

# Leite & Chen-Charpentier & Augusto & Hritonenko

*October 2019 NIMBioS Short Visit Report*

**Title:** Study of Plant Sustainability under Virus Co-infection and Harvesting in Fragmented Landscape using Data Integration within a Mathematical Framework

## Dates of the visit

**Starting date:** October 18, 2019

**Ending date:** October 20, 2019

## Contact Information of the four researchers involved:

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During the STV, the team was able to complete the tasks included in our proposal. In particular, we were able to discuss, summarize findings and infer biological implications of the study that has been done since our previous visit to NIMBioS. The study presents a mathematical framework for two ecological systems integrating data sets resulting from Gaoue's field work in Benin. We completed this phase successfully and outcomes will be the basis of two papers, which will be submitted for publication soon.

During our visit, we constructed a mathematical model to study sustainability of a tree species ecosystem in Benin. This ecological system is subject to harvesting and fragmentations as ecological stressors. The model will be tested on data. We also discussed realistic objective to set an optimal control problem aiming to maximize profit from harvesting and find sustainable development of the tree ecosystem under distinct fragmentation scenarios.

Our fruitful discussion on future research directions lead to the identification of five sub-projects unified by the theme: Advance understanding of the global response of ecological systems to multiple stressors and implications for poverty alleviation and food security in developing countries.