

# IPRO 302-Synthetic Biology: Engineering Novel Organisms

## Goals

### *Overall Goal*

The overall objective of this IPRO is to develop the tools to produce synthetic, designed organisms. This is a huge goal, so we have a more modest short-term goal: we wish to insert synthetic metabolic pathway into a microorganism that implements a biological oscillator. This should produce blinking bacteria - microbial fireflies.

### *Cloning*

The goal of this group is to implement the actual engineered organism.

### *Modeling*

The goal of the modeling group is to produce and implement a computational to simulate the proposed behavior of the target organisms through mathematical models.

## Obstacles

There were several obstacles. There was a limited amount of time and resources. We need to canvas existing elements here at IIT (genetic elements, computational platforms and tools) There also was a learning curve that calls for a need to develop and maintain expertise with technical aspects of each team.

## Results

- Effective progress has been made to set the groundwork for the next team.

### *Cloning*

- A detailed cloning plan developed and all elements obtained for

### *Modeling*

- The platform MATLAB has been chosen. The deterministic and stochastic models have been implemented. Also, a GUI and FFT analysis model have been developed.

## Future Plans

### *Overall*

Design innovations to develop more sophisticated systems

### *Cloning*

Assembly of parts to functional system

Testing and assessment of organisms

### *Modeling*

-Improvement of analysis tools.

-Correlation, automated parameter output values, parameter search algorithm.

-GUI: improved parameter entry, more biologically relevant

Units method to enter connections in terms of genetic elements, and map the appropriate equations.

## Personnel

### **Faculty Advisor**

Nick Menhart

### **Team Members**

James Anderson

Phuong Bui

Ahren Ceisel

Jason Fessel

Anthony Gaddini

Sheryl Lau

Khiem Nguyen

Anthony Vu

Elizabeth Young

### **Presentation**

James Anderson

Anthony Gaddini

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