

# The University of Wyoming Department of Veterinary Sciences & Wyoming State Veterinary Laboratory Newsletter

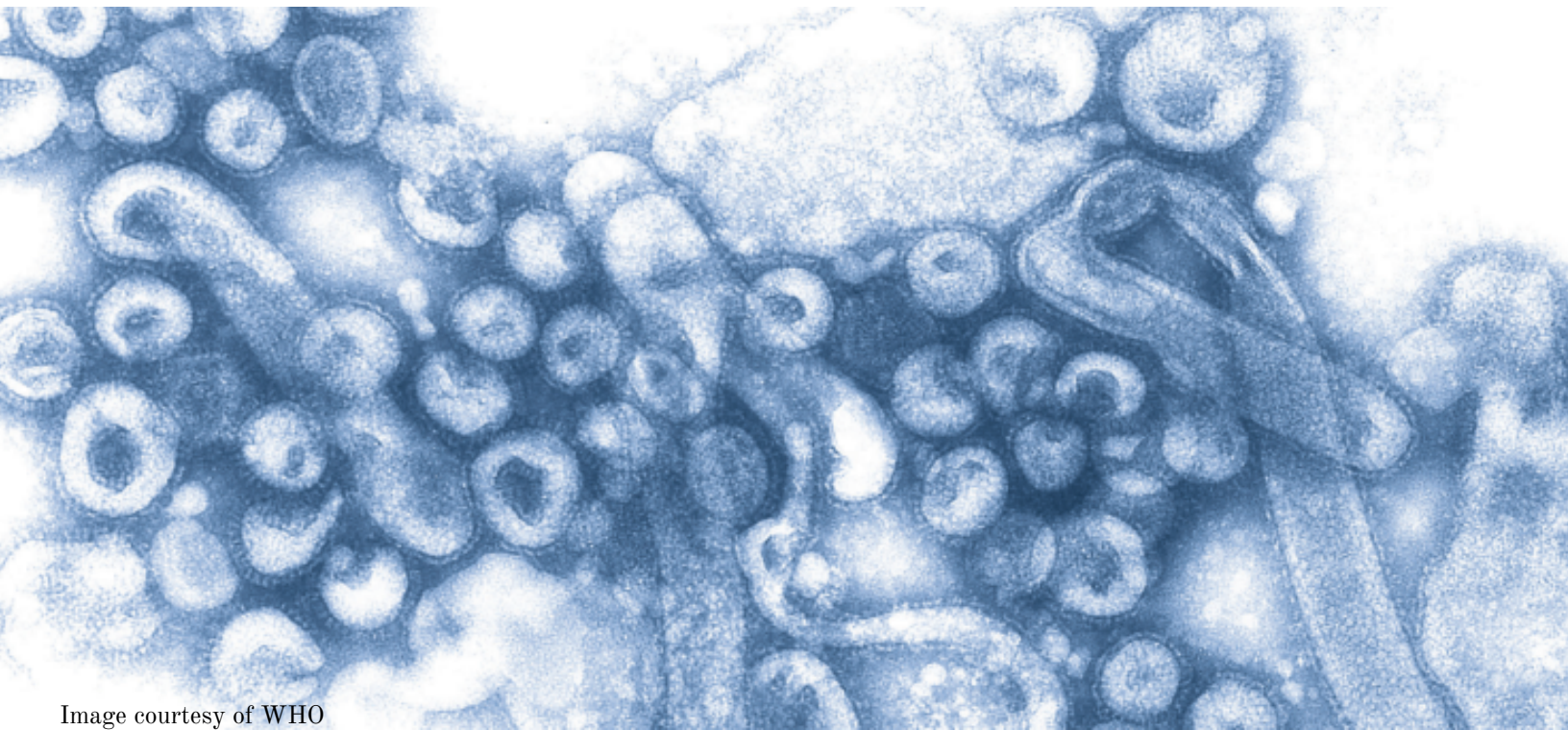


Image courtesy of WHO

## Avian Influenza Virus

- Updates from Dr. Jonathan Fox and Dr. Kerry Sondgeroth
- Wyoming Fox Succumbs to Bird Flu
- Evaluation of neurologic disease in ruminants with focus on Polioencephalomalacia
- Undergraduate Interview/ Disease Update
- Graduate Student Interview
- Faculty and Staff

## UPDATES

### **Dr. Jonathan Fox, Department Head**



Welcome to the combined winter/spring issue of the Veterinary Sciences Department / WSVL newsletter. There has been a lot going on since the last newsletter.

The department recently went through an external review as part of normal UW protocol. Drs. Angela Arenas (TAMU) and Gary Mason (CSU) visited the department in the fall and met with all the faculty and staff to develop an in depth understanding of our diagnostic, research, and teaching activities. We recently received the final report. Without going into details the reviewers were very complimentary about how much we do for a small department. We also appreciate the reviewer's valuable insights that will help us strengthen the department as we move forwards - these covered diverse areas including our graduate program, staff, faculty, and research.

Six open faculty positions in the department bring challenges and opportunity. I would like to highlight a couple of the research focused positions. We are seeking an Excellence Chair in brucellosis as a result of repurposing of another position vacated through retirement. With the University of Wyoming Biocontainment Facility online now is the time for the department to strengthen its focus on addressing the problems posed by brucellosis in the region. We plan to build a nucleus of expertise in this and other intra-cellular pathogens to enable strategic growth as we recruit more faculty. We are also recruiting to fill the Riverbend Chair endowed position in Wildlife-Livestock Health. We have sought candidates who are studying diseases transmissible between wildlife and livestock to include CWD. I hope to be able to introduce new faculty hires in the next newsletter this summer.

Please enjoy reading the newsletter. In addition to the disease focused articles and updates which are valued by our veterinary clients, we have highlighted two of our students.

### **Dr. Kerry Sondgeroth, WSVL Int Director**



This winter and early spring is a busy season for us at WSVL. We have been working hard to provide all of our clients timely results, but weather and road closures have delayed shipments to and from the laboratory. We do appreciate your patience during these unpredictable months. Recently we began including a QR code on the bottom of all our reports, that allow you to provide real time feedback to us at WSVL!

We have recently begun the transition into our updated LIMS system, called SANDI. Our goal is that our clients will have minimal disruption as we move forward. One change will be a more user friendly report! By late spring, we should have fully transitioned into this new system, but will keep you updated as that change occurs. The last WSVL fee schedule change was implemented in November, 2021. We are working to update our existing fee schedule, and these changes will likely take effect in June or July, 2023.

We have added a few new members to our WSVL team! In November, 2022 we hired Lindsey White as our WSVL Senior Accountant, and Sam True as a Necropsy Technician III. In December, we hired Brian Dominguez as a Sequencing Technician III. And in February 2023, we hired Britney Bartz as a Senior Office Associate. This is the first time in over a year that we have been fully staffed on the office side of operations.

We currently have three pathologist positions open. But to help us through our caseload we have temporarily hired a remote pathologist, Dr. Flaviu Tabaran; and two locum pathologists. The first locum, Dr. John Edwards, will be at WSVL during March through the first part of May. The second locum will be joining us in the fall. We appreciate the continued support of all our WSVL clients, and please remember that we are only a phone call (or email) away.



# Wyoming Fox Succumbs to Bird Flu



*Dr. Myrna Miller*


Dr. Myrna Miller is an Associate Professor who specializes in studying viral diseases of wildlife, including deer adenovirus, deer alphaherpesvirus. Also arthropod-borne viruses of wildlife and livestock, including bluetongue virus and epizootic hemorrhagic disease virus.



Testing at the WSVL confirmed that a sick red fox from Hot Springs County had bird flu. The fox was observed to be disoriented, stumbling, and had lost its fear of humans. Rabies virus infection was suspected, but tests for rabies and canine distemper virus were both negative. Foxes and other carnivores have been found to be susceptible to infection with High Pathogenicity Avian Influenza (HPAI), commonly known as bird flu. Neurologic signs such as seeming disoriented or blind are common features of bird flu infections in these scavengers, who become infected after feeding on the carcass of a dead bird. Documented cases have been reported in foxes, raccoons, coyote, opossum, multiple bear species, and raccoons.

An outbreak of highly pathogenic bird flu started in the spring of 2022 in North America. The impact on U.S. poultry industry due to deaths and culling has significantly increased the price of eggs and meat. Deaths in domestic poultry can approach 100%, and there is no vaccine or treatment for HPAI. Wyoming has seen a handful of outbreaks in small domestic poultry flocks, but the major impact has been deaths in wild birds ranging from waterfowl and wild turkey to raptors such as turkey vultures, great horned owls, hawks, and eagles.

Humans are very rarely infected by this virus, but it is recommended that people and pets should avoid contact with sick or dead wildlife. Good hand hygiene and wearing gloves is recommended when handling dead birds. Please call Wyoming Game and Fish if you see a dead or sick wild bird.

HPAI in cases in mammals dated January 24, 2023 (USDA website) 



## DISEASE UPDATES

**Highly pathogenic avian influenza:** We continue to have wild bird mortalities due to highly pathogenic avian influenza (HPAI). Disease in domestic flocks seems to have declined, likely due to owners heeding the state livestock board recommendations on good biosecurity. In 2022 the WSVL tested 469 birds with 144 positives (31%). In the first two months of 2023, 60 samples were tested with 28 positives (47%). A new concern in 2023 is mortalities in wild carnivores due to HPAI, including one red fox and three cougars. These mammals are thought to have been infected from opportunistically feeding on dead wild birds (free lunch).

**Tularemia:** In February 2023, a beaver was found dead near Kaycee, WY and reported to the Wyoming Game and Fish Department. WSVL tested tissue samples and they were positive for *Francisella tularensis*, the bacterium that causes tularemia. We typically see tularemia cases in the warmer months of the year, so this case is an important reminder that tularemia can happen during any season.

**Rabies:** The WSVL provides free rabies testing, a service supported by a grant from the Wyoming Animal Damage Management Board. In 2022 samples were tested from 23 species of animals ranging from bats to bears. The years testing total was 438 samples with 12 positives. Positive rabies samples included skunks (7), bats (4), and cows (2). A current map of rabies in Wyoming is available on our website, along with links to other useful rabies information resources. [HERE](#)

**Tritrichomonas foetus:** In 2022, we performed 3,333 official PCR tests for bovine *Tritrichomonas foetus* infections (mostly on pooled samples). The overwhelming majority of submitted samples stemmed from bulls in Wyoming; of these, one was tested positive in 2022. While our current *T. foetus* PCR test method is based on DNA detection, we are presently working to establish an RNA based assay, which would allow for more leeway with submission media type and transport times. We will keep our clients updated if and when we will be able to offer the new assay type. More information for these diseases can be found on our website [HERE](#)

# EVALUATION OF NEUROLOGIC DISEASE IN RUMINANTS WITH FOCUS ON POLIOENCEPHALOMALACIA



*Dr. Brett Webb*

Diagnosis of neurologic disease in ruminants is often complicated by circumstances that preclude conducting a complete neurologic exam which enables neuroanatomical localization of the lesion or lesions responsible for the neurologic dysfunction or deficits. Neuroanatomical localization of the lesion, when possible, allows the pathologist to greatly focus their efforts on evaluating anatomic structures

specifically relevant to the observed neurologic signs which is critical for an organ system in which minute lesions can have markedly outsized and often lethal effects. When clinical data is absent, appropriate sampling becomes critical as many diseases have specific distributions which require evaluation or testing of specific anatomic structures with the nervous system or in some cases other organs to facilitate diagnosis or exclusion of particular causes.

Most common causes of neurologic disease that are of concern to ruminant herd health primarily affect the central nervous system, namely the brain. Thus submission of an entire fresh intact brain, from the brain stem and cerebellum to the olfactory lobes, is the most critical sample and along with a complete set (meaning all organs required for life) of fresh and formalin fixed organ samples will provide the minimum database to determine the cause in most situations. Inclusion of other samples such as EDTA blood, water, feed and rumen contents are also important and help round out a complete submission.

Polioencephalomalacia (PEM) or cerebrocortical laminar necrosis is a fairly common cause of neurologic disease in ruminants and manifest predominately in two distinct syndromes: Recumbency and opisthotonos of peracute onset in which some animals can be found dead without clinical signs and acute to subacute onset of ataxia, circling, tremors, cortical blindness and star gazing. Animals presenting with the latter clinical signs are typically those that respond to timely treatment and can recover. It is wise to be cautious of using response to treatment to diagnose the condition as animals suffering from neurologic diseases other than polioencephalomalacia often benefit from additional thiamin.

**Maximum sulfur and sulfate concentrations in ruminants**

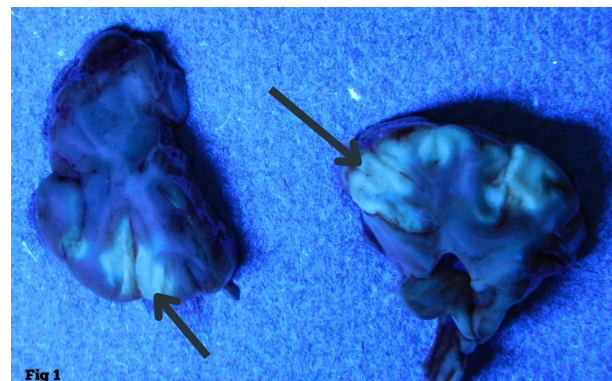
	Diet	Maximum Dietary Sulfur	Maximum water Sulfur
Cattle and sheep	> 85% concentrates	0.3%	< 600 ppm Sulfate (< 200 ppm Sulfur)
Cattle and other ruminants	> 40% forage	0.5%	< 2,500 ppm Sulfate (< 830 ppm Sulfur)

Cerebrocortical laminar necrosis or polioencephalomalacia a nonspecific lesion that can be initiated by a variety of different causes including thiamine deficiency, sodium toxicity/water deprivation, heavy metal (namely lead) toxicity and consumption of excess dietary sulfur, although the latter two causes are most common. Diagnosis of the specific cause requires either documentation or exclusion of water deprivation, evaluation of total sulfur intake, thiamine and quantitation of heavy metals, typically in kidney or liver.

Many of the surface and subsurface waters in the western states are quite high in sulfate and are responsible for the vast majority of toxicities. The lack of economical methods to remediate high water sulfate level often requires providing an alternative water source for livestock to mitigate the problem. However, evaluation of forage should not be completely neglected as some forages including Bermuda grass, Kochia sp. and other sulfur-accumulating plants can have more than 3,000 parts per million (ppm) of sulfur.

Ration composition also strongly influences sulfur tolerance in cattle, with high concentrate rations markedly reducing sulfur tolerance when compared with forage predominant diets. Thus in certain circumstances management of PEM can include reduction in amount of concentrate fed.

**Section of cerebrum under UV light demonstrating areas of cerebral cortical necrosis**



**Fig 1.** Gross lesions of PEM are typically absent or present only as subtle cerebral edema, which is most apparent by the flattened appearance to cerebral gyri and occasional slight yellowish discoloration. In more advanced cases a cortical laminar pattern of autofluorescence can be seen under UV light. Microscope evaluation of section of cerebrum are typically required for diagnosis.

# Undergraduate Student:

## MACKENZIE FAIRCLOTH

Pre-Vet Club President

College of Agriculture, Life Sciences, and Natural Resources Ambassador



### Year at the University of Wyoming.

Senior: Graduating major in Animal and Veterinary Science with a minor in Agricultural Business.

### I see you are the President of the Pre-Vet club, could you tell me more about that?

Yes! I was appointed to the student position by my peers. It is a way for me to provide as a resource for other students with tasks like scheduling, navigating the university or connecting with faculty.

### What are your career goals?

Career goals of mine are to keep growing in a leadership roll and eventually own my practice. Theriogenology is a discipline I would like to keep studying within large animals. Being able to communicate with the community while keeping their animals happy and healthy is extremely important to my values.

### Being a necropsy student worker seems like an interesting job, are there any interesting you can discuss?

Working in the necropsy lab during my undergraduate degree has produced experiences that not all veterinary seeking students are provided. The hands on involvement to work with level 3 technicians on animals ranging from gold fish to grizzly bears is a practice that will carry with me throughout my career.

### What does it mean to you to be an Ambassador of the College of Agriculture, Life Sciences, and Natural Resources?

Being an Ambassador in the AG department is a way I can help people cross a bridge without them having to find the bridge. From working on four year plans with freshmen or coordinating projects with faculty in the department, this creates connections that will hopefully grow with my career and continue into leadership rolls.

### Any pets?

Yes, I have a Borgie (corgi x border collie) named "Smooch" and a few horses as well!



## **NEW DEPARTMENTAL GRANTS**

**TITLE:** Assessing factors that influence the virulence of *Mycoplasma bovis* in bison

**Sponsor:** Bison Center of Excellences at South Dakota State University

**Faculty Associated:** Dr. Kerry Sondgeroth

**\$208,000.00**

**TITLE:** Understanding Persistence of *Mycoplasma Bovis* in Bison Herds

**Sponsor:** National Park Service

**Faculty Associated:** Dr. Kerry Sondgeroth

**\$173,500.00**

**TITLE:** MCF Vaccine Trials in Bison

**Sponsor:** USDA cooperative agreement with Dr. Cristina Cunha

**Faculty Associated:** Dr. Brett Webb

**\$50,000.00**



# Graduate Student: Research Olivia Bowers

SONDGEROTH RESEARCH LAB



Photo Credit: Lance Faulkner

## Year at the University of Wyoming?

I graduated from the University of Wyoming in May 2022 with a bachelor's degree in Animal and Veterinary Science and minors in Chemistry and Agricultural Business. I am now in my first year as a master's student.

## What sparked your interest in working in lab-based research?

I have always liked lab-based classes and working with my hands. In the summer of 2021, I became an undergraduate researcher at the Wyoming State Vet Lab and discovered that I really enjoy lab-based research.

## What are your long-term career goals?

My goal is to find a career that allows me to do hands-on lab work. I am interested in either working in a diagnostic lab, or continue working in research for a government agency such as USDA, or for an animal pharmaceutical company.

## Do you have any hobbies you like to participate in your spare time?

I started dance classes when I was three years old. I still dance ballet as a form of exercise and artistic expression, and I am teaching a children's jazz dance class. I also enjoy east coast swing dancing and am an officer for the east coast swing dance club on campus, Wyoming Swing. A couple other hobbies of mine are riding and training horses, and hiking with friends.

## Investigating Antimicrobial Resistance in E. coli in Livestock and Wildlife in Wyoming

Antimicrobial resistance (AMR) is a growing threat to human and animal health. The overuse and misuse of antimicrobials puts pressure on bacteria to select for elements that confer antimicrobial resistance. More studies are taking a "One Health" approach to AMR by considering the interconnectedness of human, animal, and environmental health. However, there is a lack of studies that focus on the AMR relationships between bacterial pathogens such as E. coli circulating in livestock and wildlife in rural western states, including Wyoming.

We hypothesize that there will be an overlap in AMR elements found in livestock (cattle) and wildlife (mule deer), with more AMR elements being found in cattle than in mule deer. Mule deer isolates with AMR elements are expected to be found at higher rates in areas with higher cattle stocking densities. In addition, MALDI-TOF protein mass spectrometry is expected to be better than whole genome sequencing at predicting resistant phenotypes in E. coli.

My research investigates the presence of antimicrobial resistance (AMR) elements present in E. coli isolates from wildlife (predominantly mule deer) and livestock (predominantly cattle) across Wyoming.

One of my project goals is to determine if AMR elements identified in both wildlife and livestock in Wyoming are associated with factors such as stocking density or location. Right now, I am working on isolating and saving E. coli from wildlife fecal samples that were collected by the Wyoming Game and Fish Department.

In the spring, I will start testing the saved isolates for antibiotic resistance and extract DNA for sequencing. AMR is a pressing threat to human and animal health, and I really like that my project will help shed light on this issue in the local area.





## FACULTY AND STAFF

### FACULTY

**Dr. Jonathan Fox**  
Department Head of Veterinary Sciences, Professor, Pathologist

**Dr. William Laegreid**  
Professor

**Dr. Gerard Andrews**  
Associate Professor, Director - Microbiology Program

**Dr. Berit Bangoura**  
Assistant Professor, Veterinary Parasitologist, Supervisor of Parasitology, Clinical Pathology

**Dr. Elizabeth Case**  
Assistant Professor, Scientific Director UW Biocontainment Facility

**Dr. Jacqueline Kurz**  
Assistant Clinical Professor, Pathologist, Supervisor of Necropsy/ Trimming/Receiving

**Dr. Kerry Sondgeroth**  
Interim WSVL Director, Riverbend Chair, Associate Professor, Veterinary Bacteriologist, Supervisor of Bacteriology and Serology

**Dr. Myrna Miller**  
Associate Professor, Veterinary Virologist, Supervisor of Virology

**Dr. Amy Rhoad**  
Assistant Professor, Life Science Program

**Dr. Brett Webb**  
Pathologist, Associate Professor

### BACTERIOLOGY

**Hally Killion**  
Laboratory Technician III, Bacteriology

**Madison Vance**  
Laboratory Technician III Bacteriology, Clinical Pathology, Cytology

### BIOCONTAINMENT

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### HISTOPATHOLOGY

**Rebecca Ashley, HTL(ASCP)**  
Laboratory Technician III, Histopathology

**Rachel Griess, HTL(ASCP) QIHC**  
Laboratory Technician III, Histopathology

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Laboratory Technician I, Case Research Lab

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**Alexander Terry**  
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**Corie Owen**  
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**Britney Bartz**  
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Manager, Vet Sci Facilities & Animals

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### NECROPSY/TRIMMING/RECEIVING RESEARCH

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**Elizabeth Wheeler**  
Laboratory Technician III, Necropsy, Trimming, Receiving

**Samuel True**  
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### QUALITY ASSURANCE

**Mark Davidson**  
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**Samantha Clinton**  
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**Dr. Rae Van Sandt**  
Research Scientist, Associate, Fox Research Laboratory

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**Brian Dominguez**  
Laboratory Technician III, Sequencing/Bioinformatics

### VIROLOGY

**Elizabeth Butkus**  
Laboratory Technician III, Virology

**Jennifer McKenna**  
Laboratory Technician III, Virology

**Marce Vasquez**  
Laboratory Technician III, Virology



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College of Agriculture and Natural Resources  
Veterinary Sciences

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**MORE COWBOYS.**

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