs with acute intervertebral disc herniation

A recent study in dogs undergoing hemilaminectomy surgery indicated patients recovered in isolated environments with sound masking devices and other calming stimuli required less analgesic medication and ingested more food in the first 48 hours post-surgery compared to dogs recovered in a standard ICU. The feasibility for most veterinary clinics to implement all the study enrichment interventions is low. The purpose of this blinded, randomized, placebo-controlled parallel-group study is to assess the impact within the ICU of white noise originating from individual-cage sound machines in comparison to cages with identical sham devices. Dogs will be assessed at specific intervals for pain, which will guide analgesic and anxiolytic antidepressant therapy. Outcome measurements will be used to evaluate for the efficacy of white noise as a tool to decrease patient distress caused by impulsive noise exposure, resulting in a decreased need for analgesic and anxiolytic medications. We hypothesize that individual sound masking devices may potentially lead to decreased patient stress in the hospital and improved recovery outcomes by decreasing a patient's perception of startling sounds.

**STUDENT’S ROLE IN PROJECT**

This study will incorporate a wide spectrum of hands-on experience within the UTCVM Intensive Care Unit caring for post-operative hemilaminectomy patients. Students will assist with the implementation of sound machines in patients' cages, physical examination and evaluation of a modified Glasgow Composite Pain Scale at several time points after surgery, and facilitation of certain treatments for each patient. The student will also help collect and interpret data points to determine the effects of a single intervention on the appetite and levels of pain and anxiety in select client-owned patients. This study will be an excellent introduction to the UTCVM Veterinary Medical Center and will provide early exposure to patient care within the ICU.

**SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)**

Flexible schedule that allows student to be present the day/evening a qualifying patient presents to the Neurology/Neurosurgery service.

Is IACUC or IRB approval required for your project? **YES** □ **NO** □

If yes, has the IACUC or IRB been submitted? **YES** □ **NO** □

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR

Elizabeth Collar

DEPARTMENT OF PRIMARY MENTOR (for student payroll)

LACS

CO-MENTOR(S) (IF APPLICABLE)

CO-MENTOR(S) EMAIL (IF APPLICABLE)

PROJECT DESCRIPTION

Title: Retrospective study evaluating partial phallectomies in equid patients.

A partial penile amputation is a common procedure performed in our equid patients for conditions like squamous cell carcinoma. This study aims to assess risks and outcomes associated with equid partial phallectomies, particularly cases performed with a modified Vinsot’s technique in standing sedated animals.

Medical records will be reviewed to identify equids that underwent a phallectomy at UTK in the previous 10 years, with a minimum of 6 months from the time of surgery to follow up. Cases will be included when follow up information is able to obtained by telephone interview with owners, utilizing a questionnaire consisting of standardized questions.

STUDENT’S ROLE IN PROJECT

The student will assist with recording and organizing data collected from the hospital record system. The student will help develop a questionnaire consisting of standardized questions, and gain experience talking to owners about cases under the guidance of the PI. Additionally, the PI's lab has multiple other ongoing studies for the summer during which the student could gain experience with lameness/physical exams, activity monitors, gastroscopies, and kinematic assessments. Student will be acknowledged on manuscript. Depending on the level of student effort through final data analyses and manuscript preparation, opportunities for abstract presentation at conferences and authorship on the manuscript exist.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Is IACUC or IRB approval required for your project?  [ ] YES  [✓] NO

If yes, has the IACUC or IRB been submitted?  [ ] YES  [✓] NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PROJECT DESCRIPTION

Project Title: Comparison of firocoxib and t-TUCB alone and in combination for the treatment of osteoarthritis in horses.

Osteoarthritis is a degenerative, progressive, and painful joint disease across species. In large animals, long-term pain control for this debilitating disease is predominantly achieved with reliance on non-steroidal anti-inflammatory drugs (NSAIDs). However, continued use of NSAIDs is associated with renal and gastrointestinal side effects including renal injury due to reduced blood flow, stomach ulcers, and colitis. Use of Cyclooxygenase (COX)-1 sparing (COX-2 selective) NSAIDs at recommended doses are associated with reduced risk of renal and gastrointestinal side effects, however they are associated with cardiovascular events. Development of effective new drugs for control of inflammation and pain without the side effects of current drugs is important for improving human and animal welfare.

Soluble epoxide hydrolase (sEH) inhibitors represent an alternative method of pharmaceutical pain control that could be used alone or in combination with COX inhibitors at lower doses, thus lowering the risk of dangerous side effects. Oral administration in dogs with osteoarthritis at has demonstrated decreased pain scores and improved function. The sEH inhibitor may be a promising addition to the currently limited options for anti-inflammatory and analgesic drugs available in large animals.

The objective of this study is to evaluate the multi-dose administration of TUCB and firocoxib alone and in combination in horses with naturally occurring osteoarthritis in a 3-way crossover design. Effects of 10 days of administration of each treatment group will be measured with repeat lameness exams (using inertial sensor system), kinematic assessments (using motion-capture video and pressure sensor), gastroscopies (with collection of gastric fluid to measure pH), and synovial fluid collections (arthrocentesis). Horses will additionally be monitored in the pasture with activity monitors.

STUDENT'S ROLE IN PROJECT

The student will assist with and learn how to (1) conduct and analyze lameness exams in a research setting using both objective and subjective methods, (2) perform gastroscopy exams and measure pH of gastric contents, (3) collect blood samples for a multi-dose pharmacokinetic study, (4) perform and analyze kinematic assessments, and (5) perform arthrocentesis. They will collect and process samples (blood, synovial fluid, gastric fluid). The student will be responsible for assisting with recording and organizing the data collected from lameness/physical exams, activity monitors, gastroscopies, and kinematic assessments. Student will be acknowledged on manuscript. Depending on the level of student effort through final data analyses and manuscript preparation, opportunities for abstract presentation at conferences and authorship on the manuscript exist.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Experience with or comfort handling horses preferred.

Is IACUC or IRB approval required for your project? [✓] YES [ ] NO

If yes, has the IACUC or IRB been submitted? [ ] YES [✓] NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Rick Gerhold

PRIMARY MENTOR EMAIL
rgerhold@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)

BDS

CO-MENTOR(S) (IF APPLICABLE)
Jessie Richards

CO-MENTOR(S) EMAIL (IF APPLICABLE)
jeserich@vols.utk.edu

PROJECT DESCRIPTION

Title: Parasite and vector borne disease prevalence in moose and elk throughout North America.

This study will examine parasite and vector borne disease prevalence in samples collected from moose and elk throughout North America. We will be conducted serological testing for various cervid parasites including meningeal worm, arterial worm, and Toxoplasma. In addition, we may perform molecular testing for several vector-borne pathogens from ticks and tabanids collected from animals or in the vicinity of the animals. There may be opportunity for field work as well depending on schedule.

STUDENT’S ROLE IN PROJECT

The student will be involved in all aspects of the research.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Is IACUC or IRB approval required for your project? [ ] YES [X] NO

If yes, has the IACUC or IRB been submitted? [ ] YES [ ] NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Rick Gerhold

PRIMARY MENTOR EMAIL
rgerhold@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
BDS

CO-MENTOR(S) (IF APPLICABLE)
Emma Willcox

CO-MENTOR(S) EMAIL (IF APPLICABLE)
ewillcox@utk.edu

PROJECT DESCRIPTION

Title: Examining various health issues associated with free-ranging bats in Tennessee.

There have been some cases of alopecia that need to be examined further through trapping of bats, examining them for skin lesions and doing follow diagnostic testing. Testing will include examining for ectoparasites, bacteria and fungal culture, etc.

In addition, insect and acoustic sampling as part of our tricolored bat foraging study will be conducted. The acoustic detectors and insect traps will need to be deployed and then all the call files and insects sorted and organized.

Finally DNA extractions will be performed on insect samples as well as other samples

STUDENT’S ROLE IN PROJECT
The student will be involved in all aspects of the research including field work and lab work

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)
Rabies vaccination

Is IACUC or IRB approval required for your project? ☑️ YES ☐ NO

If yes, has the IACUC or IRB been submitted? ☑️ YES ☐ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Hampton, Chiara

PRIMARY MENTOR EMAIL
champ14@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Large Animal Clinical Science

CO-MENTOR(S) (IF APPLICABLE)
Giori, Luca/Schaefer, D

CO-MENTOR(S) EMAIL (IF APPLICABLE)
lgiori@utk.edu

PROJECT DESCRIPTION

Title: In vitro feasibility of bovine and canine blood product as a source of xenotransfusion in swine

Transfusion is a medical practice that aims to replace the missing components of blood. Lack of access to blood to restore circulating volume and oxygen carrying capacity may contribute to morbidity and mortality observed in this species perioperatively and in the emergency setting. Xenotransfusion is the practice of administering blood products harvested from a subject of one species to a subject of another. Due to the current difficulties in sourcing swine blood, we believe xenotransfusion to pigs represent a viable clinical practice to be investigated, with the potential to be life-saving in emergency settings due to its ability to temporary stabilize the patient. This study aims to determine the in vitro compatibility of commercial swine whole blood with bovine whole blood and of pet swine whole blood with cWB and cPRBCs by crossmatch technique. Crossmatches are in vitro tests conducted on the donor's and the recipient's blood products to assess their compatibility. This experiment is designed as a prospective in vitro study conducted on a total of 8 commercial-cross pigs (recipients), 8 pet pigs (recipients), 12 heifers/steers/bulls (donors), 3 bags cWB, and 6 bags of cPRBCs (3 DEA1.1 Negative and 3 DEA1.1 Positive). A total of 136 crossmatching pairings will be tested for compatibility.

STUDENT'S ROLE IN PROJECT

Student will work with researchers awarded the BDS FEAR fund grant (Drs Giori, Hampton, Mulon, Smith J., and Schaefer D.) to identify target cases, harvest blood, and perform crossmatching procedures under supervision. They will collect and analyze collected data, and participate in the preparation of a scientific manuscript, and potentially present their findings at a conference if possibility arises.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Experience with benchtop laboratory work is preferred but not essential. Organization, enthusiasm, and will to learn are the main requirements for this project!

Is IACUC or IRB approval required for your project? [ ] YES [ ] NO

If yes, has the IACUC or IRB been submitted? [ ] YES [ ] NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Ashley Hartley

PRIMARY MENTOR EMAIL
ahartle2@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
SACS - Small Animal Clinical Sciences

CO-MENTOR(S) (IF APPLICABLE)
Richard Gerhold

CO-MENTOR(S) EMAIL (IF APPLICABLE)
rgerhold@utk.edu

PROJECT DESCRIPTION

Title: Characterizing Cytotauxzoon felis in cats of eastern Tennessee
Cytotauxzoon felis is a parasitic infection of cats that is transmitted by ticks. A recent study revealed that approximately 2.8% of Amblyomma americanum ticks found in eastern Tennessee were positive for C. felis DNA (data unpublished, Wilkinson et al). Cats with C. felis infection present to veterinary practices with a range of clinical signs, from fever, lethargy, and icterus, to acute death in severe cases. Interestingly, a subset of cats have been found to be asymptomatic carriers of the C. felis parasite. In endemic regions (such as eastern Kansas), the overall C. felis infection prevalence in asymptomatic cats was 26% (Wikander et al., 2020). The prevalence of C. felis infection in cats in Tennessee is unknown. The objective of this study is to characterize the prevalence of C. felis in cats living in eastern Tennessee using convenience blood samples from hospitalized and feral cats using a PCR assay. Location, seasonal time, and other information extracted from the history and medical records will be investigated to identify risk factors.

STUDENT’S ROLE IN PROJECT

The student will be involved in all aspects of DNA extraction and PCR assay testing of collected blood samples. Additional literature search and data collection from medical records will be necessary to analyze data and prepare presentations. Students involvement in article preparation is encouraged but not required for participation.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

enthusiasm and organization are pluses!

Is IACUC or IRB approval required for your project? ☐ YES ☑ NO

If yes, has the IACUC or IRB been submitted? ☐ YES ☐ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
# MENTOR PROJECT PROPOSAL FORM
## 2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

**DUE DATE:** January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

**PRIMARY MENTOR**
- Dr. Liza Köster

**PRIMARY MENTOR EMAIL**
- lkoster@utk.edu

**DEPARTMENT OF PRIMARY MENTOR (for student payroll)**
- SACs

**CO-MENTOR(S) (IF APPLICABLE)**

**CO-MENTOR(S) EMAIL (IF APPLICABLE)**

### PROJECT DESCRIPTION
**Study title:** Comparison of methods of quantification of mitral regurgitation (MR) in dogs with myxomatous mitral valve disease (MMVD) and association with heart murmur, ACVIM stage of heart disease, and outcome

**Study design:** Retrospective cohort study

**Objectives:**
- Adapt the classification system of MR by the ASE (Quinones et al. 2002) and apply it to dogs with MMVD: simple question of mild vs severe (adapt a score system semi-quantitative)
- Determine the classification of (subjective and objective) MR severity correlates with both ACVIM stage or simply L-sided chamber dimensions and murmur grade – measure of agreement
- Compare proposed dog adapted ASE MR classification with established scheme: MINE
- Determine of coaptation gap measured with calipers on A4C agrees with ECHO estimates of MR severity
- Determine the association of MR severity with cardiac related death or survival time

**Study design:** Retrospective descriptive study

**Materials and Methods:**
Inclusion criteria:
- dogs, 14 kg. >4 years
- left apical holosystolic murmur
diagnosis of MMVD confirmed on echocardiography with the following criteria: thickened and/or prolapsing mitral valve with confirmed eccentric mitral insufficiency on QFD
echocardiogram available on study cast
- 30-50 dogs per ACVIM category: stage B1 > B1

Exclusion criteria:
- Significant comorbid PH
- Concurrent cardiac disease, specifically congenital heart disease
- Systemic illness including anemia, hypoproteinemia or hypertension (anything that may increase MR estimate)
- Echo quality preventing accurate measurements
- Taking care to avoid the impact of R-R variability on MR severity i.e. RSA
- Arrhythmia specifically atrial fibrillation

**Data collection:**
- Review medical records and record patient signalment and heart murmur and outcome/survival as determined by telephonic update from the referring veterinary hospital.
The MINE score (Vezzosi et al 2020) will be compared to the modified ASE score used in human MR.
- Measure coaptation gap on 2 D echo

### STUDENT’S ROLE IN PROJECT

An interest in cardiology and specifically congenital heart disease and echocardiography

Experience in data capture

**Tasks:**
- This would be an estimated 20 hr/week project and include the following duties:
  - Meeting with librarian for review of the use of Endnotes, Excel and Database search,
  - Preparing for and meeting with mentoring supervisor and statistician with project aims to generate an excel data sheet for collection agreed variables,
  - Regular meetings with mentoring supervisor on data collection progress and meeting the objectives outlined at the start of the project,
  - Screening medical records for case inclusion,
  - Collecting signalment, presenting complaint, murmur grade and outcome,
  - Spending 3 days (20 hr) in the Cardiology clinic observing echocardiography and observing measurement of variables,
  - Training session on collecting echocardiographic variables for cases from echo reports,
  - Meeting with statistician on discussing analyses of data

**SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)**
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert: mtolber4@utk.edu

PRIMARY MENTOR
Dr. Liza Köster

PRIMARY MENTOR EMAIL
ikoster@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
SACS

CO-MENTOR(S) (IF APPLICABLE)

CO-MENTOR(S) EMAIL (IF APPLICABLE)

PROJECT DESCRIPTION

Title: PDA size and echocardiographic markers of shunt volume in dogs:
Patent ductus arteriosus is considered one of the most common and clinically important congenital heart defects of dogs. This disease is associated with left heart volume overload leading to cardiac remodeling and potential congestive heart failure in the form of cardiogenic pulmonary edema if left untreated in pediatric and adult dogs. Patent ductus arteriosus manifests in a variety of morphologies and grades of disease which is described with 3D echocardiography and on necropsy.

Aims:
Primary:
1. Objectively calculate shunt fraction of the PDA using Qp:Qa, estimated pressure gradient of ductus flow and color flow Doppler semi-quantitative measurement,
2. Measure minimum ductal diameter (MDD),
3. Determine if these two categories of objective measures PDA (shunt fraction and MDD) correlate with LV indices reflecting volume overload
4. Determine if there variables that are significantly predictive of LV volume overload as defined by increased LV dimensions
Secondary outcome:
1. to determine if estimates of shunt volume were associated with outcome in patients or clinical signs
2. if murmur grade was associated with shunt volume
3. compare left vs right sided acquisition measurements of MDD and limits of agreement

Study design:
Retrospective descriptive study

Materials and Methods:
Inclusion criteria:
Dogs diagnosed with a PDA and presented to UTCVM between July 2020 – July 2023
Echocardiographic diagnosis
Complete medical record

Exclusion criteria:
Concurrent congenital defect
Eisenmenger syndrome

Data collection:
Review medical records and record clinical signs related to heart disease, if present

STUDENT’S ROLE IN PROJECT
An interest in cardiology and specifically congenital heart disease and echocardiography
Experience in data capture

Tasks:
This would be an estimated 20 hr/week project and include the following duties:
• Meeting with librarian for review of the use of Endnotes, Excel and Database search,
• Preparing for and meeting with mentoring supervisor and statistician with project aims to generate an excel data sheet for collection agreed variables,
• Regular meetings with mentoring supervisor on data collection progress and meeting the objectives outlined at the start of the project,
• Screening medical records for case inclusion,
• Collecting signalment, presenting complaint, murmur grade and outcome,
• Spending 3 days (20 hr) in the Cardiology clinic observing echocardiography and observing measurement of variables,
• Training session on collecting echocardiographic variables for cases from echo reports,
• Meeting with statistician on discussing analyses of data,

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Is IACUC or IRB approval required for your project? □ YES □ NO

If yes, has the IACUC or IRB been submitted? □ YES □ NO
PDA size and echocardiographic markers of shunt volume in dogs

Patent ductus arteriosus is considered one of the most common and clinically important congenital heart defects of dogs. This disease is associated with left heart volume overload leading to cardiac remodeling and potential congestive heart failure in the form of cardiogenic pulmonary edema if left untreated in pediatric and adult dogs. Patent ductus arteriosus manifests in a variety of morphologies and grades of disease which is described with 3D echocardiography and on necropsy.

Fig. 1. Transesophageal echocardiogram depicting the patent ductus arteriosus connecting the aorta with the main pulmonary artery. The ductal waist is indicated by the arrow.
Fig. 2. A right parasternal long axis view of the left ventricle. Typically the left ventricle is dilated and globoid in appearance in dogs with a significant shunt volume due to a PDA.

Fig. 3. Lateral thoracic radiograph of a dog with cardiogenic pulmonary edema secondary to a left-to-right shunting PDA.

Aims:

Primary:

1. Objectively calculate shunt fraction of the PDA using Qp:Qa, estimated pressure gradient of ductus flow and color flow Doppler semi-quantitative measurement,
2. Measure minimum ductal diameter (MDD),
3. Determine if these two categories of objective measures PDA (shunt fraction and MDD) correlate with LV indices reflecting volume overload
4. Determine is there variables that are significantly predictive of LV volume overload as defined by increased LV dimensions

Secondary outcome:
1. to determine if estimates of shunt volume were associated with outcome in patients or clinical signs
2. if murmur grade was associated with shunt volume
3. compare left vs right sided acquisition measurements of MDD and limits of agreement

Study design:
Retrospective descriptive study

Materials and Methods:

Inclusion criteria:
Dogs diagnosed with a PDA and presented to UTCVM between July 2020 – July 2023
Echocardiographic diagnosis
Complete medical record

Exclusion criteria:
Concurrent congenital defect
Eisenmenger syndrome

Data collection:
Review medical records and record clinical signs related to heart disease, if present
Record murmur grade allocated by the cardiologist
Outcome: ACDO vs surgery vs none
Survival time, vs alive
Examine echocardiograms and record the following findings:
- 2D dimensions and systolic function: LVIDDn, LVIDSn, iESV, iEDV, EDF, LAmx (RPLAX), LA:Ao, LA FS, LA FAC
- LVOT peak velocity
- Shunt volume: estimate on CFD, left antegrade diastolic pulmonary artery flow, Ao velocity, E velocity, shunt CWD velocity, Qp:Qs
- Ductal measurements: MDD, ampulla diameter
• Color flow Doppler grade:
  o **grade 1**, minimal flow through the PDA at the entrance into the main pulmonary artery (MPA)
  o **grade 2**, small jet into the MPA, which does not reach the pulmonic valve
  o **grade 3**, shunt reaching the pulmonic valve
  o **grade 4**, color flow jet filling ≥50% of the MPA. Mitral valve regurgitation was classified by color Doppler in 3 groups (mild, moderate, and severe)

**Student requirements:**

An interest in cardiology and specifically congenital heart disease and echocardiography
Experience in data capture

**Tasks:**

This would be an estimated 20 hr/week project and include the following duties:

• Meeting with librarian for review of the use of Endnotes, Excel and Database search,
• Preparing for and meeting with mentoring supervisor and statistician with project aims to generate an excel data sheet for collection agreed variables,
• Regular meetings with mentoring supervisor on data collection progress and meeting the objectives outlined at the start of the project,
• Screening medical records for case inclusion,
• Collecting signalment, presenting complaint, murmur grade and outcome,
• Spending 3 days (20 hr) in the Cardiology clinic observing echocardiography and observing measurement of variables,
• Training session on collecting echocardiographic variables for cases from echo reports,
• Meeting with statistician on discussing analyses of data,
• Preparing an abstract for presentation at the Summer Student Research Day

Further involvement with the project with writing and potentially presenting at a conference are optional.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

PRIMARY MENTOR
Andi Lear

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Large Animal Clinical Sciences

CO-MENTOR(S) (IF APPLICABLE)

PROJECT DESCRIPTION
Title: Biomarker discovery in pregnant cattle infected with bovine viral diarrhea virus.

In susceptible, pregnant cattle exposed to bovine viral diarrhea virus (BVDV), fetal infection is common and results in decreased animal health and economic loss. Fetal infection with BVDV is common and can result in an array of consequences while the pregnant dam remains asymptomatic. The overall goal of this project is to identify non-invasive circulating biomarkers in maternal blood that are associated with fetal BVDV infection. To achieve this goal, we will aim to (1) identify specific fetal and placental markers and (2) compare those markers between healthy and virally infected pregnancies. This goal will be achieved by performed the following objectives: (1) quantify pregnancy associated glycoproteins throughout gestation, and (1) isolated and characterized extracellular vesicles from maternal circulation in dams carrying BVDV infected and non-infected control fetuses.

STUDENT'S ROLE IN PROJECT
The student will collect blood from pregnant cattle under BSL2 containment periodically throughout the summer. The student will perform required laboratory work including ELISAs and EV isolation. The participating student will be trained as needed to successfully complete these tasks. The student will also participate in other projects occurring within LACS. Lastly, they will be expected to write methodology related to their summer work and participate in a weekly journal club.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)
Basic cattle handling experience is preferred but not necessary. Must undergo bio safety training.

Is IACUC or IRB approval required for your project? [ ] YES [ ] NO

If yes, has the IACUC or IRB been submitted? [ ] YES [ ] NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
Title: Using natural remedies to treat fungal (Bsal) infection in salamanders

Batrachochytrium salamandrivorans (Bsal) is a novel fungal pathogen that is emerging in Europe and killing salamanders. The UT Amphibian Disease Laboratory is attempting to identify therapeutic levels of plant-derived antifungal medications that could be used to treat salamanders in the wild. Our previous research has identified that curcumin can inhibit Bsal growth and is not toxic to eastern newts. Our future work will identify curcumin concentrations that are necessary to inhibit Bsal infection and treat newts that are already infected with Bsal. Once concentrations are identified, we will test for lethal effects of curcumin on a panel of non-target species.

STUDENT’S ROLE IN PROJECT

The student will lead controlled experiments to test the efficacy of curcumin preventing and clearing Bsal infections and verifying non-toxic effects on non-target species. The student will participate in designing and implementing the experiments. The student will learn amphibian husbandry and how to culture Bsal in growth media, identify gross signs of Bsal chytridiomycosis, perform humane euthanasia, collect non-lethal tissue (swab) samples for pathogen testing, extract genomic DNA from samples, perform quantitative PCR, prepare tissues for histological examination, and identify microscopic signs of Bsal lesions. The student will participate in data collection, statistical analyses, and manuscript writing. It is anticipated that at least one peer-reviewed journal article will be produced.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Previous experience with basic microbiological techniques (biosecurity practices, pipetting, microbe culturing) is preferred. The student should have a strong interest in performing research, ideally with wildlife species. The student must be comfortable with performing euthanasia and necropsying animals used in the experiment.

Is IACUC or IRB approval required for your project?  
✔ YES  ☐ NO

If yes, has the IACUC or IRB been submitted?   
✔ YES  ☐ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
**PROJECT DESCRIPTION**

**Title:** Retrospective histopathological investigation of sea turtle hatchling mortalities

This study is to document cause of death in sea turtle hatchlings collected over the past few years. Although a select number have been processed, many turtles that were collected as dead-in-nest or that died shortly after emergence, have not yet been investigated. This study will involve doing necropsies on formalin-fixed specimens, weighing and measuring select organs, preparing glass slides, examining histologic tissue sections using light microscopy and recording detailed findings both written and photographic formats.

**STUDENT'S ROLE IN PROJECT**

The student will be responsible for examining and doing necropsy on preserved specimens, trimming in tissues and preparing glass slides, examining and reading the histologic preparations, interpreting the results and detailing them in written and photographic formats. The student will then work with the team to combine this information with others collected over the past decade.

**SPECIAL REQUIREMENTS IF ANY**

*strong desire to do anatomic pathology. High level of organization. Ability to stand or sit for long periods and ability to look through a microscope for long periods.*

Is IACUC or IRB approval required for your project?  
- [ ] YES  
- ✅ NO

If yes, has the IACUC or IRB been submitted?  
- [ ] YES  
- ✅ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Debra Miller

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
DBDS

CO-MENTOR(S) (IF APPLICABLE)
Samantha Kuschke and Jeanette Wyneken

PROJECT DESCRIPTION

Title: Sea turtle hatchling fusariosis

There are two major areas of this project, one is an investigation into sea turtle egg fusariosis to estimate its prevalence in sea turtle nests in Boca Raton and Juno Beach Florida and its relation to incubation temperature, nest success, and long-term hatching success. The second is to aid in the establishment of reference intervals for packed cell volume (PCV) and total protein (TP) in 4-5 week old loggerhead sea turtles and begin writing a paper to publish these values in a scientific journal.

STUDENT’S ROLE IN PROJECT

Assist with nest inventory, data analysis, sample collection, and possibly husbandry of hatching sea turtles. Collect samples from nest sand and dead-in-nest turtles for fungal culture. Culture and identify all fungal samples and analyze data in conjunction with nests success and temperature. Perform opportunistic necropsies on dead-in-nest turtles and analyze necropsy findings in conjunction with temperature data. The student will also have the opportunity to perform hatching blood collection for the PCV and TS analysis and DNA extractions on samples collected for another on going project.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Must be willing and able to live near the field site (Boca Raton, FL) for the duration of the program. A strong desire to work with sea turtles is also necessary. Experience working with sea turtles and a background in statistics would be useful.

Is IACUC or IRB approval required for your project? □ YES □ NO

If yes, has the IACUC or IRB been submitted? □ YES □ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMAR Y MENTOR
Pierre-Yves Mulon

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Small Animal Clinical Sciences/Large Animal Clinical Sciences

CO-MENTOR(S) (IF APPLICABLE)
Joe Smith; Angela Rollins

PROJECT DESCRIPTION

Title: Evaluation of patient nutrition practices in a farm animal referral hospital

For this project the investigators will be reviewing the feeding practices for hospitalized farm animal patients. A review of all feed materials will be conducted by the research team initially, and afterwards the team will analyze patient feeding practices and daily physical examination data to identify conditions or subgroups of patients that may need altered feeding in the large animal hospital environment.

This project will also include assistance with a small animal clinical nutrition project evaluating feeding recommendations and guidelines of commercial pet foods in the US. This is part of a global research project and may lead to coauthorship.

STUDENT'S ROLE IN PROJECT

The student will be responsible for working with the research team to catalog feeding practices, and then collect data from the medical record system and treatment sheets for analysis. The student will be able to conduct data analysis with assistance from the team. The student will also perform online searches of US pet food feeding guidelines and compile data into an Excel spreadsheet.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Prior experience with large animals preferred but not required. Ability to consistently work in the hospital on a regular basis throughout the summer required.

Is IACUC or IRB approval required for your project? □ YES ☑ NO

If yes, has the IACUC or IRB been submitted? □ YES □ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Girish Neelakanta

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Biomedical and Diagnostic Sciences

PROJECT DESCRIPTION
Title: Prevalence of bacterial pathogens in ticks collected from deer in Tennessee.

Tick-borne diseases caused by bacteria, viruses and parasites are very prevalent throughout the United States. My laboratory uses multidisciplinary approaches to decipher important aspects of tick and pathogen interactions. Currently, my laboratory is characterizing some of the tick and bacterial molecules for the development of vaccines to target tick-borne diseases. In addition, we perform field studies for the identification of bacterial pathogens in ticks collected from the deer. The objective of this study is to identify presence of any rickettsial pathogens including Anaplasma species, Ehrlichia species and Rickettsia species in ticks collected from deers. The findings from this study will provide us the information on the presence of various rickettsial pathogens in the wild life.

STUDENT'S ROLE IN PROJECT
Student will be trained in various molecular biology techniques including DNA extractions from ticks, gel electrophoresis, PCR analysis, Sequencing analysis, bioinformatic analysis such as multiple sequence analignment and BLAST analysis.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)
This is a good opportunity to learn/improve molecular biology skills.

Is IACUC or IRB approval required for your project? ☐ YES ☑ NO
If yes, has the IACUC or IRB been submitted? ☐ YES ☑ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
Leptospirosis is one of the most widespread zoonotic diseases that can cause fatal disease in humans and animals. Leptospira, the spirochete bacteria that causes this disease is harbored in the kidney of reservoir animals and are excreted to the environment through urine. In order to study the host pathogen interaction and to reduce the use of animal model, we are focusing to develop a renal tubuloid model.

The student will be trained in cell culture procedures to develop a renal tubuloid model. The student will participate in weekly lab meetings, prepare lab reports, presentations and manuscript preparations. Based on the outcome of the project, student may get an opportunity to present the study in a national meeting such as CRWAD or NVSS symposium.

Enthusiasm for learning

Is IACUC or IRB approval required for your project? ☑️ NO
If yes, has the IACUC or IRB been submitted? ☑️ YES ☐ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
Mycoplasmal bacteria are important veterinary pathogens that can cause a broad spectrum of diseases. In recent years, the number of Mycoplasma has been isolated from skin diseases in dogs and cats. Their significance and characteristics are unknown at this time. The objective of this project is to characterize the phenotypic and genotypic attributes of the Mycoplasma isolates obtained from dogs and cats.

STUDENT’S ROLE IN PROJECT

Student will identify target cases and assist with sample collection, processing and culture. They will collect and analyze retrospective data, perform subculture of banked isolates followed by characterization using phenotypic and genotypic (PCR, Whole genome sequencing) methods. They will also conduct a literature review, prepare research reports, presentations and manuscripts from the work completed.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Enthusiasm for learning

Is IACUC or IRB approval required for your project? □ YES  ✔ NO

If yes, has the IACUC or IRB been submitted? □ YES □ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Barry T Rouse

PRIMARY MENTOR EMAIL
btr@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
BDS

CO-MENTOR(S) (IF APPLICABLE)

CO-MENTOR(S) EMAIL (IF APPLICABLE)

PROJECT DESCRIPTION

Title: How to research the literature and compose a review that has a story to tell

Doctor Barry T Rouse would be interested and keen to mentor a summer veterinary student who has a potential interest in pursuing a career that includes research. Rouse is a CVM faculty member who has spent a lifetime in productive research. He wishes to inspire a vet student to catch the research bug, but since his own lab is no longer active (after 51 years and >450 articles published), he proposes to mentor the student how to research the literature and compose a review that has a story to tell and which we would expect to publish together. The exercise will entail meetings to discuss what we plan to explore and where to find the information needed. I would suggest one viable idea would be 'Is there a place for the novel mRNA vaccine approach to prevent veterinary infectious diseases?' Other topics would be welcome resulting from discussions between the student and the mentor.

btr@utk.edu
https://vetmed.tennessee.edu/home/Pages/faculty_staff_details.aspx?NetID=btr
https://scholar.google.com/citations?user=Dl-wF9sAAAAJ&hl=en

STUDENT’S ROLE IN PROJECT

To search the literature and synthesize some interesting concepts. To lean how to tell an interesting and informative story. Eventually to filed questions raised by reviewers of our manuscript

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Enthusiasm and energy would be a plus

Is IACUC or IRB approval required for your project? ☑ NO

If yes, has the IACUC or IRB been submitted? ☑ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
**MENTOR PROJECT PROPOSAL FORM**

**2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM**

**DUE DATE:** January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

<table>
<thead>
<tr>
<th>PRIMARY MENTOR</th>
<th>PRIMARY MENTOR EMAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah Schmid</td>
<td><a href="mailto:sschmid7@utk.edu">sschmid7@utk.edu</a></td>
</tr>
</tbody>
</table>

**DEPARTMENT OF PRIMARY MENTOR (for student payroll)**

SACS

**CO-MENTOR(S) (IF APPLICABLE)**

<table>
<thead>
<tr>
<th>CO-MENTOR(S) EMAIL (IF APPLICABLE)</th>
</tr>
</thead>
</table>

**PROJECT DESCRIPTION**

**Project 1:** Evaluating the effect of bilirubinuria and hemoglobinuria on urine dipstick results

The urine dipstick consists of colorimetric assays for protein, blood, leukocytes, nitrate, glucose, ketones, pH, bilirubin, urobilinogen, and urine specific gravity. Patients may present with pigmenturia secondary to hyperbilirubinemia, hemoglobinuria, and myoglobinuria. Per the Siemens' Urine Multistix package insert, substances that cause abnormal urine color may affect the readability of test pads on urinalysis reagent strips. Such substances include visible levels of blood, bilirubin, or drugs containing dyes. In practice, it is thought that false positive results for glucose and protein can be seen on urine dipstick results of dogs presenting with marked bilirubinemia secondary to immune mediated hemolytic anemia. However, the effect of urine pigments altering the color of reagent pads for each urine dipstick analyte has not been studied. It is unknown how bilirubinuria and hemoglobinuria affect urine dipstick analytes and if there is a concentration-dependent effect. The purpose of this study to determine, what, if any, effect bilirubinuria and hemoglobinuria have on urine dipstick results. Banked urine samples from healthy dogs will be aliquoted and spiked with various concentrations of bilirubin and hemoglobin using bilirubin and hemoglobin standards. The urine specific gravity will be noted for each urine sample. Two urine dipstick analyses will be performed: one will be evaluated by visual inspection, the second evaluated using the Siemens Clinitest urine dipstick-reading instrument. The effect of various bilirubin and hemoglobin concentrations of the urine will then be evaluated.

**Project 2:** Incidence and etiology of hypoalbuminemia in cats

Hypoalbuminemia, or low albumin, has been shown to be a negative prognostic indicator in hospitalized dogs, dogs with heat-induced illness, canine surgery patients, and dogs with chronic gastrointestinal disease. Although less common in cats, the etiology and prognostic characteristics of hypoalbuminemia has not been investigated. In this retrospective study, cats that have been seen by UTCVM and had a chemistry panel that revealed hypoalbuminemia will be identified. The medical records will be reviewed to determine the underlying disease, severity of hypoalbuminemia, and when applicable, date of euthanasia/death. Using the new Lab Data Search tool, 1527 occurrences of feline hypoalbuminemia have been identified within the UTCVM database.

**STUDENT'S ROLE IN PROJECT**

The student will work with a small animal Internal Medicine Clinician to gain experience in both prospective and retrospective research. In an effort to provide the student with 40 hours of work per week, two independent studies will be performed by the scholar.

Prospective Study: Under the support of a small animal internist and specialist, the student will collect and analyze the data. They will also conduct a literature review, prepare a manuscript, and a prepare a presentation to present at the National Veterinary Scholar Program Symposium. Should the student be motivated to do so, they would be supported in submitting the manuscript for a first author publication.

Retrospective study: Under the support of a small animal internist and an internal medicine resident, the student will help review records and collect data for a retrospective study evaluating the incidence, severity, etiology, and prognosis of hypoalbuminemia in cats. This will provide the student with experience navigating the medical record system prior to starting on clinics. In addition, the student will conduct a literature review. Based on contribution, the student will be included as a co-author on this manuscript.

The student will also have the opportunity to attend small animal medicine journal club, to further their exposure to the veterinary literature and how to critically analyze the literature. Although, direct mentorship will be provided throughout the summer program, a 1-hour meeting will be scheduled each week for the mentor and student to discuss progress and questions.

**SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)**

An enthusiasm for learning and desire to explore research are the only requirements.

Is IACUC or IRB approval required for your project? **☑ NO**

If yes, has the IACUC or IRB been submitted? **☐ YES  ☐ NO**
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Nora Springer

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Biomedical and Diagnostic Sciences

PROJECT DESCRIPTION
Title: childhood obesity results in premature aging of adipose tissue, therefore creating a tumor-permissive microenvironment for colorectal cancer development

Childhood obesity is at epidemic levels and linked to adulthood colorectal cancer, even if the weight is lost prior to cancer diagnosis. The incidence of colorectal cancer lacking a familial genetic mutation has increased in the millennial generation in parallel with childhood obesity. We will explore the hypothesis that childhood obesity results in premature aging of adipose tissue, therefore creating a tumor-permissive microenvironment for colorectal cancer development. Adipose stromal cell (ASC) cell lines have already been generated from lean, obese, formerly obese, and aged mice to be used in this project.

STUDENT'S ROLE IN PROJECT
The student will perform experiments to identify conserved molecular and structural features of ASC derived from lean, obese, formerly obese, and aged mice. Techniques to be learned include cell culture, creating decellularized extracellular matrix, immunostaining, brightfield and fluorescence microscopy, and western blotting. The student will be involved in all aspects of experimental design, data collection, and data analysis. Co-authorship on a future manuscript is possible, pending the results of summer study.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Is IACUC or IRB approval required for your project? YES NO
If yes, has the IACUC or IRB been submitted? YES NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Joe Smith

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Large Animal Clinical Sciences

CO-MENTOR(S) (IF APPLICABLE)
Pierre-Yves Mulon

PROJECT DESCRIPTION

Title: Development of an induced lameness model for goats.

Goats are increasing in popularity as agricultural and companion animals in the United States. Clinicians often do not have extensive evidence when treating disease, such as lameness in goats.

For this project biometric data will be collected from normal goats. This includes physical examination data, pressure mat analysis, 3-axis data logger data, and other movement metrics. After collection of data from normal goats, a brief transient synovitis will be induced by injecting the distal interphalangeal joint with amphotericin B to induce lameness (as reported in cattle and other species). The same data will then be collected from these goats while lame. This data will be used to develop metrics so that this model can be refined and used in the future to investigate pain relieving drugs for lameness in goats.

STUDENT’S ROLE IN PROJECT

The student will assist in all aspects of the project. Animal evaluation and care, study implementation, data collection as well as interpretation. The student will also have the ability to review retrospective lameness data in goats and be given a structured format to conduct a literature review.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Prior experience with goats or small ruminants would be preferred, but not required. Flexibility for project scheduling would also be preferred as there will be several busy collection periods, and then less rigid down time for data analysis.

Is IACUC or IRB approval required for your project? ✓ YES □ NO

If yes, has the IACUC or IRB been submitted? ✓ YES □ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR
Dr. Hameeda Sultana

PRIMARY MENTOR EMAIL
hsultana@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
Biomedical and Diagnostic Sciences

CO-MENTOR(S) (IF APPLICABLE)

CO-MENTOR(S) EMAIL (IF APPLICABLE)

PROJECT DESCRIPTION

Title: Screen of human mimicry molecules in tick exosomes
Flaviviral transmission from the infected vectors (such as ticks and mosquitoes) to the vertebrate host via arthropod exosomes could be an important strategy for dissemination of these vector-borne pathogens. My research laboratory is the first to show that arthropod exosomes mediate flaviviral transmission from the vector to the vertebrate host. Currently, we are on the way to identify and characterize the entire cargo being transported via arthropod exosomes to the mammalian host. We have been performing several proteomics analysis to reveal the cargo proteins. In this line of investigation, we have identified an important family of vertebrate host mimicry molecules in ticks that needs further examination and understanding. We strongly believe that targeting the vertebrate mimicry molecules in ticks may hamper them from not just the nuisance bite and blood feeding but also block transmission of pathogens to the vertebrate host. The student enrolled in the summer scholars research program will be contributing to this growing line of important research and will be working on the characterization of these mimicry molecules.

STUDENT'S ROLE IN PROJECT

Student will be trained in various molecular biology and biochemistry techniques including RNA and protein extractions, Cloning, DNA gel electrophoresis, PCR analysis, Sequencing analysis, and Western Blotting. The student will be extensively trained in routine cell culture and cell based assays. In addition, the student will also conduct a literature review, prepare research data documents (like .ppt files and excel sheets), presentations and parts of the manuscript that results from this work.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

An excellent exposure to a high standard research laboratory and extensive training in molecular biology, cell biology and biochemistry.

Is IACUC or IRB approval required for your project? □ YES  □ NO

If yes, has the IACUC or IRB been submitted? □ YES □ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

PRIMARY MENTOR

Danielle Tarbert

PRIMARY MENTOR EMAIL

dtarbert@utk.edu

DEPARTMENT OF PRIMARY MENTOR (for student payroll)

Small Animal Clinical Sciences

CO-MENTOR(S) (IF APPLICABLE)

CO-MENTOR(S) EMAIL (IF APPLICABLE)

PROJECT DESCRIPTION

Title: establishing normal references for neurologic and orthopedic examination in tortoises
Chelonians (turtles and tortoises) have long lifespans, some exceeding 100 years. Tortoises of all ages can
be affected by musculoskeletal and/or neurological diseases, such as septic arthritis, degenerative
osteoarthritis, and traumatic injuries. Abnormal shell growth, a common consequence of inappropriate
husbandry, can result in impingement of the limbs, vertebrae, and spinal cord. Range of motion and ability to
ambulate appears diminished in many chelonians, especially those of advanced age, and can significantly
impact patient welfare. Recent advances have been made in reptile analgesia; however, diagnosing
problems such as lameness and arthritis remains a challenge. Information is not available regarding normal
gaits or expected appendicular joint range of motion (goniometry). Additionally, description of normal
neurological examination findings in chelonians is limited to sea turtles with no descriptions in terrestrial
chelonians.
This study will establish normal references for neurologic and orthopedic examination in tortoises. CT will be
utilized to exclude tortoises with radiographic evidence of neurologic or orthopedic abnormalities. Three
species of tortoises will be utilized to evaluate for species variation. This baseline information will provide
practitioners with data to better diagnose and treat chelonian musculoskeletal and neurological diseases.

STUDENT’S ROLE IN PROJECT

Student will work directly with Dr. Tarbert, UTCVM radiology department, and Zoo Knoxville staff. Specialists in
orthopedic surgery, neurology, and veterinary sports medicine/rehabilitation will also be included in the project. An
initial literature review of the chelonian musculoskeletal and neurological systems will be conducted. Student will
assist with acquisition and evaluation of CT scans for each tortoise. Student will then perform goniometry, gait
analysis, and a neurological examination on each tortoise; this can be done independently after initial training.
Data will be entered and analyzed. At least 1 conference presentation and first-author paper is anticipated.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)


Is IACUC or IRB approval required for your project? ☑ YES ☐ NO

If yes, has the IACUC or IRB been submitted? ☐ YES ☑ NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in
August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.
DUE DATE: January 25, 2022 – Email to Morgan Tolbert mtolber4@utk.edu

MENTOR PROJECT PROPOSAL FORM
2023 VETERINARY SUMMER SCHOLARS RESEARCH PROGRAM

PRIMARY MENTOR
Tena Ursini

DEPARTMENT OF PRIMARY MENTOR (for student payroll)
LACS

CO-MENTOR(S) (IF APPLICABLE)

PROJECT DESCRIPTION

Title: Biomechanical research in the horse using high speed motion capture cameras and electromyography to pair the muscle activity to the motion being performed.

Horses will be instrumented with electromyography sensors both on the skin surface and implanted into deep muscles to measure onset and offset of muscle activity as well as strength of contraction. Horses will also be instrumented with reflective markers that the cameras use to track the position and motion of body segments three dimensionally.

Data for 2 projects will be obtained
1. While instrumented, horses will be asked to perform various tasks: carrot stretches, butt tucks, sternal lifts, while standing on flat asphalt and while standing on foam balance disks.
2. Walking and trotting in hand to determine an ideal and repeatable tracking system for 3D motion of the axial spine

STUDENT’S ROLE IN PROJECT
Help with horse handling, instrumentation, data collection, data processing, assist with daily horse care in between data collection periods, potential for 1-2 publications. Some self study and independent computer work also involved.

SPECIAL REQUIREMENTS IF ANY (such as prior experience preferred)

Horse experience required.
IACUC's for both projects mentioned above are approved.

Is IACUC or IRB approval required for your project? [ ] YES [ ] NO

If yes, has the IACUC or IRB been submitted? [ ] YES [ ] NO

Remember, if an IACUC/IRB is required for your project, it must be approved before students can work in August. NO students shall be allowed to actively work on projects with animals, until the IACUC is approved.