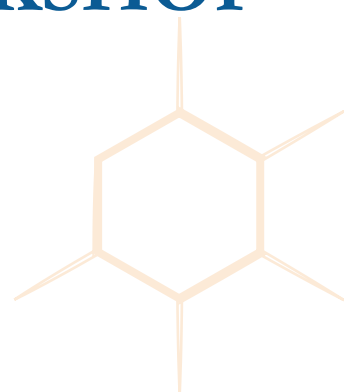
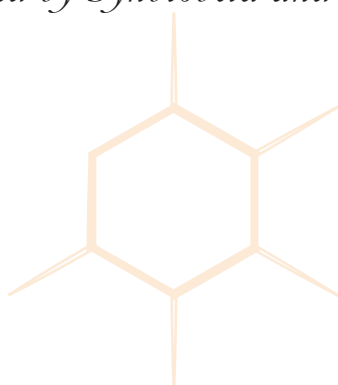
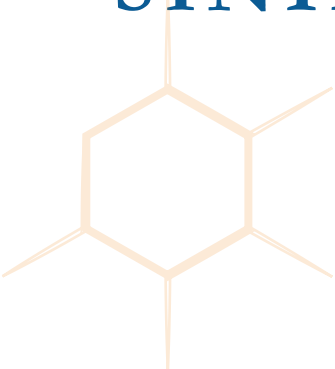




Introduction to
SYNTHETIC BIOLOGY WORKSHOP

Jointly organized by Synbiobeta and NUS SynCTI



Introduction to Synthetic Biology Workshop

You will get an introduction to the world of biology, biotechnology and synthetic biology. We start with an input/output approach to biological systems, then explain where biological molecules come from and how they are formed, what they look like and how they perform such a wide variety of functions. We then see how these very same properties of native cell function allow us to probe, manipulate, and modify cell function. With this core knowledge in hand, we'll discuss state of the art **industry applications**, such as the ability of biological systems to produce a huge variety of chemicals including alcohols, fuels and drugs and what modern methods are used for the manipulation of biological systems. We will cover how biological systems compute and perform logic, and how biology can be engineered for such activities. The risks and benefits of genetically modified organisms will be discussed and the start-up and industry landscape and new technologies will be reviewed.

This course is designed for people with **little or no previous knowledge** of biology but with some background in the shared engineering skillset of creative problem solving, iteration, classification, and archiving results. We will use analogies and stories from computer science and engineering to describe how cells, genes and organisms function and highlight the differences between these systems, both on a physical level and in terms of technological development. This approach helps us find useful places to apply our effort to improve synthetic biology and to craft high quality projects.

Date: 21 June 2016

Location: Singapore Economic Development Board,
Raffles City Tower #28-00

Schedule:

9.30 am to 11.30 am – Morning Session

11.30 am to 12.30 pm – Lunch Break

12.30 pm to 2.30 pm – Afternoon Session

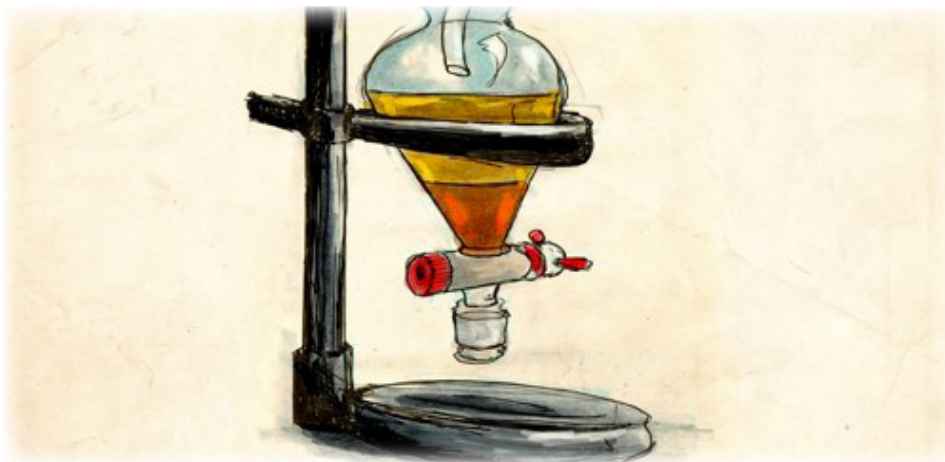
2.30 pm to 2.45 pm – Break

2.45 pm to 3.30 pm – Open Discussion



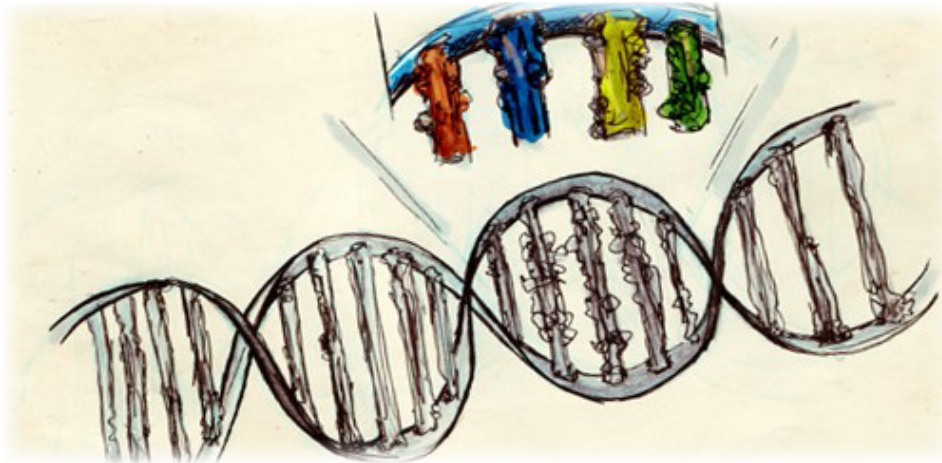
1. An Introduction to Synthetic Biology

We will discuss the core principles of biology, including safety, terminology, inputs, outputs and processes. We will develop a framework for organizing the lessons to come and adapt to working in a science that always finds room for exceptions. We will conclude by covering some simple, yet foundational experiments utilizing these principles that prepare us for the integrated approach to synthetic biology that follows.



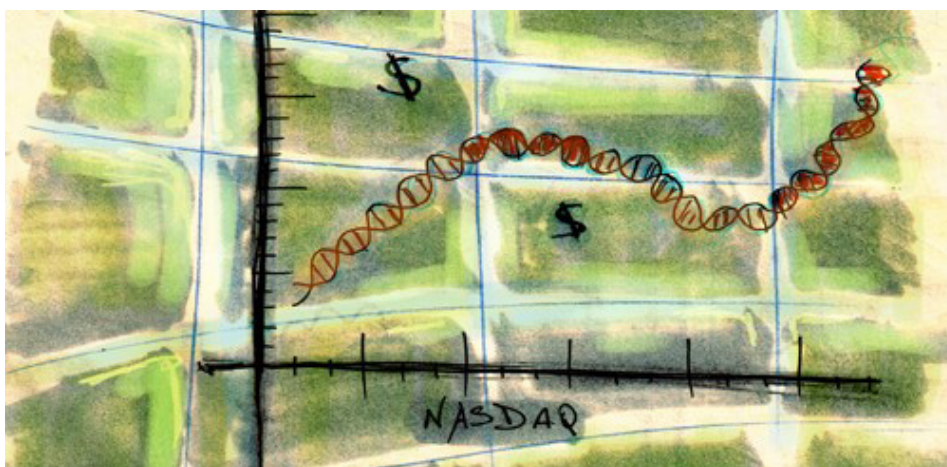
2. Synthetic Biology for Brewing

The traditional baliwick of bioengineering is the improved production of biomolecules through fermentation. Advances in synthetic biology change what we can make and how well we make it. We cover early examples, such as adding a single gene to an existing pathway, then more modern bioengineering, where entire synthetic pathways are developed along with a suite of support genes that improve cellular function and stability under these taxing conditions.



3. Understanding Genetically Modified Organisms

GMOs are an emerging concern in the global collective mind. In this section we analyze the concerns, promises, and technology of multi-cellular organism modification and their use outside the laboratory environment. An international approach is used to probe where our concerns really lie and how those concerns match up with the current state of GMO development and regulation.



4. New Companies and Technologies in the Bioeconomy

Get an overview of synthetic biology start-up companies and industry players. We'll also discuss how new technologies are changing the landscape of biotechnology and look at predictions of future technologies to come.