

**Project Name:** Bird flyways and CCHF emergence: spreading the world with infested ticks ?

**Project Location:** Remote (data set building)

**Mentor Name:** Anne Laudisoit, Melinda Rostal, Billy Karesh

**Mentor Email:** [laudisoit@ecohealthalliance.org](mailto:laudisoit@ecohealthalliance.org)

**Project Description:**

Intern will produce a robust database on eastern bird flyways and ticks in relation to CCHF cases occurrence and seasonality in humans and livestock to contribute to the development of CCHF grants and on-going projects at EcoHealth Alliance.

Crimean-Congo haemorrhagic fever virus (CCHFV) causes severe disease with fatality rate of 30%. The virus is transmitted to humans through the bite of an infected tick, direct contact with the products of infected livestock as well as nosocomially. There is currently no vaccine and treatment is symptomatic. The disease occurs sporadically throughout many of African, Asian and European countries. Different species of ticks serve either as vector or reservoir for CCHFV.

This project is a contribution to CCHF research conducted by various EHA scientists and aims at building a historical dataset of birds and their tick seasonal assemblage along their eastern flyways from Africa to Asia in relation with CCHF human cases seasonal occurrence. If interesting and relevant literature is not on line, students will have the opportunity to contact the authors and ask for reprints or pdf copies of their paper. Intern will also learn to use citation software to append the databases.

Introduction to CCHF: <https://openwho.org/courses/crimean-congo-haemorrhagic-fever-introduction>

**Skills Needed:** Database management, Data cleaning, Advanced bibliography search, Basic GIS skills (ultimately the dataset can be used to produce maps)

**Student Level:** Undergraduate or Graduate

**Available Spots:** 1

**Local conservation.**

**Global health.**

460 West 34<sup>th</sup> Street, 17<sup>th</sup> Floor    [EcoHealthAlliance.org](http://EcoHealthAlliance.org)

New York, NY 10001-2320

**Project Name:** Economic assessment of vaccination policies for Rift Valley fever (RVF) in South Africa using an integrated assessment modelling approach

**Project Location:** EcoHealth Alliance, New York, NY

**Mentor Name:** Carlos Zambrana-Torrel

**Mentor Email:** zambrana@ecohealthalliance.org

**Project Description:** EcoHealth Alliance (EHA) requests an EcoHealth Net researcher to participate in work conducting economic assessment and modelling of vaccination policies to reduce Rift Valley fever incidence in livestock production in South Africa . The researcher will participate in a project to model the economic and health impacts of RVF to maximize livestock production and social welfare. The researcher will work with EHA scientists to integrate data from a multi-disciplinary, international collaboration to produce an integrated assessment model (IAM), predictions of rift valley fever incidence, and its links to agricultural productivity. The researcher will also participate in modeling scenarios of different forecasts of livestock production to determine the most economically optimal long-term path for disease risk reduction and increase in social welfare. This work will be conducted through modeling simulation, data analyses, and literature reviews. The researcher will be mentored in advanced skills on spatial and economic modeling and data science. The researcher will be embedded in a multidisciplinary research environment, and be expected to participate in meetings and research discussions.

**Skills Needed:** The candidate should have strong data interpretation and writing skills, have completed graduate-level coursework in economic modeling, optimal control theory, statistics, and have experience using the R programming software. The candidate should also have interest and knowledge of environmental and natural resources economics, and infectious diseases.

**Student Level:** Graduate, PhD level

**Available Spots:** 1

**Project Name:** Economic assessment of land policies using an integrated assessment modelling (IAM) approach

**Project Location:** EcoHealth Alliance, New York, NY

**Mentor Name:** Carlos Zambrana-Torrel

**Mentor Email:** zambrana@ecohealthalliance.org

**Project Description:** EcoHealth Alliance (EHA) requests an EcoHealth Net researcher to participate in work conducting economic assessment and modelling of policies for the agriculture and forestry sectors. The researcher will participate in a project to model the economic and health impacts of diseases related with land use change to maximize social welfare. The researcher will work with EHA scientists to integrate data from a multi-disciplinary, international collaboration to produce an integrated assessment model (IAM), predictions of land conversion into different agricultural productions and their links to infectious diseases. The researcher will also participate in modeling scenarios of different forecasts of agricultural production to determine the most economically optimal long-term path for disease risk reduction and increase in social welfare. This work will be conducted through modeling simulation, data analyses, and literature reviews. The researcher will be mentored in advanced skills on spatial and economic modeling and data science. The researcher will be embedded in a multidisciplinary research environment, and be expected to participate in meetings and research discussions.

**Skills Needed:** The candidate should have strong data interpretation and writing skills, have completed graduate-level coursework in economic modeling, optimal control theory, statistics, and have experience using the R programming software. The candidate should also have interest and knowledge of environmental and natural resources economics, and infectious diseases.

**Student Level:** Graduate, PhD level

**Available Spots:** 1

**Project Name:** Forecasting Global Veterinary Disease

**Project Location:** EcoHealth Alliance, New York, NY

**Mentor Email:** ross@ecohealthalliance.org

Project Description: EcoHealth Alliance (EHA) requests an EcoHealth Net researcher to 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.

**Skills Needed:** 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.

**Student Level:** Graduate or Undergraduate

**Available Spots:** 2

**Dates:** March-August 2016

**Project Name:** Emerging disease surveillance at the Human/Wildlife interface in Kenya

**Project Location:** Mpala Research Centre, Laikipia Kenya, George Mason University, & Smithsonian Global Health Program

**Mentor Name:** Michael von Fricken

**Mentor Email:** [mvonfric@gmu.edu](mailto:mvonfric@gmu.edu)

**Project Description:** George Mason University, the Smithsonian Global Health Program, and the Mpala Research Centre have an ongoing collaboration to investigate emerging vector-borne diseases within the Laikipia region of Kenya. We request support for two graduate students to travel and work in Laikipia for 8-12 weeks, one student to focus on mosquito surveillance the other to focus on ticks. Over 17% of emerging infectious diseases are vector-borne, thus it is critical that we have trained research staff, who understand both proper field and epidemiological methods to conduct surveillance for emerging pandemic vector threats. Researchers will engage in trapping and dragging for mosquitoes and ticks within ecologically protected grasslands, learn how to identify important vectors of disease based on morphological characteristics, and take part in ongoing surveillance efforts being carried out in Kenya, with samples serving as a biorepository for further disease surveillance in East Africa. They will work with Mason, SI, EHA, and Mpala scientists to integrate data using a One Health approach. This research site in particular is home to multiple research projects and is accustomed to having student researchers. Data from this study will be used to model the influence of ecological, environmental, and climate factors with risk of VBD exposure based on conditions at collection sites. The researcher will be mentored in advanced skills in epidemiology and medical entomology, all embedded within an international research experience.

**Skills:** 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 Statistical programs (STATA, R, SAS) The candidate should have a strong interest and some knowledge of vector-borne diseases.

**Student Level :** Undergraduate & Graduate level accepted

**Available Spots :** 2

**Project Name:** Developing strategies to mitigate zoonotic risks in rural Southern China

**Project Location:** EcoHealth Alliance HQ

**Mentor Name:** Hongying Li

**Mentor Email:** [li@ecohealthalliance.org](mailto:li@ecohealthalliance.org)

**Project Description:** Frequent human-animal interactions and low levels of environment biosecurity are presenting risks of zoonotic disease emergence in the rural communities of Southern China. The successful applicant will work closely with Hongying Li to 1) review preliminary data and literacy to identify existing policies in selected communities for zoonotic risk mitigation; 2) develop a research protocol to evaluate the identified policies; and 3) initiate the data collection and analysis to develop effective zoonotic risk mitigation strategies.

**Skills Needed:** knowledge and experience in community development, public health, policy evaluation, and qualitative research method

**Student Level:** graduate

**Available Spots:** 1

**Project Title:** Merging Economics, Ecology, and Public Health to Conserve Forested Lands in Liberia

**Host Organization:** EcoHealth Alliance

**Project Location:** EcoHealth Alliance, New York, NY

**Mentor Name:** Carlos Zambrana-Torrel

**Location:** New York, New York

**Graduate Level:** Masters and PhD students

**Project Description:**

EcoHealth Alliance (EHA) requests an EcoHealth Net researcher to conduct economic-ecological modeling as part of the Forest Health Futures, Liberia project. The researcher will work with EHA scientists to integrate data from a multi-disciplinary, international collaboration to produce models and predictions of emerging infectious diseases and its link to land use change. The model will quantify how much land should be converted to a given commodity type and where this development should occur while minimizing the loss of ecosystem services, especially the disease-regulatory capacity of ecosystems. The researcher will also participate in modeling future scenarios of land use under different forecasts of commodity yield, production profits, and ecosystem services value to determine the most economically optimal long-term path for sustainable development. The researcher will participate in this work through model development, data analyses, and literature reviews and will be mentored in advanced spatial and economic modeling and data science. The researcher will be embedded in a multidisciplinary research environment and be expected to participate in meetings and research discussions.

**Skills:** The candidate should have strong data interpretation and writing skills, have completed undergraduate or graduate-level coursework in GIS, remote sensing, and environmental economics. The candidate should have experience in the R programming language. Familiarity with the Google Earth Engine platform is recommended but not required. The candidate should also have interest or experience in disease ecology, land use change and sustainable development.

**Project Name:** Infectious Diseases at the Wildlife-Livestock Interface in Chad: Assessing Risks for the World's Most Endangered Antelope

**Project Location** (institution and/or country): Smithsonian Conservation Biology Institute (Washington D.C.); Ouadi Rimé-Ouadi Achim Wildlife Reserve (Chad)

**Mentor Name** (will be in contact with selected student and must be onsite at project location): Dawn Zimmerman, DVM, MS

**Mentor Email:** ZimmermanD@si.edu; Katherine Mertes, PhD

**Project Description:** To identify infectious disease threats to the three most endangered antelope in the world - reintroduced scimitar-horned oryx (categorized as "extinct in the wild"), critically endangered dama gazelle, and critically endangered addax. We propose a cross-sectional prevalence study to investigate pathogens at the wildlife-livestock interface in the Ouadi Rimé-Ouadi Achim Wildlife Reserve (OROAWR) in Chad. Given the frequency of direct contact between wild and domestic species (camels, sheep, goats, and cattle) and the potential for cross-species pathogen transmission in this system, this study aims to gather foundational knowledge of regional infectious disease circulation with the following objectives: 1) evaluate exposure to select pathogens in livestock that range in the OROAWR; and 2) opportunistically assess serological exposure of these pathogens in reintroduced oryx. We will assess pathogen exposure through serologic testing for 15 diseases suspected to be prevalent in Chadian livestock, selected for their public health impact, conservation significance, and expected geographic distribution. Serum will be collected from 100 heads of cattle, small ruminants, and camels owned by pastoralists throughout OROAWR. Serum will also be collected opportunistically from an anticipated 50 oryx during recapture events for concurrent movement ecology studies. Samples will be tested using various serologic methods, and standard epidemiologic measures of disease frequency will be determined, including overall prevalence in each population. Participating student(s) will travel to Chad and assist with the sampling of livestock, as well as analysis and dissemination of results. Preparatory work prior, based at Smithsonian in Washington, DC, will be required.

**Skills Needed:** Field sampling required; animal/veterinary experience (blood collection, biosafety, ethics in animal handling); Ability to work in harsh field conditions/climate; Some knowledge of livestock/ruminant diseases

**Student Level:** graduate (veterinary student preferred)

**Available Spots:** 1



**Project Name:** Serological Detection of Zoonotic Influenza C and D in Non-Human Primates from Laikipia North County, Kenya.

**Project Location):** Institute Of Primate Research, Nairobi, Kenya.

**Mentor Name:** Dr. Dawn Zimmerman; Dr. Joseph Kamau

**Mentor Email:** ZimmermanD@si.edu

**Project Description:** Little is known about influenza C and D viruses across species and regions. Recent studies have indicated a wide host tropism in Africa, warranting further investigation on distribution. This study seeks to serologically detect influenza C and D viruses in archived NHP samples collected in Kenya during the PREDICT-2 program. Surveillance of influenza C and D in Kenya is paramount to understanding the role NHPs may play as maintenance hosts. The study will inform potential risks posed by wildlife-livestock-human interactions. The selected student will work at the Institute of Primate Research in Nairobi, Kenya and assist the PI in testing of banked samples, data analysis, and reporting of findings.

**Skills Needed:** Experience in conducting serological assays and data analysis.

**Student Level:** Graduate level; Kenyan national preferred.

**Available Spots:** 1

**Project Name:** Vector-borne disease surveillance in Chad.

**Project Location (institution and/or country):** Smithsonian Conservation Biology Institute (Washington D.C.); Ouadi Rimé-Ouadi Achim Wildlife Reserve (Chad)

**Mentor Name** (will be in contact with selected student and must be onsite at project location): Dawn Zimmerman, DVM, MS; Katherine Mertes, PhD

**Mentor Email:** ZimmermanD@si.edu

**Project Description:** Some of the most devastating global zoonotic diseases (e.g. Ebola, Yellow fever, Zika) have their origins in Africa vertebrates, spreading to new regions and/or countries through large scale animal, human or vector movements, causing dramatic impacts on human health. We aim to document the distribution, diversity and prevalence of known and emerging zoonotic pathogens in Chad. Data collected via our proposed network approach will provide validated data for informed vector / pathogen hazard mapping of this region. This study is a collaboration with the Walter Reed Biosystematics Unit (WRBU), where the selected student(s) will learn vector identification and safe collection methodology. The student(s) will then travel to Chad to conduct vector surveillance activities targeting collections of ectoparasites and biting flies associated with humans, wildlife spp. and domestic animals. The samples will later be exported and processed at WRBU to assess, document and characterize the identity, diversity, prevalence and population structure of bacteria, parasites, viruses, vectors and hosts detected across the region, using metagenomics approaches and the latest Illumina® NovaSeq next generation sequencing technology. It may be possible for the student to observe this testing on other samples as part of the pre-travel training.

**Skills Needed:** Experience in field / with sample collection; some knowledge of vectors and vector-borne diseases

**Student Level:** Graduate level

**Available Spots:** 1

**Project Name:** Mapping Emerging Infectious Disease Risk in Laikipia County, Kenya

**Project Location:** Smithsonian Conservation Biology Institute (Washington D.C.); Nanyuki, Kenya

**Mentor Name:** Dr. Dawn Zimmerman (SCBI-USA); Dr. Maureen Kamau (SCBI-Kenya)

**Mentor Email:** Zimmermand@si.edu

**Project Description:** This project aims to develop an emerging infectious disease risk map for Laikipia County, Kenya using detailed data relevant to spillover risk from wildlife to livestock and/or wildlife to humans at the county level. The selected student will use collected and open source livestock, wildlife, and human data overlaying land use change over a 20 year period. The county-specific map will contribute towards clinical utility to health professionals in the area, data to inform future biosurveillance efforts, and quantifiable risk in light of rapid environmental and population changes in the Laikipia region. A student is sought to obtain data at this county level for any positive cases in livestock for four specified viral families (filoviruses, coronaviruses, paramyxoviruses, and orthomyxoviruses) and data related to priority notifiable and zoonotic diseases for Kenya (e.g. anthrax, rabies, RVF, brucellosis, leishmaniasis, tularemia) in Laikipia County.

**Skills Needed:** Experience in detailed and standardized data collation and use of Microsoft Excel; knowledge of EID risk factors, Kenya priority diseases, and disease diagnostics. Knowledge of R and/or other stats programs, and modelling methodology a plus. Kenyan national.

**Student Level** (undergraduate; graduate level; both): Graduate level; Kenyan national.

Available Spots (1 or 2): 1

**Project Name:** Modeling transmission dynamics of arboviruses in primate populations

**Project Location:** University of California, Davis

**Mentor Name:** Christine Kreuder Johnson

**Mentor Email:** ckjohnson@ucdavis.edu

**Project Description:** The Ecohealth Net researcher will participate in developing models describing the dynamics of arboviruses transmission in primate populations and spillover potential to humans. The researcher will work with scientists at the EpiCenter for Disease Dynamics to curate datasets, conceptualize and parameterize mathematical models and predict spread of arboviruses such as Zika virus, Chikungunya virus and Yellow Fever virus in sylvatic and urban cycles. The researcher will also contribute to the collection of data from the published literature to assess primate species traits associated with arboviral clinical pathology. The researcher will be mentored in mathematical modeling, arboviral epidemiology, and theory of infectious disease spillover. The researcher will participate in regular research activities with the EpiCenter for Disease Dynamics through lab-wide meetings and will be expected to participate in discussions and present their research progress.

**Skills Needed:** Familiarity with R programming language, knowledge of disease ecology and pathology is preferred.

**Student Level:** Graduate

**Available spots:** 1

**Project Name:** New England Wildlife Health

**Project Location:** Tufts Center for Conservation Medicine, Cummings School of Veterinary Medicine at Tufts University, Grafton, MA

**Mentor Name:** Chris Whittier, DVM, PhD

**Mentor Email:** [chris.whittier@tufts.edu](mailto:chris.whittier@tufts.edu)

**Project Description:** Tufts Center for Conservation Medicine (TCCM) has ongoing local wildlife health projects underway including assessment of lead exposure in gray squirrels, rodenticide exposure in meso-carnivores (pending funding), surveillance for snake fungal disease in northern water snakes, and a nascent wildlife camera trapping and drone mapping effort mostly focusing on ecological succession of a beaver habitat. The Research Exchange student will participate across these projects with a mix of field, laboratory and office/library work with the potential to create their own sub-project. We anticipate the student having regular interaction with if not working directly alongside MS in Conservation Medicine and/or DVM students.

**Skills Needed:** Any experience is ideal but need willingness to participate in field sampling, wildlife handling (mostly snakes and squirrels) once added to our IACUC, data input, data management, data cleaning, library/reference researching. Student will need to be willing and able to regularly provide their own transportation to monitor local field sites.

**Student Level:** preferably undergraduate

**Available Spots:** 1

**Project Name:** Disease ecology: wildlife host/virus data analysis.

**Project Location:** EcoHealth Alliance HQ, New York

**Mentor Name:** Jon Epstein & Emily Hagan

**Mentor Email:** epstein@ecohealthalliance.org & hagan@ecohealthalliance.org

**Project Description:** Student will work with existing data sets at EHA that include wildlife demographic data, telemetry data, serology and/ or viral genetic data and sociologic data describing contact between wildlife and local human populations. Student will perform statistical analyses looking at viral epidemiology and contact between wildlife and human populations to help understand risk of zoonotic transmission within various geographic locations.

**Skills Needed:** quantitative skills: Experience using R for biostatistical analyses & figure design. Experience with spatial analysis preferred, but there will be opportunity to learn.

**Student Level:** graduate, 10-12 week commitment required.

**Available Spots:** 1

**Project title:** Host susceptibility to infection with filoviruses

**Project Location:** Columbia University; Center for Infection and Immunity

**Mentor:** Dr. Simon Anthony

**Mentor email:** [sja2127@cumc.columbia.edu](mailto:sja2127@cumc.columbia.edu)

**Background:** Since the first known filovirus outbreak in humans over 50 years ago, substantial effort has been dedicated to define host reservoirs and risk factors for spillover. Despite these efforts, the reservoirs, natural distribution, and drivers of emergence are still largely unknown. Bats are considered to be the most likely hosts for all filoviruses but with >1200 species described to date it has been difficult to link specific bats with specific filoviruses (for example, with Ebola virus). Without a better understanding of the natural ecology of these viruses, including host and geographic range, we remain vulnerable to continued outbreaks.

**Project:** The objective of this project is to develop experimentally-informed ecological niche models that predict host and geographic range for all known filoviruses. The student will use molecular approaches to characterize the filovirus host-receptor (NPC1) from a wide variety of different mammals to identify species that are permissive or refractory to infection with different filoviruses. These data will then be used to refine ecological niche models to identify species that are more likely to host each filovirus, for example Ebola virus (species Zaire ebolavirus).

**Skills needed:** Experience with molecular techniques (e.g., PCR and cloning) is preferable.

**Student level:** Graduate preferred

**Link:** <https://www.mailman.columbia.edu/people/our-faculty/sja2127>