



Mathematical Biology Seminar



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3 pm – 457 CAB

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Modelling the potential role of engineered symbiotic bacteria in malaria control

The engineered symbiotic bacteria *Serratia AS1* may provide a novel, effective and sustainable biocontrol of malaria. These recombinant bacteria have been shown to be able to rapidly disseminate throughout mosquito populations and to efficiently inhibit development of malaria parasites in mosquitoes in controlled laboratory experiment. In this talk, I will present a climate-based malaria model, which involves both vertical and horizontal transmissions of the engineered *Serratia AS1* bacteria in mosquito population. We show that the global dynamics of the model system is totally determined by the vector reproduction ratio and the basic reproduction ratio. Numerically, we verify the obtained analytic result and evaluate the effects of releasing the engineered *Serratia AS1* bacteria in field by conducting a case study for Douala, Cameroon. We find that ideally, by using *Serratia AS1* alone, it takes at least 25 years to eliminate malaria from Douala, which implies that continued long term investment is needed in the fight against malaria and confirms the necessity of integrating multiple control measures.