# EASME - CI next steps
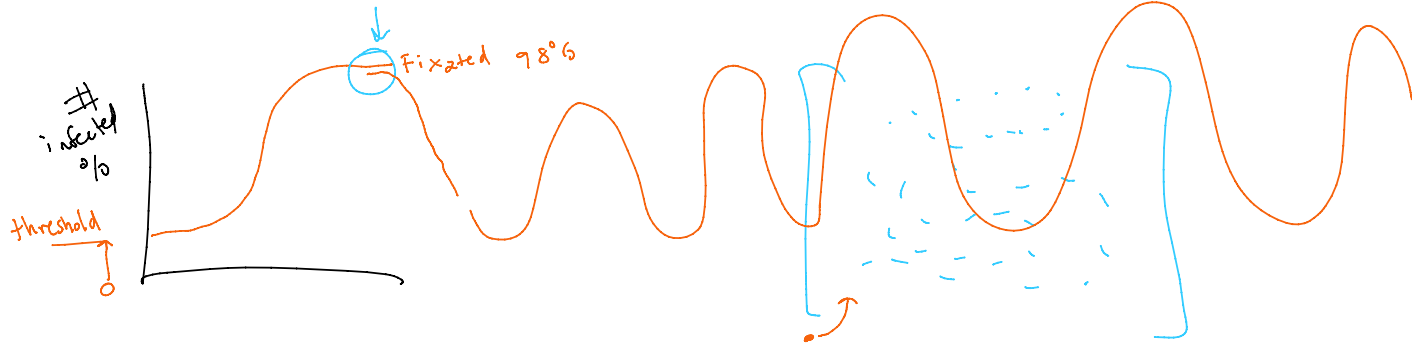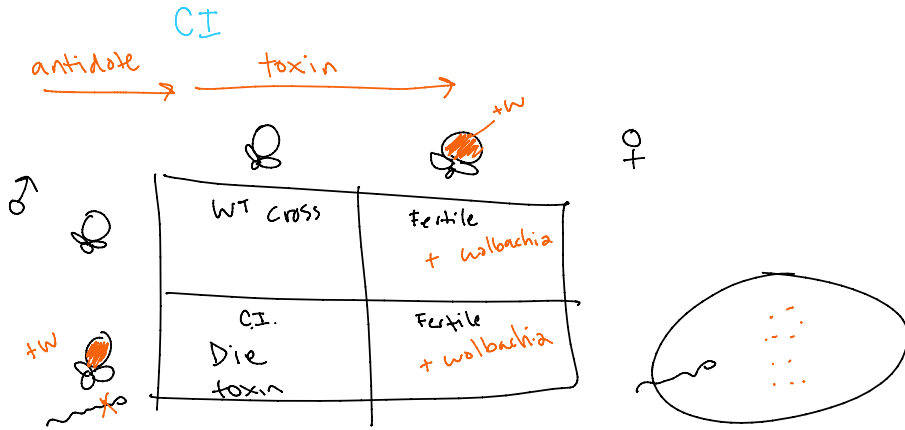
**AGENDA**
1. Discuss software needed for CI research on the NSF Career grant.
2. Discuss progress thus far on EASME Core library.
3. Discuss progress thus far on TSWV project and potential second meeting w/ collaborators.
4. Discuss fine details of thermostability fitness function/confidence scoring.
5. Set up recurring in-person meetings for Fall 2024 semester.
6. Discuss doing our LANL presentation for the professor who missed it last time, record and post on website.

How did the CI system start in the first place
What are the conditions that CAUSE CI to establish from 0 to the thresh-hold, and then the max.
What are the conditions that cause CI to spread geographically

EA model

**Population of insects**
    **Within the insect population of Wolbachia -> Each insect will need a fitness value**
        **Random mating**
        **Mate choice**
    **Within each of those wolbachia**
        **Unique operon - Toxin and Antidote**
            Kill rate,  binding rate -> rescue rate,
            Make a little genome, multiple genes, fitness value to the
            wolbachia; separate fitness functions for
            Wolbachia and genes and insects

            Epigenetics (gene level) - methylate shut off genes., promoter
            sequence mutations, value float value.

        **Mutate those toxins and antidotes**
        **Fitness benefit value of wolbachia itself (detrimental (-), neutral, (+) benefit**
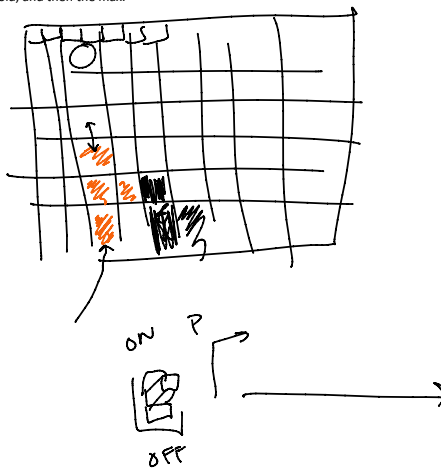    **Parameters:** infected or not infected
    CI induction rates: kill rate of 50% for example, 99% for  example
    Rescue rates: rate efficiency of rescue
    Migration rates: from box to box
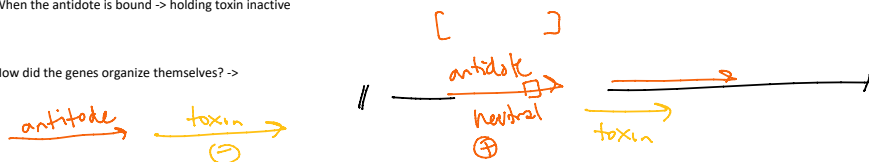
    Geography important?

Algebraic model validation, which parameters dictate the periodicity of the infection percentage

    **Allowing it to develop.**
        When the antidote is bound -> holding toxin inactive
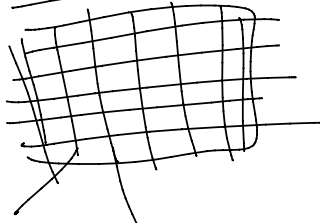
    2. How did the genes organize themselves? ->

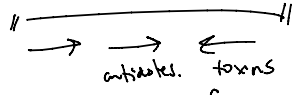2. How did the genes organize themselves? ->

antitode    toxin $\rightarrow$ $\ominus$

common
neutral $\oplus$    toxin

Populations    Ecology structure

Pop of insects

Pop of wolbachia  [#

antidotes.    toxins
$\int$ values.

%

Send paper CI algabraic paper
Send TA papers

Collaborator ->

Brandon Cooper -> Evolutionist
Get some feedback

Joe - pathogenesis ->
Get some feedback

**Simplest experiment:**
Grid population
Insect population - infected yes or no.
All wolbachia have 100% induction and 100% rescue

What is the threshold and can we replicate population fixation.

**One grid box**
Which ones go to stable state
Which ones go to periodicity