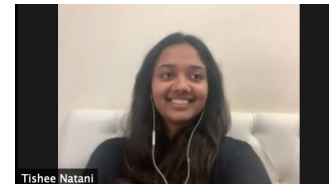
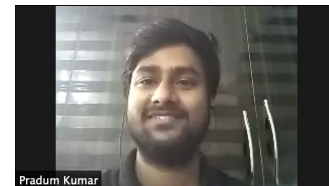
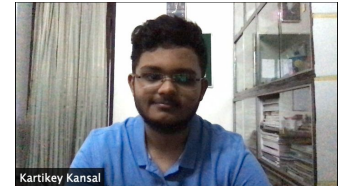
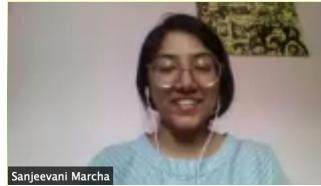


iGEM
Webinar Series
Classes 11th & 12th

Who we are?

We are a bunch of undergraduate students from IIT Roorkee conjoining from various disciplines to participate in the **world's largest Synthetic Biology competition, iGEM** (International Genetically Engineered Machine), hosted by MIT, Boston, USA.

We aim to solve one of the major problems the healthcare industry faces today using the tools of Bioengineering and Machine Learning.



What is iGEM?



- World's Largest **Synthetic Biology Competition**
- Started in **Massachusetts Institute of Technology** in 2003
- Engineering + Biology → Solve local and global problems



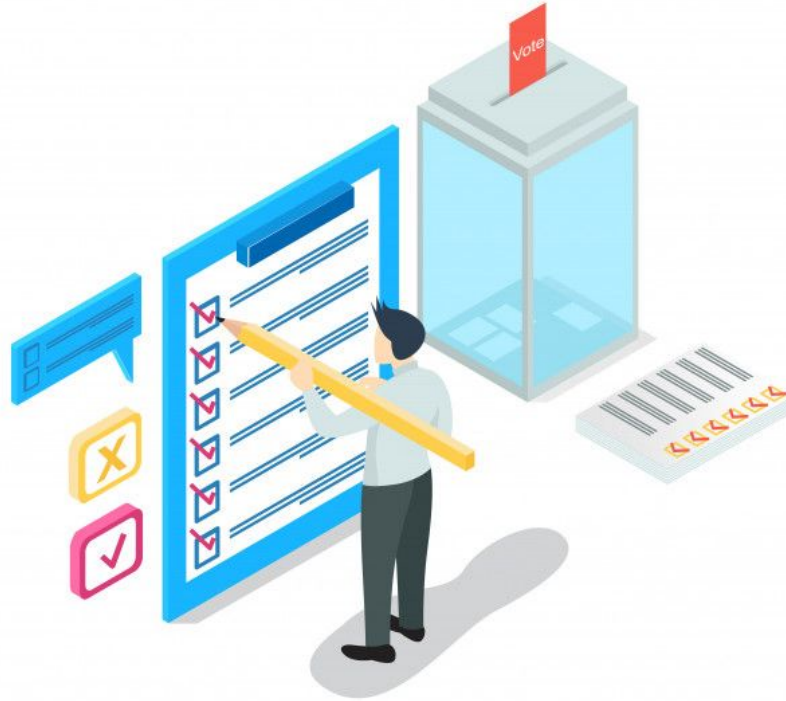
47+
Countries

350+
Teams

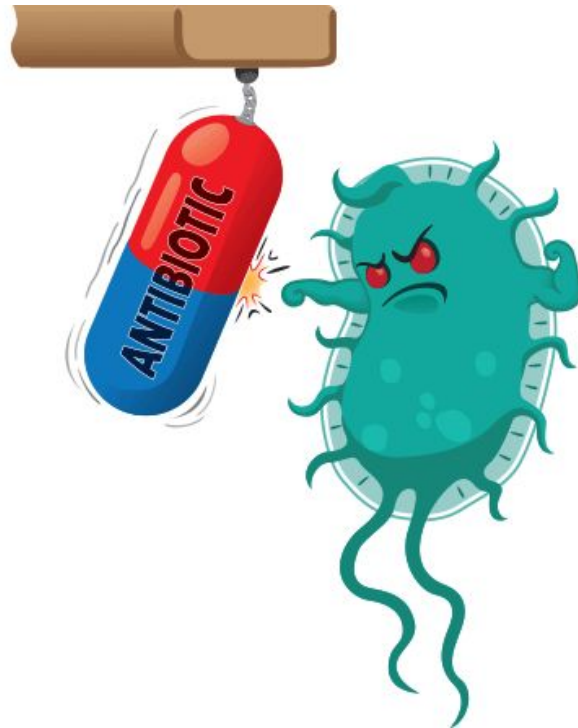
4000+
Participants



Pre - Webinar Survey

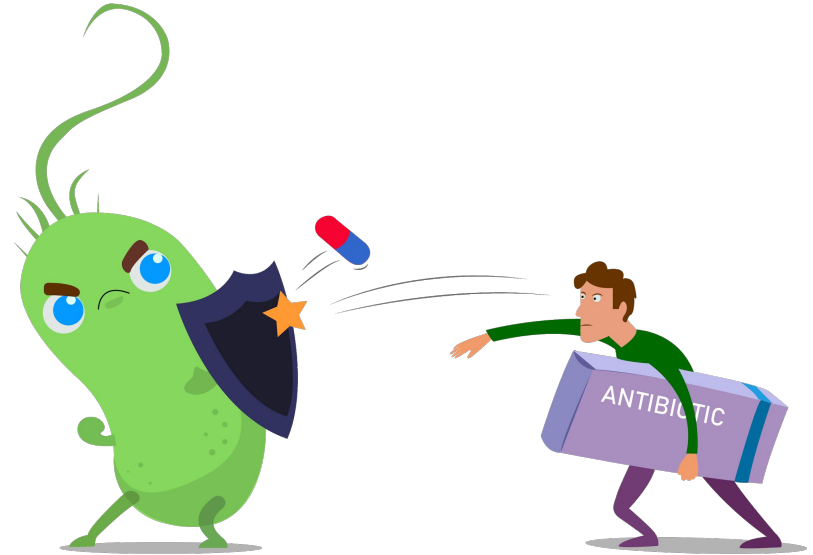


Antibiotic Resistance



What is Antibiotic Resistance

- The bacteria grow strong in nature and can no longer be killed by the antibiotics.
- Such antibiotic-resistant bacteria are called **SUPERBUGS**.



Antibiotics STOP working on Bacterial Infections

What will happen when Antibiotics don't work?

Common infections
can't be treated and
can be fatal



No surgeries can
take place



Cancer
Chemotherapy can't
take place



Preterm births
cannot happen



Post - Antibiotic Era

A single cut by metal could be
fatal.



I got hit
by a metal
wire

What can we do?

Use Antibiotics Responsibly!

4 R's of correct antibiotic usage.

DO's

- ✓ Right Drug
- ✓ Right Time
- ✓ Right Duration
- ✓ Right Dose



DON'Ts

- ✗ Don't take antibiotics without a prescription
- ✗ Don't share your antibiotics
- ✗ Don't leave your antibiotic course incomplete
- ✗ Don't take antibiotics for cold and flu

Synthetic Biology

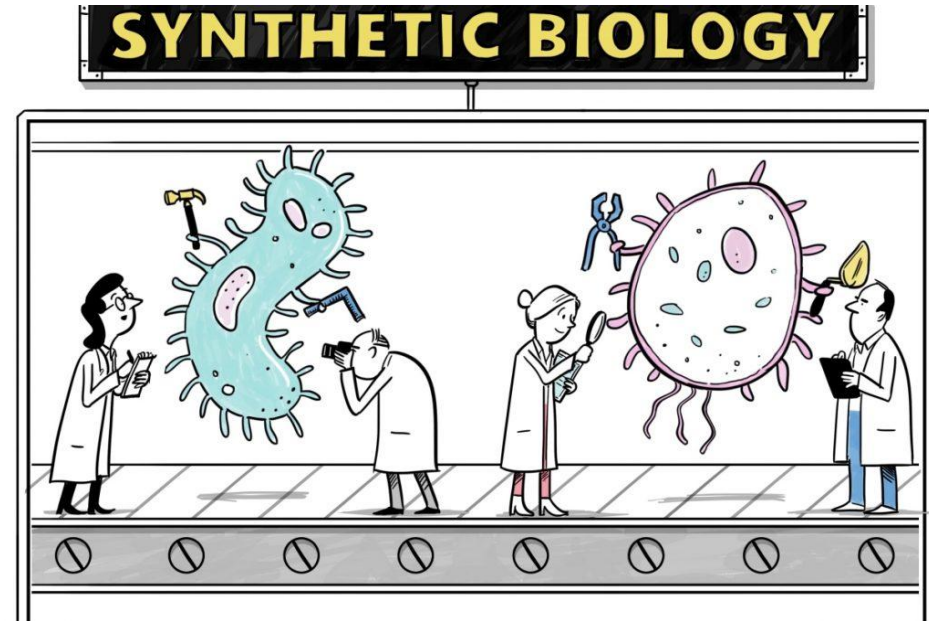
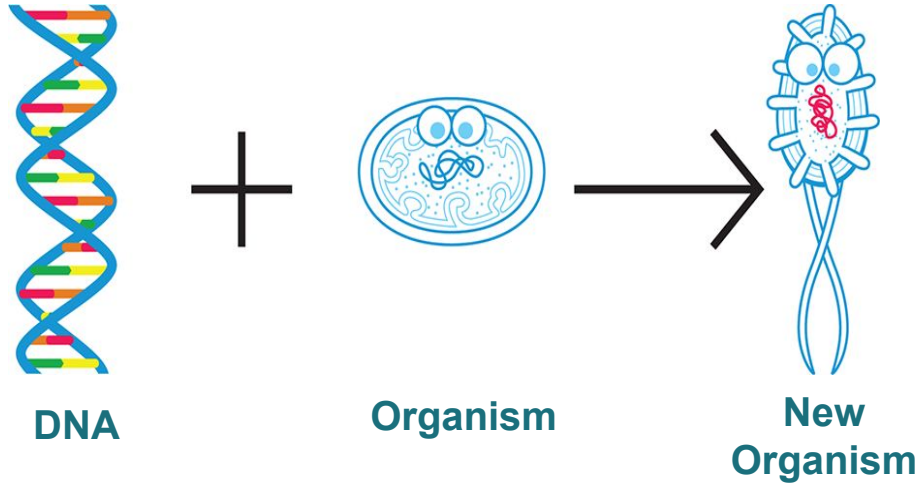


**What I cannot create
I do not understand**

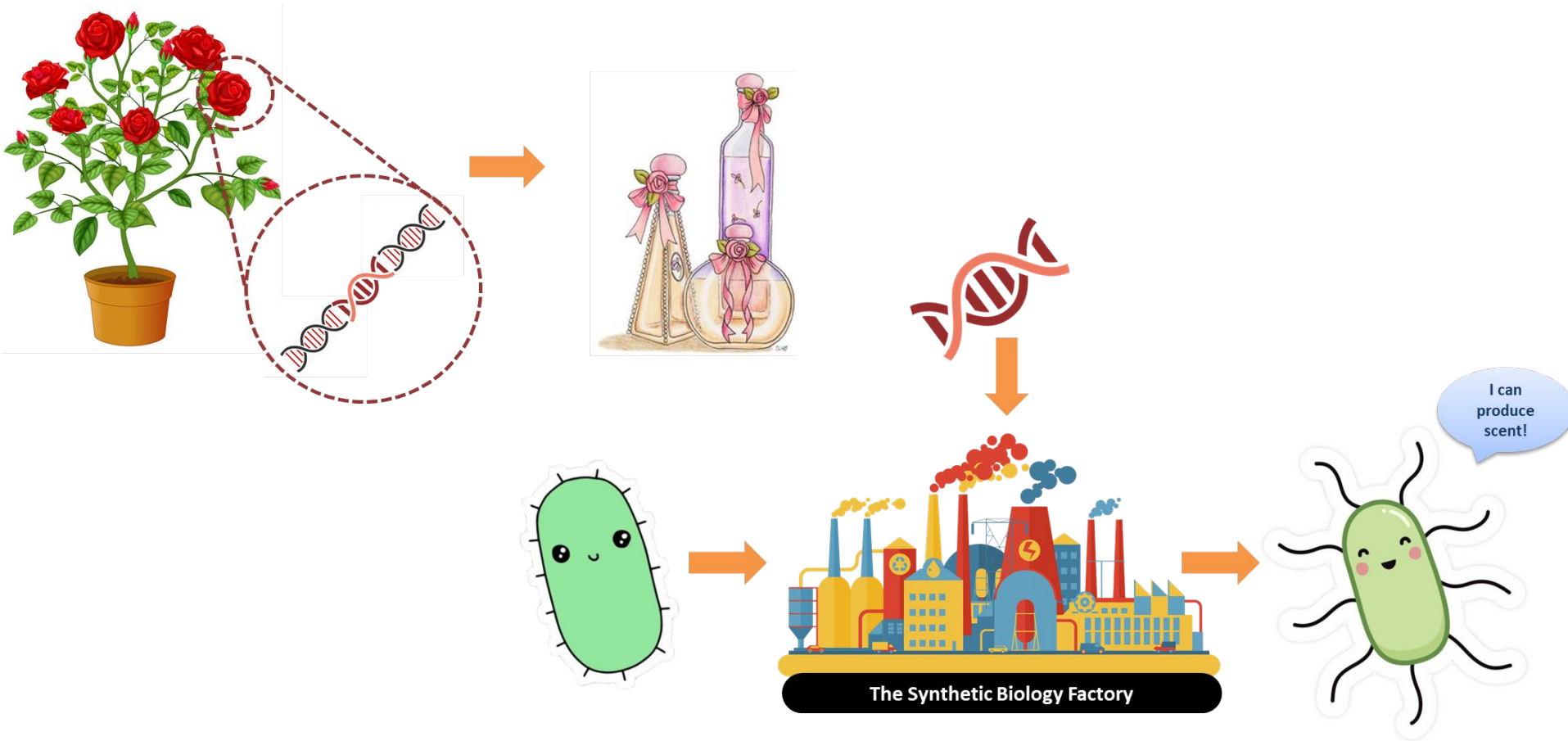
-(Richard Feynman)

Welcome to the world of SynBio!

Combining Engineering and Biology

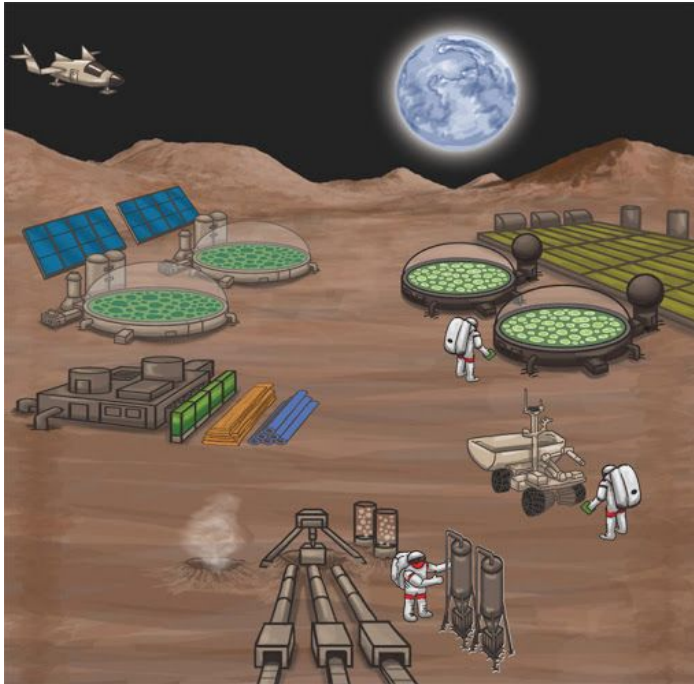


The SynBio Factory



The Transit of Synthetic Biology

With NASA's Curiosity Rover safely landed on Mars and ready to search for signs of life, back on Earth attempts are underway to engineer bacteria that could thrive on the Red Planet.



Synthetic Biology is blooming in the field of space exploration as well!



Elon Musk ✓
@elonmusk

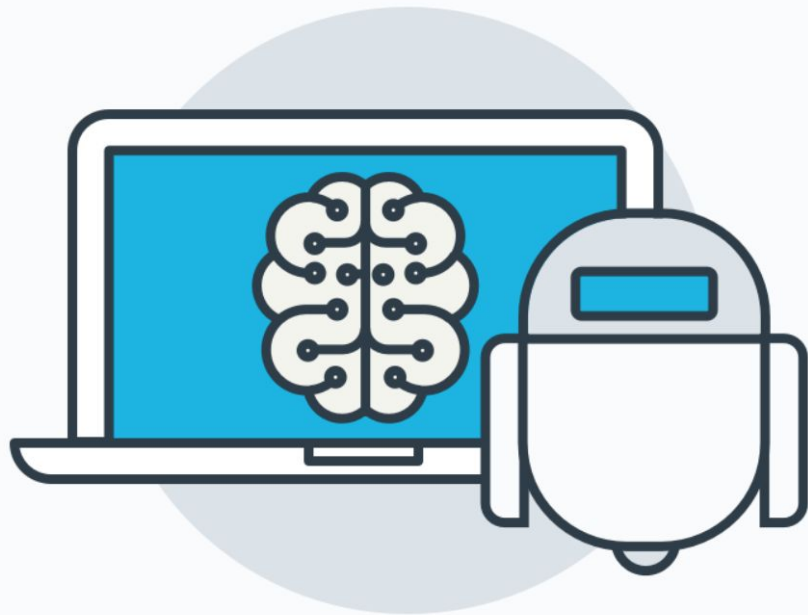
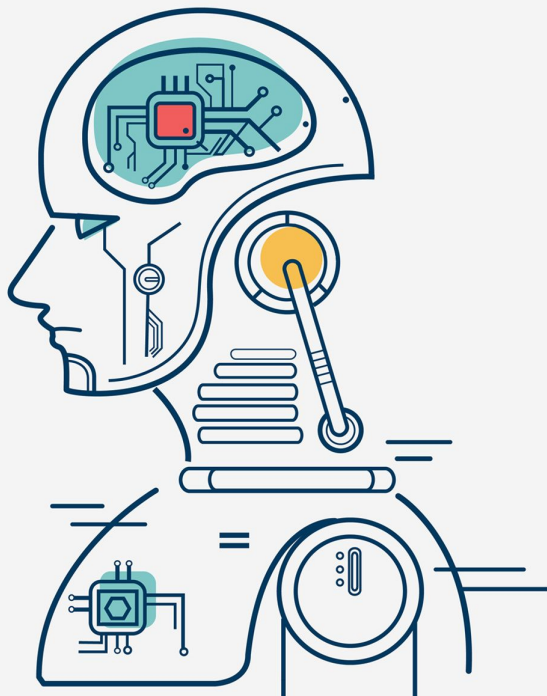


In principle, I think synthetic RNA (and DNA) has amazing potential. This basically makes the solution to many diseases a software problem.

2:36 AM · 7/2/20 · [Twitter for iPhone](#)

92 Retweets 778 Likes

Machine Learning

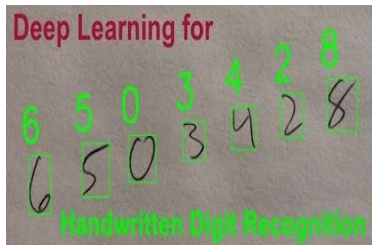


The task of digit **classification**

2	6	8	9	3	4	7	5	6
3	4	7	9	5	5	6	7	2
5	8	7	0	9	4	3	5	4
5	2	3	4	9	5	6	7	8

Given set of
handwritten digits
images, with their
correct labels,
computer program can
be developed which can
classify digits.

Interesting Applications



Handwritten Digit Recognition, discussed earlier



Online Advertisement on sites like Facebook, Instagram and others

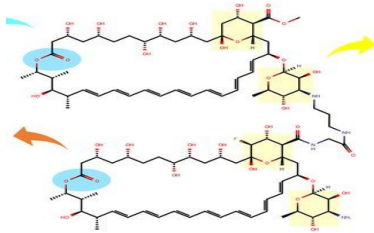


Recommendations on platforms like YouTube, Spotify and others

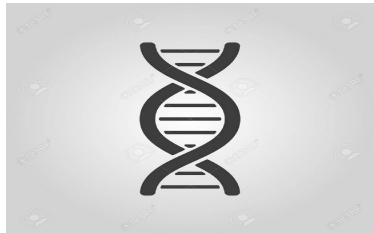
Interesting Applications



Analysis of Biological data for disease prediction



Chemical compound analysis helps in drug discovery



Classification of DNA sequence as mutated or non-mutated

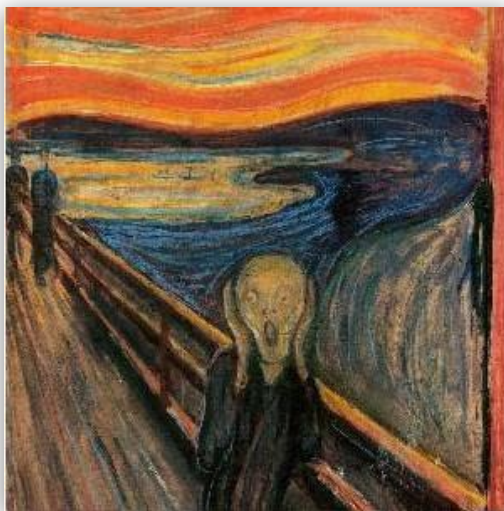
Something for **Art lovers** too...

Machine Learning algorithm can help you to transfer style of one image to another



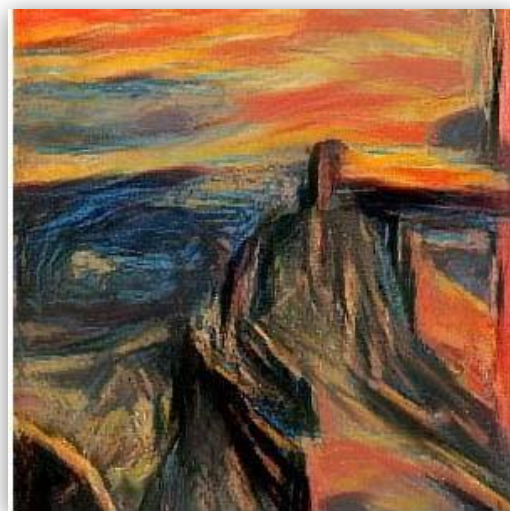
Original Image

+



Style Image

=



Modified Image

<https://thispersondoesnotexist.com/>



Key Takeaways

In this presentation, you learnt about:

- Antibiotic Resistance, **another pandemic that awaits us!!**
- Your role in tackling antibiotic resistance
- The basic concept of Synthetic Biology
- The role of Synthetic Biology in solving major problems faced by mankind
- The basic idea behind Machine Learning
- The power of Machine Learning through its various applications



Post - Webinar Survey



QnA Session

