

Project number	Project Title	Summary	Eligible countries	Applicant requirements
1	Characterising the impact of community-driven tsetse and trypanosomiasis control in the human-livestock-wildlife interface of Shimba Hills, Kwale County, Kenya	Tsetse-borne animal trypanosomiasis is a major constraint for the production and productivity in many smallholder communities in Africa. While there are tools with some potential to control tsetse and prevent trypanosomiasis infections the up-take of these is sub-optimal, in part due to a lack of understanding of their exact impact. To investigate adequacy of any vector control tool or combination thereof, and optimise their use, it is critical to characterise the impact highlighting the influence on indices such as the ecology of disease vectors, prevalence of the disease, land use changes resulting from shifts in incidence of trypanosomiasis and ultimately the productivity and incomes of smallholder farmers. This study will describe these changes through longitudinal surveys and geostatistical modelling. It takes advantage of a rare opportunity in complementary projects working with agro-pastoralists in in Kwale County, Kenya to improve the integrated use of tsetse traps and relatively newer tsetse repellent technologies.	Any sub-Saharan country	<ul style="list-style-type: none"> • MSc in Applied Biostatistics with some experience GIS, or • MSc in Natural Resource Management, or • MSc Community Development with a Biological Sciences background.
2	Assessment of animal and human health risk of a novel sandfly-borne virus and other related co-circulating arboviruses	Arboviruses constitute an emerging public health threat, with some being associated with human disease ranging from mild febrile illness to encephalitis, hemorrhage and even death. Surprisingly, most of these infections are poorly diagnosed in Africa, which obscures assessment of their potential impact on veterinary and public health. Building on recent findings identifying a sandfly-borne virus of high zoonotic potential in Kenya, this study will investigate the degree and geographic extent of exposure risk of sandfly-borne and other related and co-circulating arboviruses in serum samples from peri-domestic rodent, small livestock (goat, sheep, cattle) and humans along a gradient of rural, urban and livestock/human/wildlife interface in three ecologies of Kenya. Indirect, sandwich and competitive ELISAs will be used to screen for antibodies to diverse arboviruses in the collected samples and those bio-banked at <i>icipe</i> . Confirmation of positive sera will be tested by indirect immunofluorescence assay (IFA) and neutralisation assays (PRNT). Metagenomic probing of virus in clinical samples will be explored. A comprehensive understanding of circulation of key arboviral diseases in selected sites in Kenya including infection-related exposure in livestock and humans is important for risk assessment and potential for control are envisaged.	Kenya only	<ul style="list-style-type: none"> • MSc degree with Distinction in Biological Sciences or a related subject. • A strong background in medical entomology/virology and exposure in bioinformatics is desirable. • The applicant must be able to communicate (written and oral) fluently in English

Project number	Project Title	Summary	Eligible countries	Applicant requirements
3	Evaluating the ecology of relevant arboviruses in blood-feeding arthropods in selected ecologies of Kenya	Arboviruses constitute an emerging public health threat, some of which are associated with human disease ranging from mild febrile illness to encephalitis and even death. Surprisingly, most of these infections are poorly diagnosed in Africa, which obscures assessment of their potential impact on public health or burden of associated disease. Building on recent findings identifying a sandfly-borne virus of high zoonotic potential, this study will monitor arbovirus activity in unfed and blood-fed disease vectors (sandflies, ticks, mosquitoes, biting midges) sampled along a gradient of rural, urban and livestock/human/wildlife interface in three ecologies of Kenya. Blood feeding patterns of such engorged sample will be assessed to identify transmission pattern. Applied techniques will include viral cell culture, PCR based molecular analysis tools employing existing primers that target conserved regions of arbovirus genes and sequencing and metagenomic approach. Overall, the study will bolster our continued efforts to monitor circulation of arboviruses as part of risk assessment and foster the development of appropriate technologies for their diagnosis and control.	Kenya only	<ul style="list-style-type: none"> • MSc degree with distinction in Biological Sciences or related subject. • A strong background in medical entomology/virology and molecular biology with exposure in bioinformatics desirable. • The applicant must be able to communicate (written and oral) fluently in English.
4	House screening as an additional vector control intervention towards malaria elimination in Southern Africa	Integrated vector management (IVM) as promoted by the World Health Organization is seen as an essential strategy towards sustainable malaria vector control and malaria elimination. In the light of rapidly emerging insecticide resistance, non-insecticidal vector control methods need to be urgently included in the vector control tool box. Mosquito proof housing is a promising tool for IVM but also for long-term sustainability of control and elimination, given that once done the intervention does not need to be reapplied frequently. The proposed PhD project will be conducted in Zambia or Mozambique, both countries aiming for malaria elimination within southern Africa. The current vector control standard is distribution of long-lasting insecticidal nets (LLINs) complemented in few areas with indoor residual spraying (IRS) with mosquito adulticides. However, scaling up IRS to larger areas is not feasible, and for malaria elimination additional methods with modes of action that differ completely from insecticides used for indoor control are required. Here we propose to implement a demonstration project that investigates the potential added benefit of integrating currently readily available but not-widely used house-screening in malaria control programs. The project is expected to provide the evidence base to introduce and use diversified, proven and sustainable vector control interventions. The project aims to design simple, easy to apply screening strategies and investigate the impact of house-screening combined with LLINs on mosquito adult densities	Zambia or Mozambique	<ul style="list-style-type: none"> • MSc in Medical Entomology, Epidemiology, Public Health or related area relevant for this study. • Working experience in operational malaria vector control in Southern Africa.

Project number	Project Title	Summary	Eligible countries	Applicant requirements
		indoors and malaria incidence in the target areas in comparison to areas where only LLINs are used.		
5	Evaluating the added benefit of winter larviciding in addition to indoor residual spraying for malaria vector control in Southern Africa	The World Health Organization (WHO) have in recent years increasingly promoted integrated vector management (IVM) as the way forward towards sustainable malaria vector control and malaria elimination. The strategy emphasises the use of combinations of interventions with proven efficacy as opposed to relying on only a single intervention. The proposed PhD project will be conducted in Swaziland or Namibia, both countries considered amongst the frontline countries well positioned to begin the reorientation towards elimination within southern Africa. The current vector control standard is indoor residual spraying (IRS) with mosquito adulticides, however for malaria elimination additional methods with modes of action that differ completely from insecticides used for indoor control are required. Here we propose to implement a demonstration project that investigates the potential added benefit of integrating currently readily available but not-widely used larviciding in malaria control programs that strive for malaria elimination. The project is expected to provide the evidence base to introduce and use diversified, proven and sustainable vector control interventions. The project aims to investigate the impact of winter larviciding combined with IRS on mosquito larval and adult densities and malaria prevalence in the target areas in comparison to areas where only IRS is applied.	Swaziland or Namibia	<ul style="list-style-type: none"> • MSc in Medical Entomology or related public health area relevant for this study. • Working experience in operational malaria vector control in Southern Africa.
6	The role of Anopheles symbiotic microsporidia as malaria transmission blockers	The team of Dr Jeremy Herren recently discovered a naturally occurring inherited Microsporidian symbiont in the main mosquito vector of malaria in Africa, <i>Anopheles gambiae</i> , that has a strong malaria transmission-blocking phenotype. This very exciting finding should provide a straightforward path to developing a highly novel control strategy with transformative potential. In this project, the student will manipulate mosquito laboratory rearing conditions at <i>icipe</i> (such as larval density, nutrition, and temperature) to determine which combinations of parameters produce mosquitoes with the highest density of symbiont infection. The dynamics of Microsporidia spreading through uninfected screen house populations following the release of infected mosquitoes will then be investigated, in order to determine the optimal dissemination strategy. In addition, the student will interrogate the malaria transmission blocking capacity of mosquito screen house populations into which the Microsporidia infection has spread.	Any sub-Saharan country	<ul style="list-style-type: none"> • MSc in molecular biology or other related field, with distinction. • A demonstrated capacity to conduct independent scientific research in one or more of the following fields: molecular biology, bioinformatics, entomology and microbiology. • Well-developed communication (written and verbal) and IT skills.

Project number	Project Title	Summary	Eligible countries	Applicant requirements
7	Diversity of plants, pollinators, and their networks in natural and agricultural habitats of the Eastern Afromontane biodiversity hotspot in Kenya	Pollination is an extremely important ecosystem service promoting reproduction of wild and crop plants - thus ensuring food security. This project aims to determine the degree of specialisation in plant-pollinator interactions in a landscape context, taking into consideration the diversity of both plants and their pollinators. This will be achieved by establishing the plant-pollinator interaction networks as well as their diversity at species and molecular level across different natural and agricultural habitats at two locations of the Eastern Afromontane biodiversity hotspots in Kenya, Taita Hills and the Aberdare Range. Plant-pollinator interaction networks will be established and major factors influencing the resilience of these networks analysed. Special emphasis will be put on the diversity of plants and their pollinators, both at species and at molecular level. The data and results will inform on the vulnerability of the ecosystem of pollination and enable focusing conservation efforts effectively.	Any sub-Saharan country	<ul style="list-style-type: none"> • MSc in a relevant subject • Basic skills in field work and with data collection, storage and management, • Basic skills in insect and/or plant species identification (taxonomy), • Basic skills in laboratory work (good laboratory practice), and • Basic skills and knowledge in computers and software (e.g. office applications, statistics software).
8	Predicting the spatio-temporal distribution of common plant-pollinator interactions in two contrasted and changing agricultural landscapes of the Eastern Afromontane biodiversity hotspots in Kenya: the Aberdare range and the Taita Hills	Pollination is an extremely important ecosystem service that largely contributes to human food security and livelihood. This project aims to characterise the impact of environmental factors on pollinators in order to predict pollinator distribution as impacted by agricultural activities, and identify geographical areas with risks, where recommendations for pollinator conservation may be formulated. To achieve this objective, the spatio-temporal distribution of the most common pollinator-plant interactions will be described over diversified natural and agricultural landscapes of two of the Eastern Afromontane biodiversity hotspots in Kenya, the Taita Hills and the Aberdare range. Predicting models will be developed by incorporating data of pollinator-plant interaction occurrence and data of various environmental factors such as climate, topography, land use and land cover. Probability maps will be generated from these models for the two target regions, where areas with risk for reduced pollination service will be identified.	Any sub-Saharan country	<ul style="list-style-type: none"> • MSc in a relevant subject • Basic skills in field work and should be able to quickly communicate with stakeholders of the targeted areas (at least, English language is needed). • A first experience in insect/plant collection and some basic skills in plant and insect taxonomy would benefit the project. • Computer skills are critical and the student should be experienced in remote sensing, GIS tools and modelling.
9	Standardisation of post-harvest disinfestation treatment of export vegetables against quarantine pests	The risk of infestation by quarantine pests such as false codling moth (FCM) and Western flower thrips (WFT) in vegetables, results in rejection and decreased access to quarantine sensitive export markets affecting livelihoods of growers involved in their production. Post-harvest disinfestations such as cold/warm-water treatment can aid in eliminating these quarantine risks. The proposed project will focus on establishing post-harvest disinfestation treatment parameters for capsicum and French bean targeting FCM and WFT.	Any sub-Saharan country	<ul style="list-style-type: none"> • MSc in Agricultural Entomology • BSc in Agriculture/Biological Sciences

Project number	Project Title	Summary	Eligible countries	Applicant requirements
		The impacts of such treatments on the physico-chemical properties, nutritional profiles, shelf-life, pesticide residue and other food safety parameters will also be assessed. Assessment of current post-harvest treatment techniques, marketing channels and stakeholder analysis will be undertaken to identify opportunities for viable implementation of the improved post-harvest disinfestation treatments for capsicum and French beans.		
10	Development of endophytic and foliar biopesticides for the management of fall armyworm in East Africa	Fall armyworm is an invasive pest to Kenya where it was first reported in early 2017 on maize crops. It is native to North and South America and can cause 100% loss in wide range of cereals and vegetables. It threatens food security, incomes and livelihoods in Kenya. Synthetic pesticides have been adopted as emergency response with cost and negative environmental impacts. As an alternative to pesticides, this project aims to develop entomopathogenic and endophytic fungal-based biopesticides that have been found effective against pests, especially lepidopteran defoliators such as fall armyworm (FAW). Different formulations of these biopesticides will be researched to target FAW eggs, larvae, pupae and adults both through endophytic colonisation of maize and innovative foliar applications. The compatibility of these fungal-based biopesticides with various FAW-Integrated Pest Management options will be assessed to formulate a sustainable management strategy for the pest in East Africa.	Any sub-Saharan country	<ul style="list-style-type: none"> • MSc in crop protection/entomology with specialisation in insect pathology or MSc in Applied Microbiology with specialisation in insect pathology. • Knowledge in chemical ecology would be an asset.
11	Development of effective biopesticides for management of pesticide resistant strains of whiteflies infesting vegetables in East Africa	Whiteflies such as <i>Bemisia tabaci</i> (Gennadius) and <i>Trialeurodes vaporariorum</i> (Westwood) are key constraints to the productivity of vegetables such as tomato and French bean in Africa. Management of these pests are largely by use of pesticides, but with little benefit as whiteflies are highly resistant to various classes of pesticides. Cryptic feeding behavior of the pest and presence of cuticular waxes hinders access by contact pesticides resulting in high dependence on systemic insecticides with negative environmental effects. Entomopathogenic and endophytic fungal biopesticides targeting the adult and nymphal stages of whiteflies can be effective alternatives to pesticides in the management of whiteflies. Efficacy of these biopesticides could be enhanced through development of potent formulation and innovative application strategies. This project will focus on identifying effective entomopathogenic and endophytic biopesticides, development of effective formulations and innovative application strategies for effective management of whiteflies infesting vegetables in the East Africa.	Any sub-Saharan country, except Kenya	<ul style="list-style-type: none"> • MSc in crop protection/entomology with specialisation in insect pathology or MSc in Applied Microbiology with specialisation in insect pathology.

Project number	Project Title	Summary	Eligible countries	Applicant requirements
12	Optimisation of integrated pest and pollinators management (IPPM) strategies in avocado-cucurbit production systems in East Africa	Declining populations of pollinators are threatening biodiversity in agroecosystems and ultimately agricultural production. Current pest management practices based on pesticides are further aggravating this decline. Hence judicious integration of pollination management practices and Integrated Pest Management strategies can contribute to significant enhancement of crop productivity. However, this integration involves detailed understanding the various factors that govern the interactions between pollination services and Integrated pest management practices. This PhD study will focus on understanding the pollination services and IPM in Avocado and Cucurbit production systems in East Africa and demonstrate the benefits of the such an integrated approach on productivity of these crops.	Any sub-Saharan country, except Kenya	<ul style="list-style-type: none"> • MSc in Agricultural Entomology • BSc degree in Agriculture/Biological Sciences • Prior experience with pollinators/IPM in the MSc will be an advantage