



## Colloquium Series

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### Algae under attack: Mathematical modeling of temporal population dynamics between biofuel-relevant microalgae and predatory bacteria

**Diana Morales**

Cal Poly Pomona

#### **Abstract:**

Efforts to move away from fossil fuels have led to research and development of byproducts including those from algae; however, a major issue of algal biofuel cultivation is its vulnerability to biotic interactions resulting in crashing. This complication is pervasive and unpredictable, but by building mathematical models it may be possible to predict when and why algae environments crash. The mathematical model developed focused on the microalga *Phaeodactylum tricornutum* and a bacterial community containing an algicidal bacteria that kills algae.

The mathematical models in this project were developed in MATLAB and raw data was visualized using Excel. Theories applied were derived from population dynamics, predator-prey interactions, and mathematical modeling. Further iterations may, for example, augment parameters and equations to represent different bacteria and nutrients in the system, to better recapitulate community dynamics.

Through modeling the behavior between the algae and bacteria, the goal is to understand what makes an optimal environment for *P. tricornutum* to resist bacterial attack and survive in the system and will be used to better predict population dynamics and potentially inform future algal biofuel cultivation efforts.

**Wed. Sep. 22, 1:05 – 1:50 pm on Zoom**

For more info visit the [department website for the colloquium](#)