

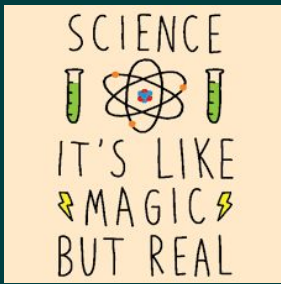
A stylized graphic of a gear with a cell-like interior, featuring several circular organelles. It is positioned behind the letter 'o' in 'kom' and the letter 'i' in 'astics'.

# komaplastics

UCSC iGEM 2020

# Who are we?

UCSC iGEM team!!!!!!



# So... Synthetic Biology

## What is it?

- Altering an organism to do something it normally does not

## Who does the work?

- Everyone!

## Why synthetic biology?

- Helping to solve current issues through science.

## JOURNEY OF THE WATERBEAR



## Past Projects

- Making a heat-stable vaccine from Tardigrades (waterbear).
- Making a synthetic milk
- Making a chewing gum that can predict your blood sugar levels
- Plastic eating bacteria

# Our project!



# komaplastics

Making a plastic out of cellulose!



01

# The Problem

Plastic waste in the  
agriculture industry

# Out of 63,000 Mt of Plastic Waste Produced Worldwide

9% of plastic was  
recycled

12% of the plastic  
was incinerated

79% of plastic was  
destined for landfills

## Our Solution

A biodegradable, cellulose-based plastic that can break down in soil without damaging it!



# What is Cellulose

- A substance that comes from plant cell walls and vegetable fibers.
- A bunch of sugar molecules connected together!
- The most abundant organic compound on Earth

# Why use cellulose as plastic for farming?

- Cellulose can break down into sugars when left in soil
- These sugars provide nutrients to the soil and the bacteria in the soil
- Nutrient-dense soil helps crops grow better!

## Outreach

- We contacted farmers and experts in film production.
- Discussed issues with current biodegradable plastics and problem solved to address them.

# **BUT cellulose has to be modified:**

Cellulose is very stiff and hard to stretch.

We want to add a plasticizer (a substance that adds stretchiness to a product). Cellulose is a brittle material, by adding a plasticizer, we can add flexibility and elasticity to a material.

# Agricultural Application

Once the lifespan of our plastic is determined, we will implement it in California fields. We hope to spread the use of our plastic worldwide.



# How to find a research project

- Think of a problem you are passionate about.
  - What solutions are there currently?
  - How could you make them better?
- Reach out to teachers, mentors, and others for their input about your idea.
- If someone else has begun the project before you, ask how to make it better!
- Students like you are doing it!

# What are some issues that can be solved with biology?

[https://jamboard.google.com/d/1dHxeCg9\\_Y87JAL0QFRM72H3-X6i9Fy1P8izCVFleqDk/viewer?f=2](https://jamboard.google.com/d/1dHxeCg9_Y87JAL0QFRM72H3-X6i9Fy1P8izCVFleqDk/viewer?f=2)