

Department of Mathematical Sciences welcomes

## Rana Parshad Iowa State University



April 19, 2019

Hosted by:  
Leonid Rubchinsky

Tea begins at 3:00  
in LD 259

Research Topic  
begins at 3:30  
in LD 229

### Mathematics of Biological Control via Additional Food

#### ABSTRACT:

Biological control, the use of predators and pathogens to control target pests, is a promising alternative to chemical control. It is hypothesized that the introduced predators efficacy can be boosted by providing them with an additional food source. The current literature claims that if the additional food is of sufficiently large quantity and quality then pest eradication is possible in finite time. We show that pest eradication will occur only in infinite time, and derive decay rates to the extinction state. We posit a new modeling framework to yield finite time pest extinction. We also discuss the role of predator and prey evolution. Our results have large scale implications for the effective design of biological control methods involving additional food.

#### ABOUT THE SPEAKER:

Dr. Rana Parshad is an Assistant Professor in the Department of Mathematics at Iowa State University. He did his bachelors degree in Math from NYU, and masters degree in applied math from the University of Maryland. His PhD is from Florida State University in 2009. His research interests are in the analysis and modeling of differential equation models for population dynamics. In particular, he is most interested in invasive species spread and control. His current and past work is funded by the NSF.

