

Morgan C. Metrailler

Curriculum Vitae

Graduate Research Assistant

Spatial Epidemiology and Ecology Lab

University of Florida

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My research interests focus on the prevalence and spread of infectious diseases. I am fascinated by the complex interactions between diseases and their surrounding environment and how these interactions lead to disease spread and evolution.

Education

Masters in Geography (M.S.), In Progress, 2023, University of Florida, Gainesville, FL

Bachelor of Science (B.S.), Biology, 2020, Northern Arizona University, Flagstaff, AZ

Minor in Anthropology

Honors: Dean's List and Lumberjack Scholarship recipient.

Research: Prevalence of Spotted Fever Group Rickettsia in Arizona ticks. Development of pesticide resistance in cattle fever ticks.

Research Employment

Temporary Research Technician, University of Florida, Emerging Pathogens Institute, (5/13/2021-8/16/2021)

Drs. Jason Blackburn and Michael Norris

Research: Assisting in laboratory experiments and computational methods focusing on the bacterial pathogen, *Bacillus anthracis*.

Research Technician, Northern Arizona University, Pathogen and Microbiome Institute, (5/25/2020-6/18/2021)

Dr. Jason Ladner

Research: I conducted research on the development of a highly multiplexed serological assay for viral diseases. The goal of this project is to reveal the entirety of an individual's antiviral immune response history. Thus, developing a comprehensive understanding of a population's viral disease transmission dynamics including a comparison of different socioeconomic and racial groups. In conjunction with this arching population view, there is also the ability to reveal the differences between individual immune responses to novel pathogens, such as SARS-Cov-2, based on their immunological history. I am experienced in BSL-2 techniques and the use of Certified Biosafety Cabinets.

Dr. David Wagner and Dr. Joseph D. Busch

Research: I conducted research for a USDA-funded project to investigate and characterize genetic variation at antigens under consideration as anti-tick vaccine for cattle. The species of interest for these studies were *Rhipicephalus microplus* and *Rhipicephalus annulatus*. I contributed to larger datasets by generating new data with qPCR and Sanger sequencing. My professional products included designing primers, analyzing data, upkeep of large tick databases, and preparing final results for supervisors. I am proficient in the use and maintenance of an AB3130 Genetic Analyzer and ABI 7500 Fast Real-time PCR system. I also attended safety trainings for chemical, biosafety, and bloodborne pathogens for research within a BSL-2 facility.

Undergraduate Research Assistant, Northern Arizona University, Pathogen and Microbiome Institute, (2/18/2020-5/25/2020)

Research: I conducted research for a USDA-funded project to investigate acaricide resistance in cattle fever ticks throughout the Southern US and Mexico. The purpose of this project was to determine the efficacy of quarantine measures put into place in these areas. In addition, an increased spread of resistant SNP' to previously susceptible cattle fever tick populations that were under quarantine could indicate a wildlife host.

Undergraduate Research Assistant, Northern Arizona University

Dr. Nathan Nieto

Research: I conducted research funded by the Bay Area Lyme Foundation that focused on the spread of tick-borne diseases and their continued emergence as a public health concern. I performed DNA extractions and real-time PCR on ticks collected through citizen science. The primary disease of interest was Lyme disease (*Borellia burgdorferi*). Additional pathogens of interest were: *Borellia miyamotoi*, *Rickettsia rickettsii*, *Anaplasma phagocytophilum*, *Bartonella henselae*, and *Babesia microti*. I managed the large datasets of our received ticks that gathered information on locations of ticks sent in, prevention methods used by the individual, and intermediate hosts. We used this data to analyze the increased range of the primary vectors for these pathogens, such as the Deer Tick, *Ixodes scapularis* and the American Dog tick, *Rhipicephalus sanguineus*.

Professional Service

Ornithology Field Assistant, Northern Arizona University, (Summer 2020)

Dr. Jeff Foster

Experience: I assisted in the banding of passerine birds in Northern Arizona. The purpose of this study was to identify the prevalence of *Borellia hermsi*, the causative agent of Tick-borne Relapsing Fever (TBRF), in birds. Knowledge about the spread and maintenance of this pathogen in birds is minimal, thus data from this study will improve this knowledge gap, specifically in birds at high elevation. I am proficient in mist-netting, bird extraction and field sample collection.

Microbiology Lab Teaching Assistant Apprentice, Department of Biological Sciences, Northern Arizona University

Dr. David John

Experience: I provided assistance to the Graduate TA in undergraduate microbiology labs. I am skilled in staining, microscopy, and bacterial culture, isolation and storage. I am also experienced in teaching microbial techniques and methodology to students.

Presentations

Metrailler M.C., W. T. Porter, Z. A. Barrand, D. J. Salkeld, J. D. Busch, N. C. Nieto. 2020. Using Citizen Science to Determine Prevalence of Spotted Fever Group Rickettsia in Arizona. Northern Arizona University, Undergraduate Research Symposium, Flagstaff, AZ. April 24, 2020.

Professional Skills

- Experience with large scale organization of laboratory materials and biological samples.
- Manage large datasets.
- Works well in groups as well as independently.

- Proficient in aseptic technique and general lab practice.
- Biosafety level 2 experience.
- Ability to safely handle biohazardous materials.
- Ability to safely handle hazardous laboratory chemicals.

Molecular Techniques:

- Familiar with bacterial culturing and isolation.
- Proficient in basic cell staining techniques.
- DNA/RNA extraction of BSL-2 organisms.
- DNA/RNA extraction in a BSL-2 Biosafety Cabinet.
- Traditional and nested PCR.
- Real-time qPCR:
 - o presence/absence
 - o genotyping.
- Sanger Sequencing.
- Next Generation Sequencing
- Primer optimization.
- PCR optimization.
- Gel electrophoresis.
- pH level of soil and water.
- Gel Quantification for whole genome sequencing (WGS)
- Trained in Certified Biosafety Cabinet techniques.

Computational Analysis Methods:

- ArcGIS, spatial analysis.
- DNASTar, Seqman Pro:
 - o Sanger sequence assembly.
 - o Sanger sequence scoring.
- BioEdit:
 - o Traditional PCR primer design.
 - o Sanger sequence editing.
- 7500Fast Software:
 - o Quantitative PCR scoring and analysis.
- Microsoft programs (Word, Excel, PowerPoint).

Additional Certifications:

- Certified Driver's License (CDL), Arizona Department of Transportation: capable of driving vans and buses.
- FERPA Training, Northern Arizona University.
- Responsible Conduct of Research (RCR), Northern Arizona University.
- Working with the IACUC - Investigators, Staff and Students, Northern Arizona University.
- Bloodborne Pathogen Training.