

ESAM SEMINAR SPEAKER



Dynamics of the Plant Pathogen *Xylella fastidiosa* : Models, Data and Sensitivity Analysis

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Xylella fastidiosa (*Xf*) is causes Pierce's disease (PD) that strikes grapevines, primarily of wine production strains. There is no known cure for *Xf* diseases. Instead, most prevention strategies focus on eliminating the insect vectors, which is somewhat effective. The bacterium forms a biofilm inside the vascular system of the plant increasing water stress and eventually killing the plant. PD affects the multi-billion dollar wine industry in California and other states. Pierces disease and other diseases caused by *Xf* are found throughout Southern US in states from California to Florida, including Texas, New Mexico, Alabama, Georgia, and North and South Carolina.

To understand the role of specific ions in *Xf* biofilm formation, with an aim to develop control methods that do not rely on antibiotics, we develop a compartmental model for growth dynamics and biofilm formation of a bacterial plant pathogen. We use the model to identify possible effects of zinc on the bacterial populations in different metabolic states. The framework reveals the underlying issues with parameter identifiability, and identifies regions in parameter space suitable for sensitivity analysis which informs us about the parameters that might be affected by addition of zinc.