

# Ecosystem responses to escalating drivers: linking species interactions and resilience

*Fernando Cagua*

The overall objective of my proposed research is to improve our current understanding of ecosystem responses to global change drivers and their cumulative impacts. In particular, I will study the role that species interactions have in determining ecosystem resilience—the amount of disturbance a community can withstand without changing its function and structure—to biotic invasions and defaunation. These two drivers, as well as the model system I will employ, have global relevance but are particularly important for New Zealand. Specifically, I will focus on mutualistic interactions (like those between plant and pollinators or between fungus and plant roots), which are of tremendous importance for the maintenance of biodiversity, soil chemistry, and crop production. I will use a complex network approach—building upon tools from statistical physics and the social sciences—in combination with empirical data and high performance computer simulations to predict, prevent and manage undesirable ecosystem transformations.