

One-year PHEFA fellow CDC billets

Division of Parasitic Diseases and Malaria /Entomology Branch

PMI Team Billet

Team Mentors: Cristina Rafferty/Sarah Zohdy

The PMI Team at Entomology Branch in DPDM is based in Atlanta, GA and supports vector monitoring and control efforts for the [US President's Malaria Initiative \(PMI\)](#). Fellows will participate in laboratory projects involving molecular entomology of malaria vectors including development and production of molecular tools used to support PMI partner countries in sub-Saharan Africa and the Mekong region. Work will include training in molecular techniques including DNA extraction, PCR, and sequencing, as well as *Anopheles* mosquito rearing, taxonomy, and preservation. Fellows will have the opportunity to see data-driven vector control decision making, vector surveillance planning (ie ESPT tool) and learn the way malaria and vector borne disease programs use science for control.

Vector Genetics Team Billet

EB Mentor: Ellen Dotson

The Vector Genetics Team in the Entomology Branch of the Division of Parasitic Disease and Malaria conducts laboratory studies related to genetics of insect vectors of human diseases and genetic based control methods. These studies include populations genetics/genomics of malaria vectors from the field and safety studies related to mosquitoes genetically modified as a potential means for reducing mosquito populations. Members of my team are improving methods for detecting malaria parasites in mosquitoes including developing a lateral flow assay for detecting sporozoites and participated in detecting malaria parasites in mosquitoes from the recent malaria outbreak in Florida. Other projects are related to maintaining of mosquitoes in the laboratory including improving rearing methods and developing a means of artificially inseminating mosquitoes as a part a study related to the cryopreservation of sperm as a means of preserving genetically modified strains. Fellows will learn how to rear mosquitoes, about genetic base control methods and are welcome to interact with other teams within our branch.

Insecticide Resistance Vector Control Team Billet

Team Mentors: Lisa Reimer/Lucy Impoinvil

The Insecticide Resistance and Vector Control Team in the Entomology Branch is conducting research to improve the detection of resistance in mosquito vectors of disease and to increase the efficacy of malaria and arbovirus control. We apply advanced molecular methods, including next-generation sequencing, to detect emergent mechanisms of resistance and we provide technical assistance to strengthen resistance management strategies in partner countries. Insecticide resistance is multi-faceted, intrinsically linked with other important biological processes, and rapidly spreading and compromising control efforts. Our team is particularly interested in understanding the evolution of resistance, how diverse mechanisms interact to influence resistant phenotypes, and links between resistance and disease transmission. The fellow will have the opportunity to develop their own research project with training provided in insectary, laboratory and data analysis methods. With support from our team, the fellow will be encouraged to apply their enthusiasm and curiosity to tackling important public health entomology challenges.

Operational Research Team

EB Mentor: John Gimnig

The Operational Research Team in the Entomology Branch conducts laboratory and field research on the biology, behavior, ecology, surveillance, and control of mosquito vectors of malaria. Fellows will participate in our laboratory investigations using large enclosures with free-flying mosquitoes to investigate the behavior of mosquitoes and how they interact with current and potential vector control tools such as insecticide treated nets or insecticide treated clothing. We are also conducting laboratory studies to understand sugar feeding of mosquitoes and how this can be exploited to target mosquitoes that transmit malaria. Lastly, Fellows will have the opportunity to work with other teams within the entomology branch to learn molecular tools for species identification which can be applied to field studies of mosquito abundance and behavior.

Division of Vector-Borne Diseases

Dengue Branch

Insecticide Resistance Surveillance

DB Mentors: Ryan Hemme and Gilberto Felix

The Entomology and Ecology Team (EET) at the Dengue Branch is seeking a PHEFA fellow with an interest in entomology and mosquito control. Members of our team (EET) are involved in laboratory and field research that covers the biology, behavior, and ecology of *Aedes aegypti*. The successful candidate for this position will be expected to collect mosquitoes and mosquito eggs in the field, rear and maintain mosquitoes in the CDC insectary and design and perform laboratory experiments. The candidate will conduct CDC bottle bioassays to assess resistance to commonly used insecticides in Puerto Rico mosquitoes, detect and quantify factors that contribute to the insecticide resistance (IR) phenotype, analyze data, and disseminate findings to CDC colleagues and partners. The fellow will learn what factors contribute to IR, how IR is maintained, and how IR can be managed within an integrated vector management program.

Oviposition ecology and attractants

DB Mentor: Luisa Otero

The Entomology and Ecology Team at Dengue Branch conducts laboratory and field research on the biology, behavior and ecology, surveillance, and control of mosquito vectors of dengue and other arboviruses. Currently, EET is searching for a candidate that is enthusiastic to learn about public health entomology. The successful candidate will split time between the field and the laboratory where the candidate will work alongside an EET-member to complete research and evaluation activities focused on *Aedes aegypti* oviposition behavior, natural attractants, development and testing of baits and the microbiology of aquatic habitats. The fellow is expected to design and complete research objectives and analyze data under the supervision of EET staff. The individual will disseminate findings to colleagues and partners in the Branch and Division.

Arboviral Diseases Branch

Entomology and Ecology team

ADB focuses on viruses spread by mosquitoes and ticks. This branch is responsible for viruses like [chikungunya](#), [West Nile](#), [yellow fever](#), and [Zika](#). This branch also serves as the World Health Organization (WHO) Collaborating Centre for Arthropod-Borne Viruses Reference and Research. ADB supports fundamental activities that promote ongoing arboviral surveillance and response efforts among federal, state, local and international agencies. The fellow will learn how virological techniques can be used in concert with entomology to understand arboviruses. In addition to primary virological techniques the fellow will learn how to handle infected mosquitoes in the laboratory and support vector competence assessments. In concert with Dr. Connelly's entomological mentoring, the fellow will obtain a well-rounded experience of the many functions of CDC's Entomology and Ecology team in the Arboviral Disease Branch.

Rickettsial Zoonoses Branch

Ecology and Entomology Team

The Rickettsial Zoonoses Branch focuses on a special category of bacteria primarily spread by ticks, lice, and fleas. This branch is responsible for bacteria like [Q fever](#), [Rocky Mountain spotted fever](#), and [typhus fevers](#). This team conducts field and laboratory studies to better understand the fundamental biology and ecology of rickettsial pathogens, their invertebrate vectors, and their vertebrate hosts. This information is essential for development of effective prevention, management, and control tools for the diseases associated with these organisms. Fellows may choose from a variety of projects to investigate these topics, meet core competencies for the PHEFA program, and network with others to gain a multidisciplinary approach to tick-borne diseases.