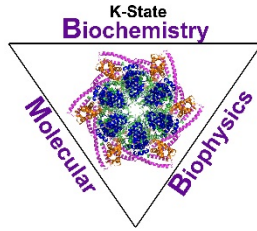


Leisure Hall, Room 13  
Thursday, March 15, 2018  
4:00 P.M.



Coffee and Cookies  
Leisure Hall, Room 13 alcove  
3:45 P.M.

Biochemistry  
&  
Molecular  
Biophysics

# Seminar

## Shifting into second gear: programming CRISPR-based gene drives in budding yeast.

Gregory C. Finnigan, PhD

Biochemistry and Molecular Biophysics  
Kansas State University



Control of biological populations is an ongoing challenge in many fields including agriculture, biodiversity, ecological preservation, pest control, and the spread of disease. In some cases, such as insects that harbor human pathogens (e.g. malaria), elimination or reduction of a small number of species would have a dramatic impact across the globe. Given the recent discovery and development of the CRISPR/Cas9 gene editing technology, a unique arrangement of this system—a nuclease based “gene drive”—allows for the Super-Mendelian spread and forced propagation of a genetic element through a population. Recent studies have demonstrated the ability of a gene drive to rapidly spread within and nearly eliminate insect populations in a laboratory setting. While there are still ongoing technical challenges to design of a more optimal gene drive to be used in wild populations, there are still serious ecological and ethical concerns surrounding the nature of this powerful biological agent. Here, we use budding yeast as a safe and fully-contained model system to explore mechanisms that might allow for programmed regulation of gene drive activity. We describe conserved features of all CRISPR-based drives and demonstrate the ability of each drive component to modulate the overall drive activity within a microbial population. We hope to continue study and development of nuclease-based gene drives for their potential application to a range of fields.