Disease in mutualistic systems

Mutualism is one of the three interaction types between species in ecology. Broadly defined, mutualism refers to an association that reciprocally benefits the interacting species. Mutualism benefits the interacting populations either directly by increasing the reproduction rate or indirectly by improving the carrying capacity (symbiosis).

In this project, the candidate will investigate the effect of diseases on mutualistic systems. The candidate will conduct a stability and sensitivity analysis to
- Establish how infection and disease-induced mortality rates alter the stability of mutualistic systems,
- Investigate how interaction preference for a healthy mutualistic partner affects the abundance of the other population,
- Determine if introducing a mutualistic partner can control the disease in a population.

The models will take the form of autonomous systems of differential equations. The project will enhance the candidate's understanding of ODE, DS, numerical methods, and their applications. The candidate will also gain experience in scientific programming.