UNIVERSITY of WISCONSIN
UWMILWAUKEE
Department of Mathematical Sciences

# Master's Thesis Defense

## Mrs. Jessica Harter

### MS Graduate Student

## Under the Supervision of Dr. Daniel Gervini

**Tuesday, Apr 21, 2020 at 12:00 pm**
*Online via Microsoft Team's*

**Mrs. Jessica Harter**

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## Fitting of Coupled Population Data Through Estimation of Parameters Using the Least Squares Method

The population of two types of bacteria found in the Gulf Coast of Florida, V.chagasii and V. harveyi, is best described by the Lotka-Voltera Competition model. Using data gathered in experiments conducted by Bury and Picket (2015), we obtain better parameter estimates using numerical methods in R. In particular, we find a numerical solution to the coupled set of ODEs and minimize the mean squared error in order to obtain the optimal parameter estimates that will fit the data best. In order to get a sense of accuracy of these parameter estimates, we use bootstrap estimation to compute the component wise standard deviations and construct confidence intervals for the estimates.

**Committee Members:**
Profs. Daniel Gervini (Advisor); Gabriella Pinter & David Spade

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