

## EcoHealthNet 2.0 2021 Research Exchange Project Descriptions

### Projects 1-5 of 17

Project Title	Host Organization	Student Level	Openings	Project Description	Skills
Systematic review of Crimean-Congo hemorrhagic fever incidence	EcoHealth Alliance	Undergraduate or Graduate	1	The student will conduct a systematic literature review on global Crimean-Congo hemorrhagic fever (CCHF) incidence. CCHF is classified as a R&D Priority Pathogen by the WHO. It is a vector-borne virus that can be transmitted to people either directly through a tick bite or via the blood of an infected animal. The virus can cause a hemorrhagic disease and is fatal in 2-50% of cases. Specifically, we are interested in the symptomology of CCHF among infected individuals that participated in incidence studies. The student will be mentored to quantifying the incidence reported in different countries using metaanalysis methods.	The candidate should have strong data literacy and scientific writing skills
Developing Common One Health Data Guidance	EcoHealth Alliance	Undergraduate or Graduate	1	The student will conduct a comprehensive literature review to produce a guidance document on one health data collection, structures and reporting. Student will research comparative methods of field data collection and management across a variety of human and veterinary epidemiological projects, interview researchers, and help develop and disseminate guidance and standard tools.	The candidate should have strong data literacy and scientific writing skills
Human Behavior and Zoonotic Disease Risk	EcoHealth Alliance	Undergraduate or Graduate	1	The student will assess the theoretical frameworks and existing programs for community behavior change as it related to zoonotic disease risk in Southeast Asia & China	The candidate should have basic skills in literature review and scientific writing, along with strong cultural competence and a strong interest in community-based work
Evaluating the pangolin-human interface in Southeast Asia and Africa	EcoHealth Alliance	Undergraduate or Graduate	1	The student will work to evaluate the pangolin-human (or wildlife-human) interface in SEA and/ or Africa to understand deficiencies and guide further studies in the field (ethnographic studies and interface evaluation). This work will occur through a compilation of peer-reviewed literature and public media, in addition to investigation of local sources. The work may target one or multiple countries, and local beliefs and myths for the species are expected to be incorporated in the assessment. Students with language skills specific to African or Southeast Asian countries would be preferred.	The candidate should have an interest in ethnography and strong cultural competency
Analysis of ecological data and bat-borne disease risk in Western Asia	EcoHealth Alliance	Graduate	1	The student will work to develop an ecological data analysis project examining host-pathogen interactions and patterns, with a focus on bat-borne viruses. The intern will work closely with EHA's Western Asia Bat Research Network project to analyze ecological data from bats, as well as bring in other data sets to investigate disease ecology. The specific project will be defined by the student in consultation with their mentor, but could include: analysis of host traits and sampling biases in zoonotic disease surveillance, analysis of bat ecological data (including echolocation calls) to understand species distribution, etc.	The candidate should have a background in ecology, with experience in R and data analysis

**EcoHealthNet 2.0 2021 Research Exchange Project Descriptions**  
**Projects 6-9 of 17**

<b>Project Title</b>	<b>Host Organization</b>	<b>Student Level</b>	<b>Openings</b>	<b>Project Description</b>	<b>Skills</b>
Forecasting Global Veterinary Disease	EcoHealth Alliance	Graduate	1-2	The student will participate in the development of a novel tool to target the global spread of veterinary diseases. The researcher will work with EHA scientists to build models to forecast the occurrence, spread and impact of diseases that threaten livestock such as African Swine Fever. They will work with data on historical disease outbreaks and international trade to develop algorithms, visualizations, and interactive tools to predict and manage new disease outbreaks. The researcher will be mentored in advanced skills in data science, machine learning, and reproducible research. The researcher will be embedded in a team in a dynamic and multidisciplinary research environment, and be expected to participate in meetings and research discussions.	The candidate should have strong data interpretation and writing skills, have completed graduate-level coursework in statistics and/or epidemiological or ecological modeling, and have experience using the R programming language. The candidate should have interest and some knowledge of infectious diseases.
Economic Analysis of Disease Threats in Liberia	EcoHealth Alliance	Undergraduate or Graduate	1	The student will assess the economic impacts of a zoonotic disease in West Africa, using economics/econometrics to assess multi-sectoral impacts. The project will require selection of a relevant disease (e.g. Lassa fever) and study design to be determined in consultation with the research team. Relevant methods may involve interpretation of survey data, literature reviews, and/or stakeholder consultations to identify relevant cost items, estimate impacts, or assess potential cost-effective strategies to reduce risk and impact. The project could also translate burden of disease assessments into economic terms (e.g. productivity losses or healthcare spending). Students with some economics training, or at least interest in impact assessment, are encouraged to apply. This opportunity is open to Liberian or West African students or students with expertise working on disease impacts of West Africa.	The candidate should have some economics training, or an interest in impact assessment.
Climate Change as it Relates to disease risk in wildlife and/ or domestic species	EcoHealth Alliance	Undergraduate or Graduate	1	The student will investigate the influence of climate change on wildlife health through a literature review of animal mortality or disease presence blamed on a change in temperature. The student may approach the work through an exploration of one or more observed associations, such as higher temperatures in connection to more parasites, higher stress, lower immune system, changes in population density, food availability, competition for resources, etc.	The candidate should be supportive in stating that climate change has a direct correlation to an increase in animals sharing or contracting disease. Strong writing skills preferred.
Human Behavioral Surveillance	EcoHealth Alliance	Undergraduate	1	The student will conduct a scan of validated social science tools that can be used for behavioral risk investigations in zoonotic disease hotspots for the Behavioral Risk Surveillance team at EcoHealth Alliance. This search should include survey instruments that have been validated for appropriate use in different international contexts to understand local context, knowledge, attitudes, skills, and behaviors. As time and interest permits, the student will also work in assessing current behavioral risk surveillance tools developed at EcoHealth Alliance, and help develop future frameworks for tool validation.	The candidate should have an interest in social science

## EcoHealthNet 2.0 2021 Research Exchange Project Descriptions

### Projects 10-21 of 17

Project Title	Host Organization	Student Level	Openings	Project Description	Skills
Improving Usability of the Wildlife Health Information Sharing Partnership-event Reporting System	United States Geological Survey (USGS), National Wildlife Health Center	Graduate	1	The Wildlife Health Information Sharing Partnership – event reporting system, or WHISPers, is an online data collection portal and map created by USGS for Federal, Tribal, and State natural resource management agencies to transform crowdsourced stakeholder data about wildlife health events into actionable intelligence. Enhancing data entry, visualization features, and data management tools will improve usability and partner satisfaction, thus growing the user base and stimulating ongoing disease reporting. We will conduct pre- and post-improvement usability assessments with a focus stakeholder group. In addition, we will query this group about how they manage their wildlife health information, and what new features could improve their understanding of disease risks and facilitate science-based decision making.	The candidate should have experience with databases, data management, user interface, and data visualization
Opportunities and Challenges with Implementation of a One Health Approach to Wildlife Disease Surveillance in Thailand	United States Geological Survey (USGS), National Wildlife Health Center	Graduate	1	The first objective of the survey is to understand the perceived importance and value of conducting wildlife disease surveillance as part of a One Health surveillance system in Thailand. This will allow for a better understanding of which sectors will use and benefit from a wildlife disease surveillance system and how the associated data and information system may be used in their daily work. The second objective of the survey is to understand the capabilities of current wildlife disease data collection, data management, and collaboration across health sectors to optimize zoonotic disease prevention. Participants will be surveyed about perceived impediments to successful wildlife disease surveillance as a component of One Health surveillance, their recommendations for solutions, and their motivations for making improvements. Ultimately, this process will allow for the collection of ideas for improvement in wildlife disease risk assessment, monitoring and surveillance, diagnostic tools and data management in order to identify priority needs for information, training and resources. For the second phase of the project, professionals involved in wildlife disease surveillance will be interviewed to gather more detailed information on perceived impediments and challenges to the implementation of wildlife disease surveillance as a component of One Health surveillance.	The candidate should have a basic understanding of One Health, disease surveillance, statistical methods, international experience preferred
Assessing One Health gaps and pathways in veterinary and biodefense programs in the Caucasus and/or African nations	EcoHealth Alliance	Undergraduate or Graduate	1	The student will contribute to an initiative designed to identify, develop, and help implement coordinated, multi-sectoral strategies to improve regional biodefense and biosurveillance efforts in the Caucasus. The student will engage in a review of published and unpublished reports and conduct a basic data and gap analyses as it relates to multi-sectoral infectious disease preparedness and response.	The candidate should have strong oral and written communication skills. Previous experience conducting systematic reviews and/or writing policy documents is a plus; experience working in the Caucasus or speaking one of the languages also a plus.

## EcoHealthNet 2.0 2021 Research Exchange Project Descriptions

### Projects 13-15 of 17

Project Title	Host Organization	Student Level	Openings	Project Description	Skills
Investigation of Febrile Illnesses in Rescued Wild Orangutans in West Borneo, Indonesia	Smithsonian Conservation Biology Institute (SCBI) & International Animal Rescue Indonesia (IARI)	Graduate	2	Habitat loss and fragmentation are forcing orangutans to live in isolated plots of forest with altered ecological conditions and increased human-ape interfaces. Orangutans rescued from the wild, or victims of poaching and trafficking, are often housed in Rescue and Rehabilitation Centers (RRCs) across Borneo. International Animal Rescue Indonesia (IARI) runs an RRC for orangutans in West Kalimantan province, where over 227 orangutans have been rescued to date, with over 100 currently undergoing rehabilitation for reintroduction into the wild. To ensure disease risk doesn't pose yet another threat to these orangutans, this project will investigate one of the most common health-related problems in rescued orangutans at RRCs – febrile illnesses. One such febrile illness is malaria, <i>Plasmodium spp.</i> , which has a prevalence of over 40% in orangutans at the IARI RRC. Disease investigation and the collection of baseline epidemiology data will be used to identify and characterize these pathogens causing disease in wild rescued orangutans and understanding the potential mechanisms and factors involved. The student will be asked to assist in the study of malaria vectors in the orangutans, reviewing literature, data analysis, collecting mosquitoes, and conducting PCR to identify <i>Plasmodium spp.</i> , pending COVID travel restrictions. Students based in Indonesia preferred.	The candidates should have experience with data collection, excel, and lab experience in molecular analysis, some proficiency in R, and experience in mosquito traps/ collection.
Building a Network for Emerging Infectious Disease Detection in Kenya	Smithsonian Conservation Biology Institute (SCBI)	Graduate	2	Africa hosts a large biodiversity of domestic and wildlife species, each in turn with a diverse association of codependent ectoparasites (ticks, fleas, lice) and hematophagous insects (mosquitoes, <i>Culicoides</i> biting midges, tabanids etc.) and a correspondingly complex association of pathogens (bacteria, protozoans and viruses). Despite the public health importance of zoonotic diseases in Africa, particularly zoonotic vector borne diseases, these interactions are still not well understood. This project aims to improve biosurveillance and biosecurity within Kenya by developing and testing new methods, using near real-time field forward diagnostics, with which to inform Kenyan policy experts and decision-makers, and members of the broader global health field, on the distribution, prevalence and diversity of known and novel pathogens circulating among wildlife, domestic animals, and vectors of Kenya. Selected candidates will be expected to develop independent research questions under this research umbrella focusing, e.g. on <i>Coxiella burnetti</i> or a livestock important tick-borne disease. Pending COVID travel restrictions, activities in the field (based out of the Mpala Research Centre in Laikipia, Kenya) will include site identification and characterization, safe vector collection, and testing at our on-site lab. Data analysis can be performed remotely, and can be combined with data from other projects conducted at the same sites and/or from data with partners (e.g. VectorMap data).	The candidate should have Experience in vector (mosquito and tick) field sampling, previous experience in implementation of independent laboratory work, experience in molecular biology techniques a plus, knowledge of R or other statistics program, knowledge of wildlife/livestock vector borne disease.
Pathogen metagenomics of Endangered Indian pangolins ( <i>Manis crassicaudata</i> ) in Sri Lanka	Smithsonian Conservation Biology Institute	Undergraduate or Graduate	1	Working with the Elephant Transit Home (ETH) in Sri Lanka, this project seeks to investigate health issues in Indian pangolins that are treated/rehabilitated at the ETH, as well as potential zoonotic diseases that they may carry. Retrospective diagnostic health data from pangolins received at the ETH, as well as other wildlife facilities across the country, will be collected. Additionally, banked biological samples will be identified, with associated metadata, and processed (permits) for shipping to our US lab for metagenomic next-generation sequencing. Both antemortem and postmortem samples will be collected continuously by the student over the project's duration. The student will conduct a literature review, learn about newer laboratory methodologies available for pathogen detection (both known and novel), assist in data analysis and manuscript development, and will be encouraged to submit findings for a conference presentation. Pending COVID travel restrictions, training in mNGS, amongst other methodologies, will be made available to the student at our partner laboratory at the Walter Reed Biosystematics Unit in the U.S.	The candidate should have Basic knowledge of animal health, epidemiology, laboratory diagnostics, biosafety and biosecurity; Experience in safe animal and sample handling

EcoHealthNet 2.0 2021 Research Exchange Project Descriptions  
Projects 16-17 of 16

Project Title	Host Organization	Student Level	Openings	Project Description	Skills
Disease risk modeling in the endangered mountain gorilla: A conservation management tool to assess mitigation strategies against infectious diseases	Smithsonian Conservation Biology Institute	Graduate	3	<p>Emerging infectious diseases have the potential to extirpate small isolated populations of endangered great apes. This has been evident in small outbreaks, such as measles and metapneumovirus in mountain gorillas, to larger devastating outbreaks such as Ebola in western lowland gorillas. As the interface between humans and wildlife increases, the threat of anthroponoses to great ape populations is also increasing. The COVID-19 pandemic has further highlighted the danger that infectious disease transmission between humans and wildlife poses to conservation, economic welfare, and public health. There is an urgent need to arm wildlife managers with the tools to assess risk and impact of disease on susceptible populations in order to develop robust preventive and response strategies in protecting the health of endangered great apes. Modeling great ape population dynamics in response to infectious disease can help increase understanding of disease transmission, make quantitative predictions for the future course of an outbreak, and inform management interventions such as the effect of various vaccination scenarios.</p> <p>To pilot wildlife disease modeling, as an integral part of park and species management, we will develop a training course focused towards wildlife professionals in Rwanda, Uganda, and the Democratic Republic of Congo to aid in the protection of mountain gorilla populations against a variety of infectious diseases, including SARS-CoV-2, Ebola, tuberculosis, and others. Students will assist in the development of disease training models, working with the Species Conservation Toolkit Initiative and their <i>Outbreak</i> model. Being assigned to a pathogen, each student will identify the disease parameters needed to accurately employ the model based on a set number of research questions and mitigation strategies. Activities will include a literature review on previous models of the pathogen, ecological and social traits associated with transmission, and both pro-active and reactive control methods. Students will also assist with virtual or locally based training workshops, dependent on COVID restrictions. At project end, students will compile results for a potential publication and/or presentation.</p>	The candidate should have basic knowledge of infectious diseases / epidemiology and demographic modeling frameworks
Identification of zoonotic disease hotspots in Southern Africa using risk map assessments	University of Pretoria, Centre for Viral Zoonoses and EcoHealth Alliance	Graduate	3	<p>There are a number of environmental, biological and demographical factors that contribute towards the emergence of pathogens from wildlife/livestock (Gebreyes et al. 2014). However, the extent and intricate interactions of these factors leading to the emergence of zoonotic pathogens remains unclear. Through data modelling, several studies have attempted to identify key factors and interactions that play a role in disease emergence at a global scale (Jones et al. 2008, Allen et al. 2017). Although this provides useful information for global consideration, more regional data analyses are necessary. A detailed investigation into the factors specific to Southern Africa is required to be able to generate risk maps with a higher resolution and identify in country hot spots. We are seeking students to construct a Southern African risk-map including South Africa, Zimbabwe and Mozambique using publicly available data of factors (e.g. population density, biodiversity and climate) to serve as predictors in a mathematical model to determine, identify and overlay mechanisms underlying zoonotic disease emergence (Allen et al. 2017). Publicly available databases will be searched for information pertaining to the various factors under consideration. Including climate and rainfall data, population densities of humans and animals and mammal and vegetation diversity. Information of emerging infectious diseases will be obtained through online searches of the literature on platforms such as PubMed and Google Scholar.</p>	The candidate should have a virology and ecology background with specific experience in zoonotic diseases, excellent computer skills including Excel experience, and experience with public database searches and compiling databases.