**BIO 5202 Analysis Tutorial Prospectus**

**Title**: Genetic Diversity and Evolutionary Dynamics of *Anopheles stephensi* Populations in Selected West African Countries

**Research Question**:

* What genomic differences can be observed in *Anopheles stephensi* populations across these selected locations.
* What insights can comparative genomic analysis provide into the evolutionary history and population dynamics of *Anopheles stephensi* in these locations?

Malaria is a global health concern, particularly prevalent in Africa. *An. stephensi* is a major vector of malaria and has been reported as an invasive vector originating from East Asia, spreading and establishing in new territories. Despite various control measures, such as the use of insecticides, recent studies have shown the development of resistance in *An. stephensi* to multiple classes of insecticide.

The focus of this tutorial is to explain the genetic diversity among *An. stephensi* populations across different territories, comparing their genomes with those from East Asia. Through this comparative analysis, we aim to understand the patterns of spread and colonization. Further, it seeks to explain and calculate evolutionary biology statistics such as Tajima's D, segregating sites, and nucleotide diversity relevant to explaining mutations within the genome which can be because of natural selection or environmental selective pressure.

By constructing a phylogenetic tree, we can visualize and explain the relationship among the selected locations, understand pattern of spread and therefore be able to develop tailored control strategies to prevent the colonization and establishment of *An. stephensi* in new territories.