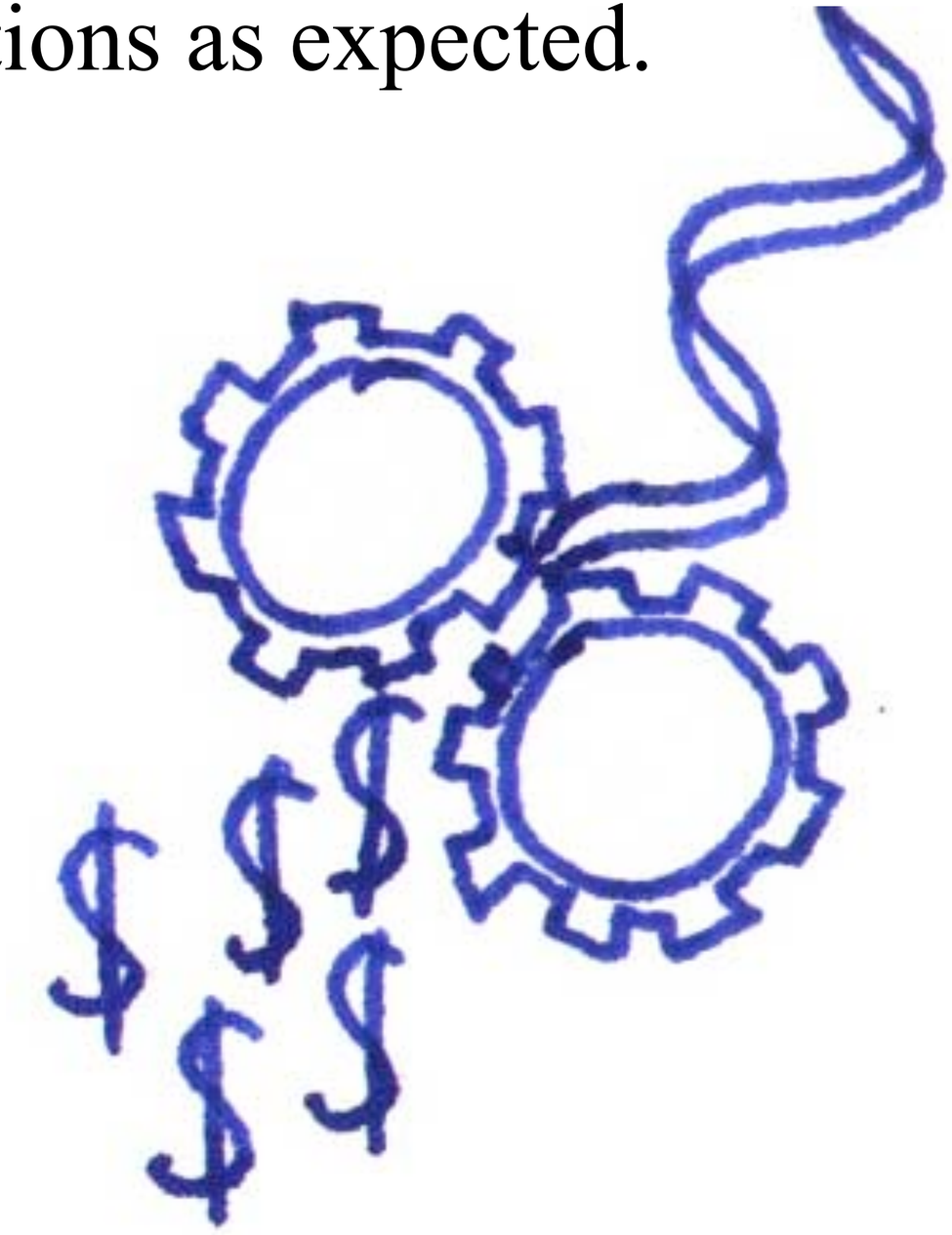
What is Synthetic Biology?

Application of engineering principles and mathematical modeling to the design and construction of biological parts, devices, and systems with applications in energy, medicine, and technology.

www.bio.davidson.edu/projects/gcat/Synthetic/What_Is_SynBio.html

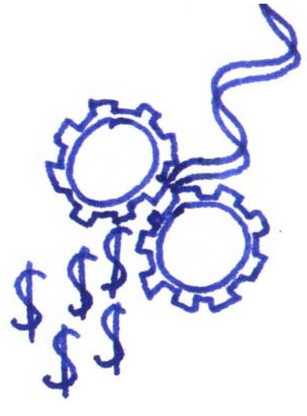
Synthetic Biology: Win-Win

Win #1: your design functions as expected.

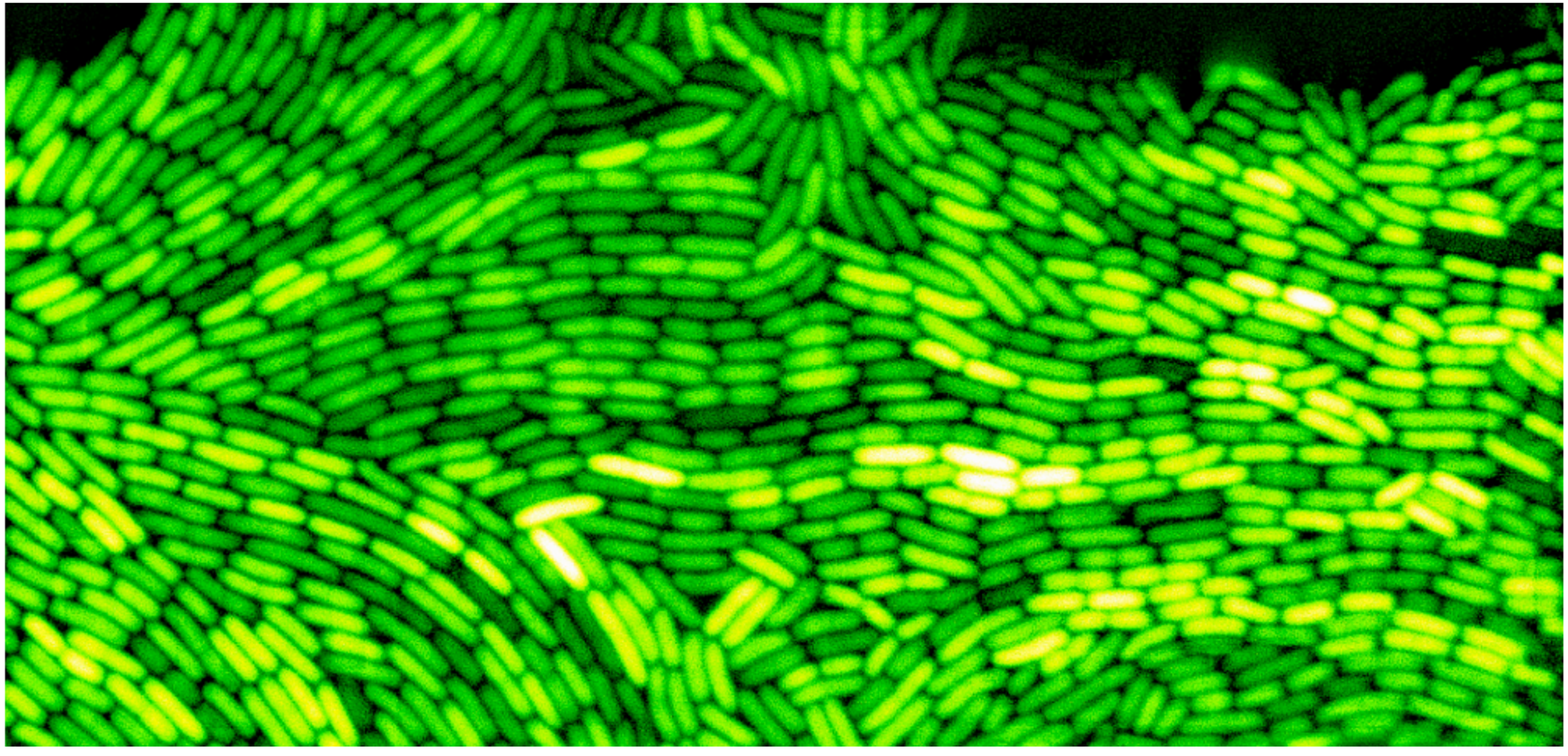


Synthetic Biology: Win-Win Research

Win #1: your design functions as expected.



Win #2: your design fails but you uncover basic biology



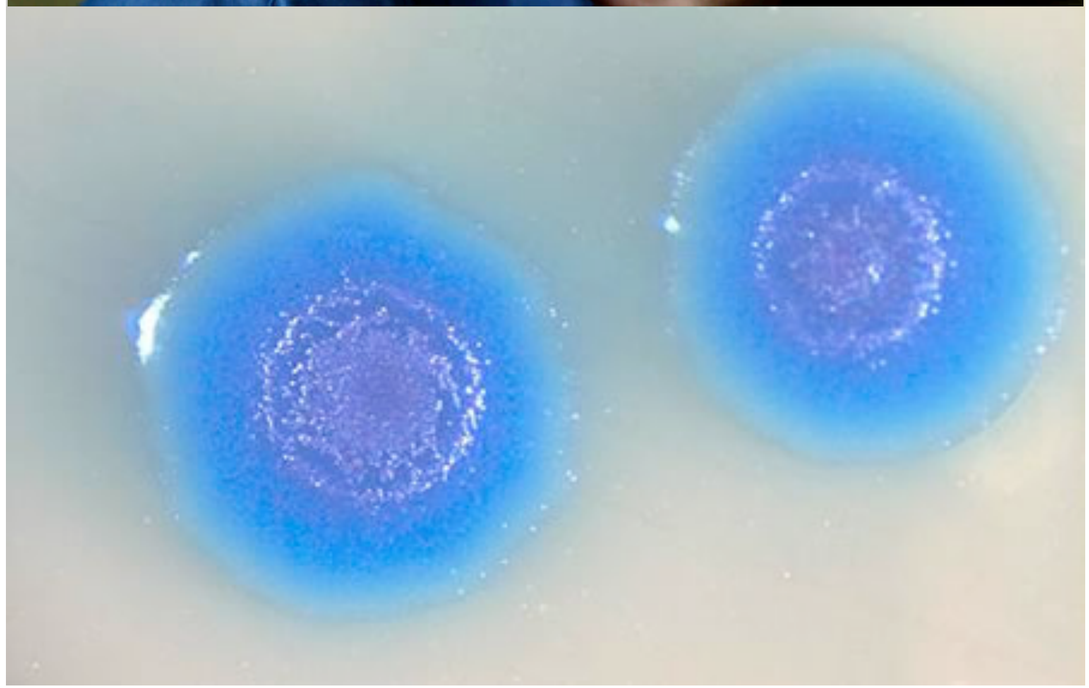
How is Synthetic Biology Different?

Abstraction

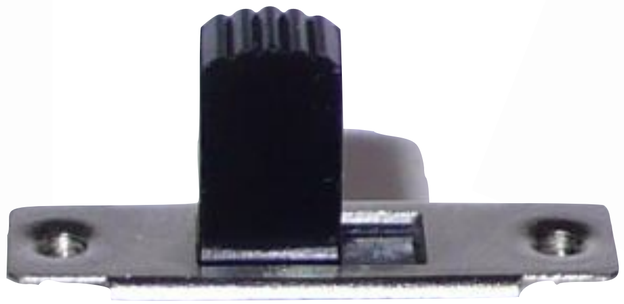
Modularity

Standards

Designing and modeling



Abstraction



Abstraction

Modularity

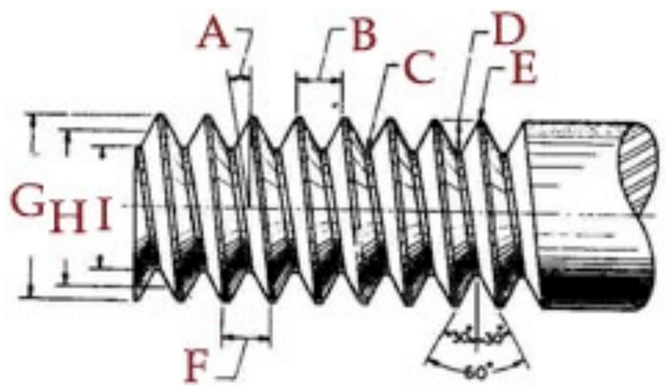
USB ports on computers

Modularity

Standardization

On a Uniform System of Screw Thread

"In this country, no organized attempt has as of yet been made to establish any system, each manufacturer having adopted whatever his judgment may have dictated as best, or as most convenient for himself."



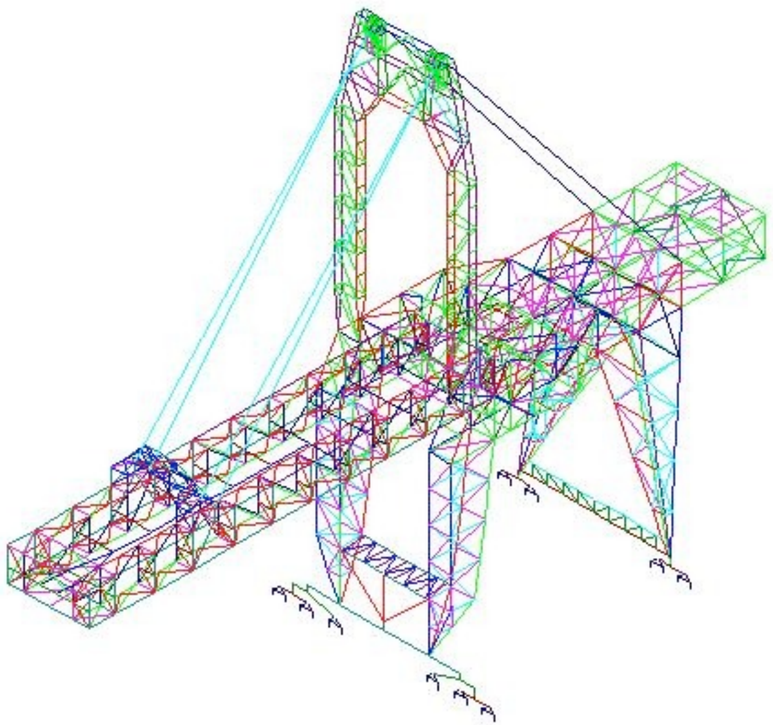
William Sellers April 21, 1864

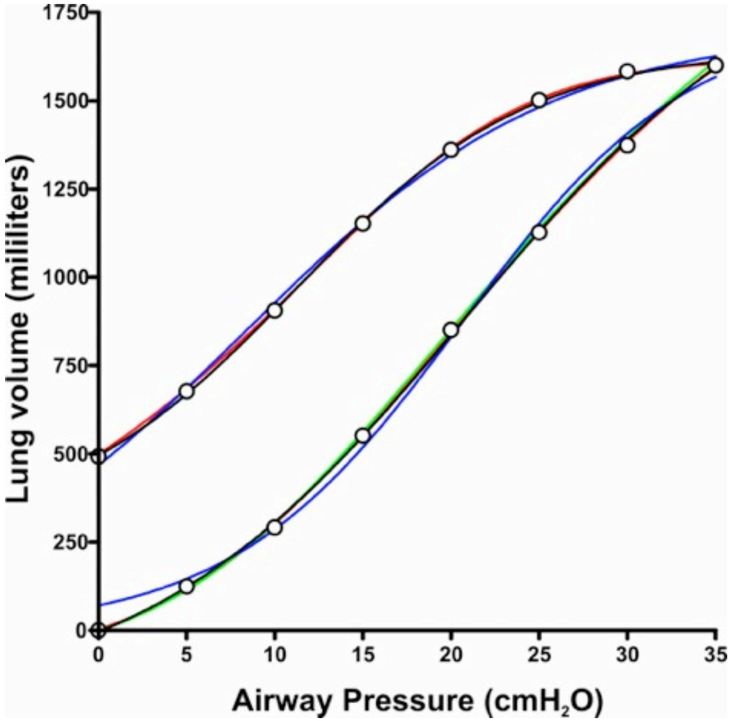
http://openwetware.org/images/b/bd/BBFRFC9.pdf

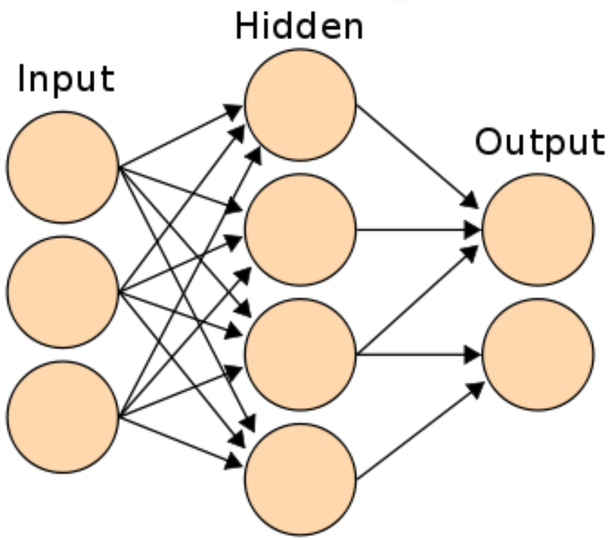
Standardization

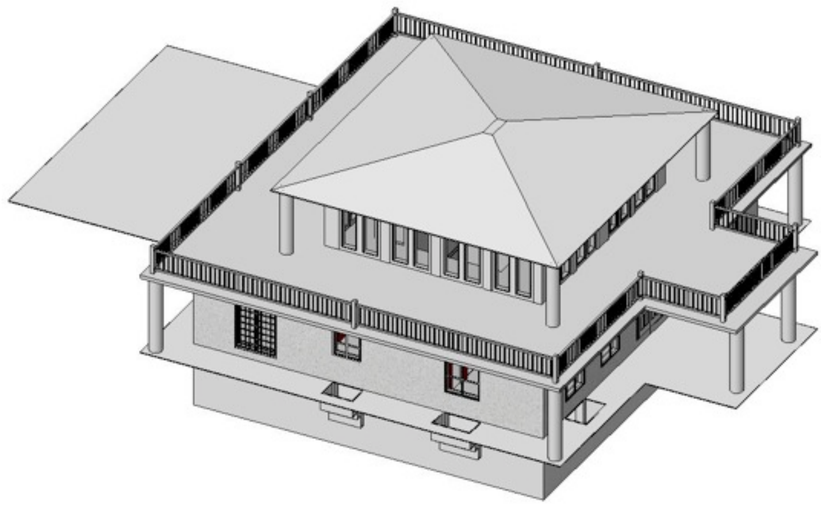
On a Uniform System of Screw Thread

Modeling of Designs



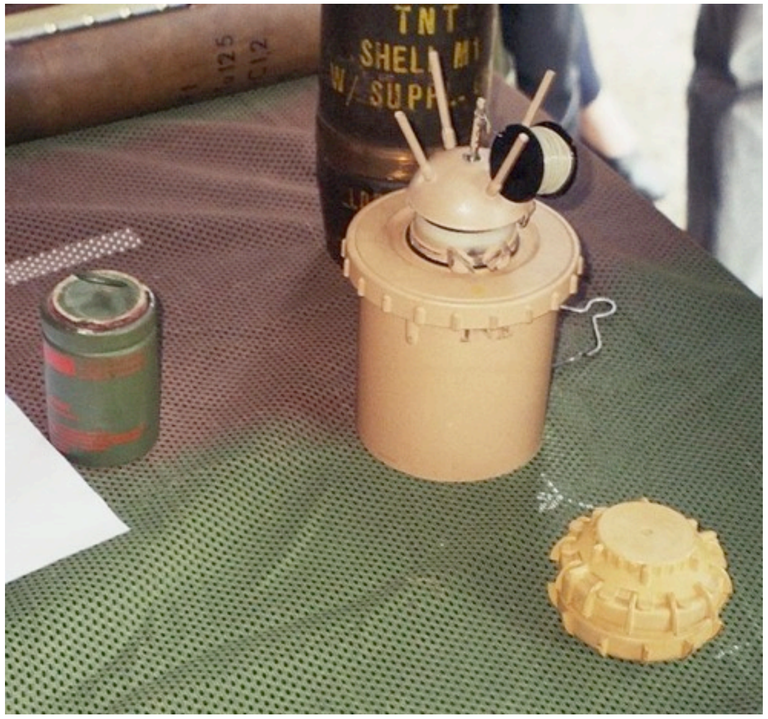




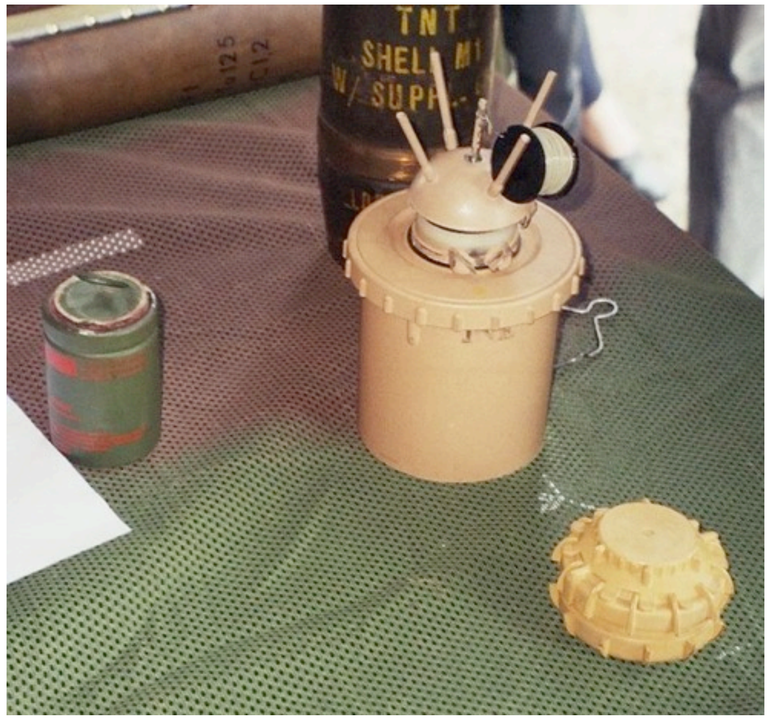


Real World Applications of Synthetic Biology

Land Mine Detection



Land Mine Detection



Synthetic Biology
Land Mine Detection

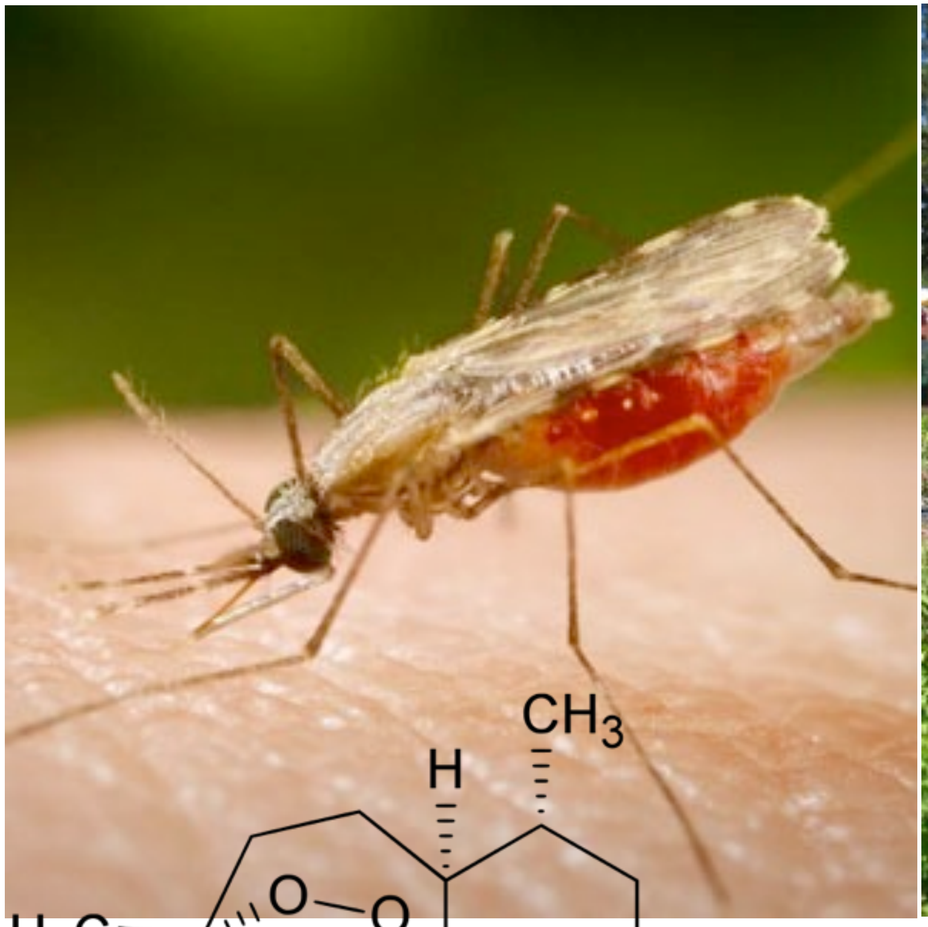
WARNING SIGN: The bioengineered Thales cress turns red when exposed to a mine byproduct.

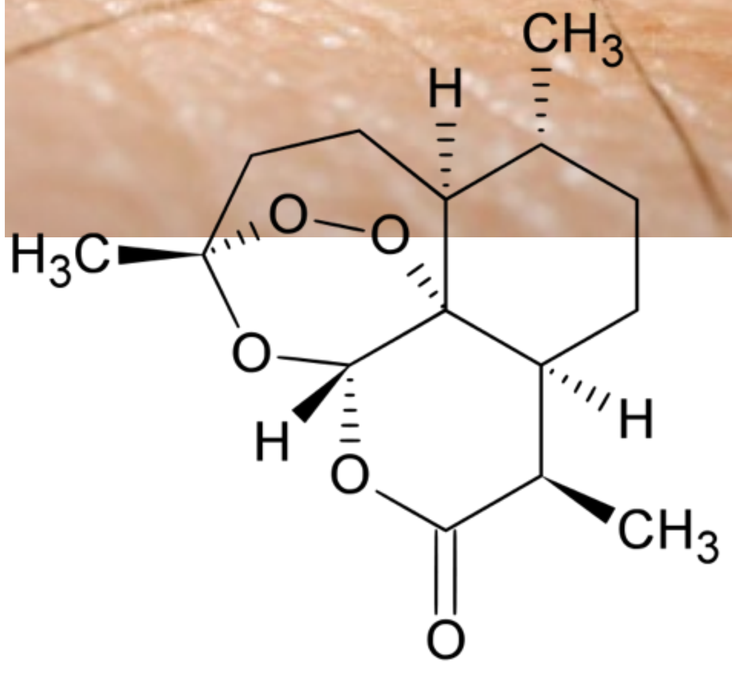
COURTESY OF ARESA BIODETECTION

New weed may flag land mines

By John K. Borchardt | *Contributor to The Christian Science Monitor*

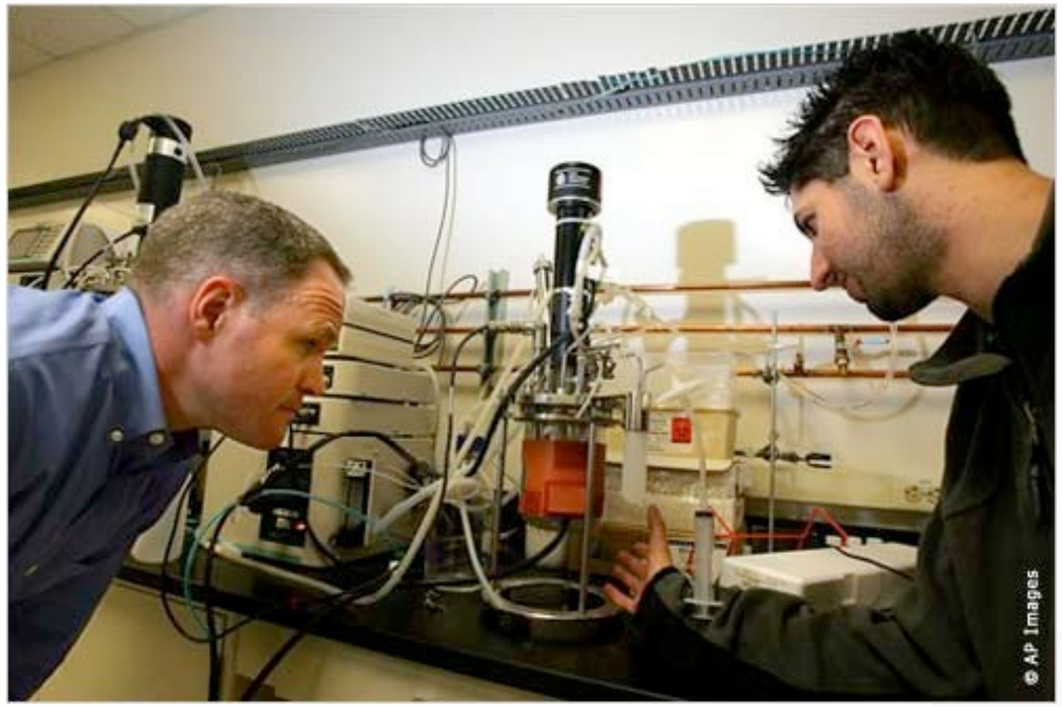
Production of Medicines

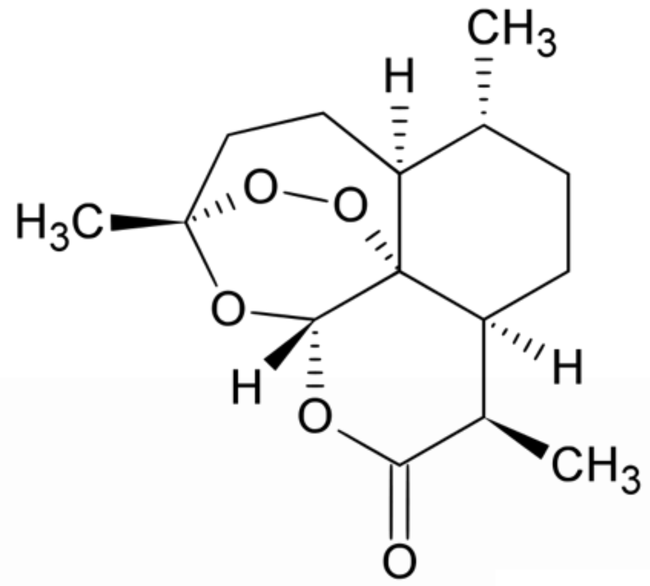




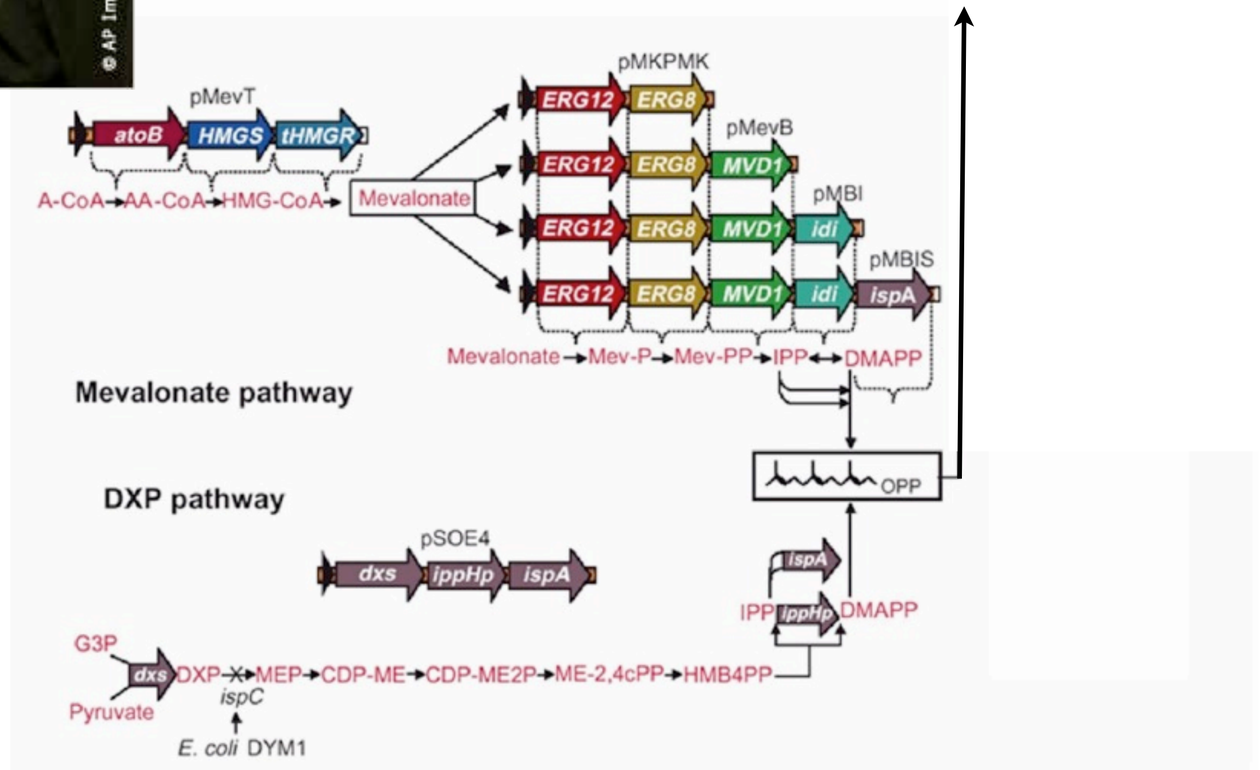
$1 per pill

Production of Medicines

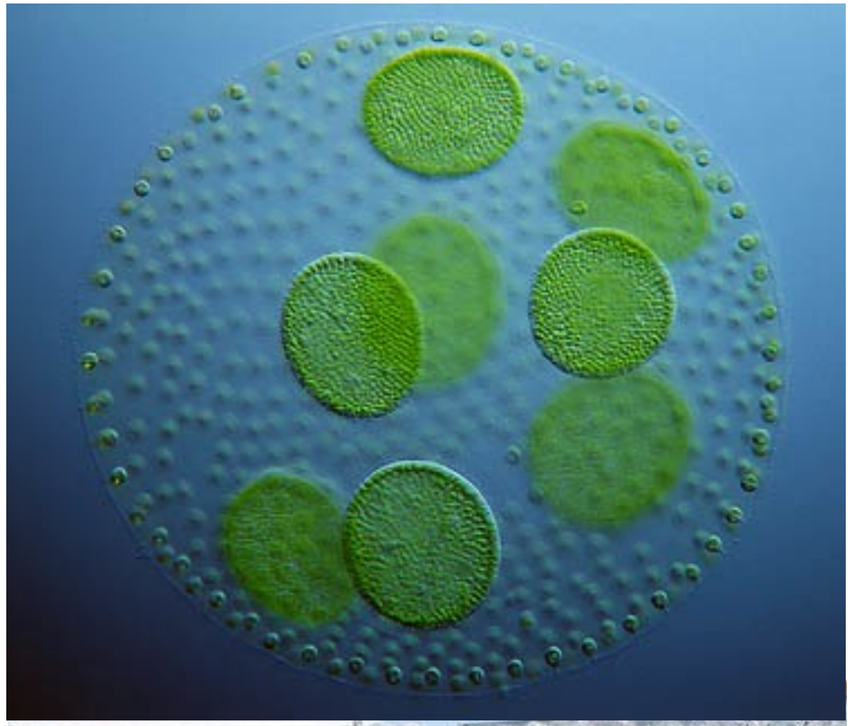




10¢ per pill



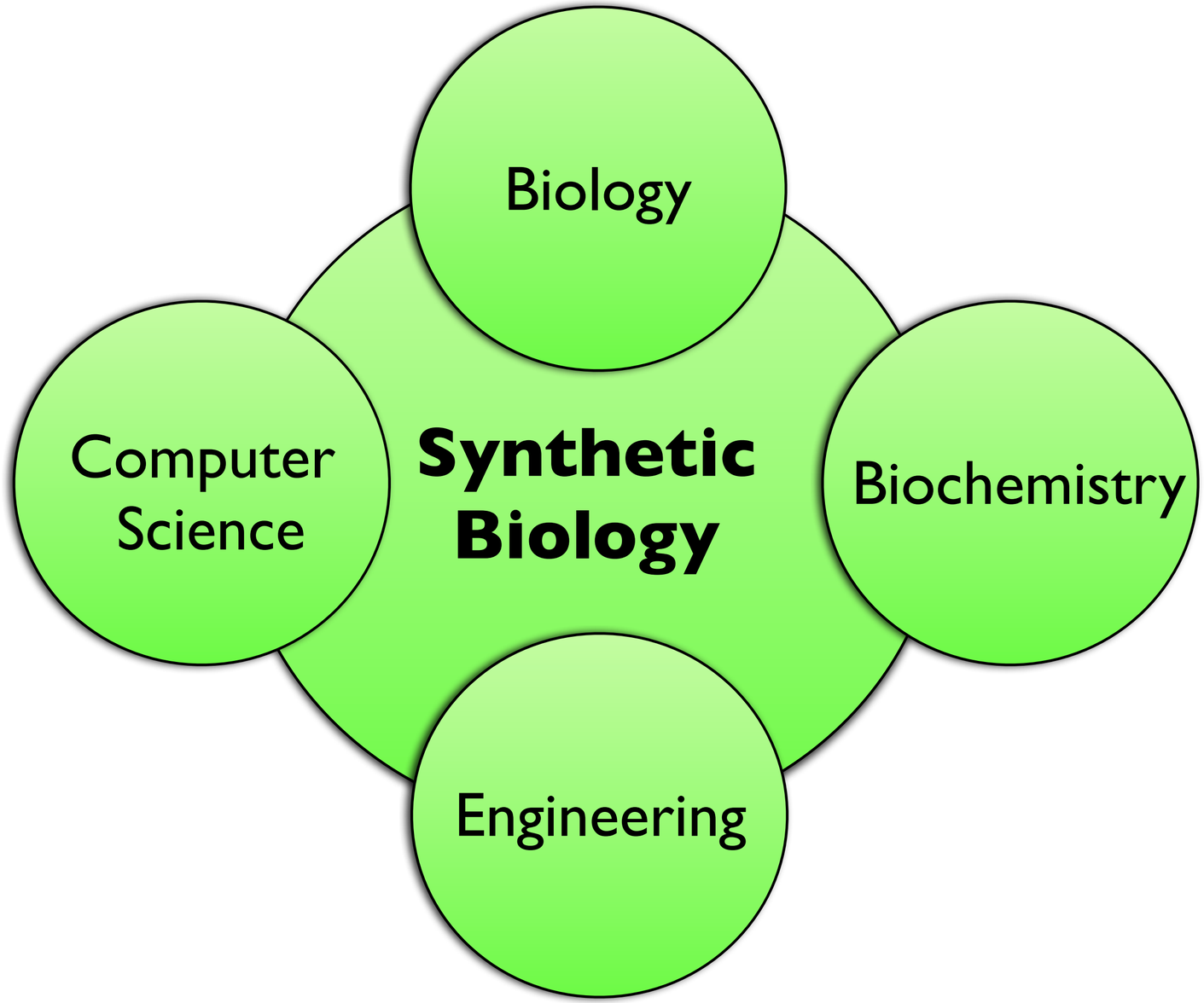
Biofuels from Algae



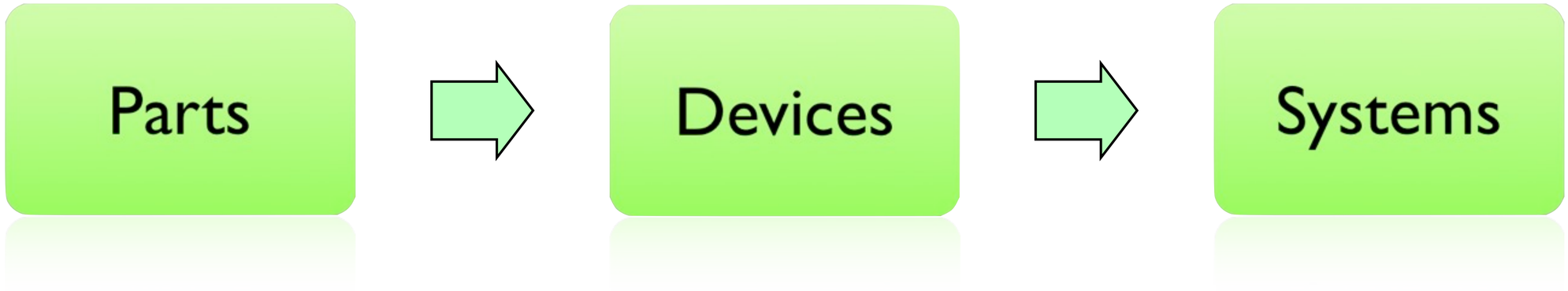
CO_2-neutral

1,000,000 gallons in 2008

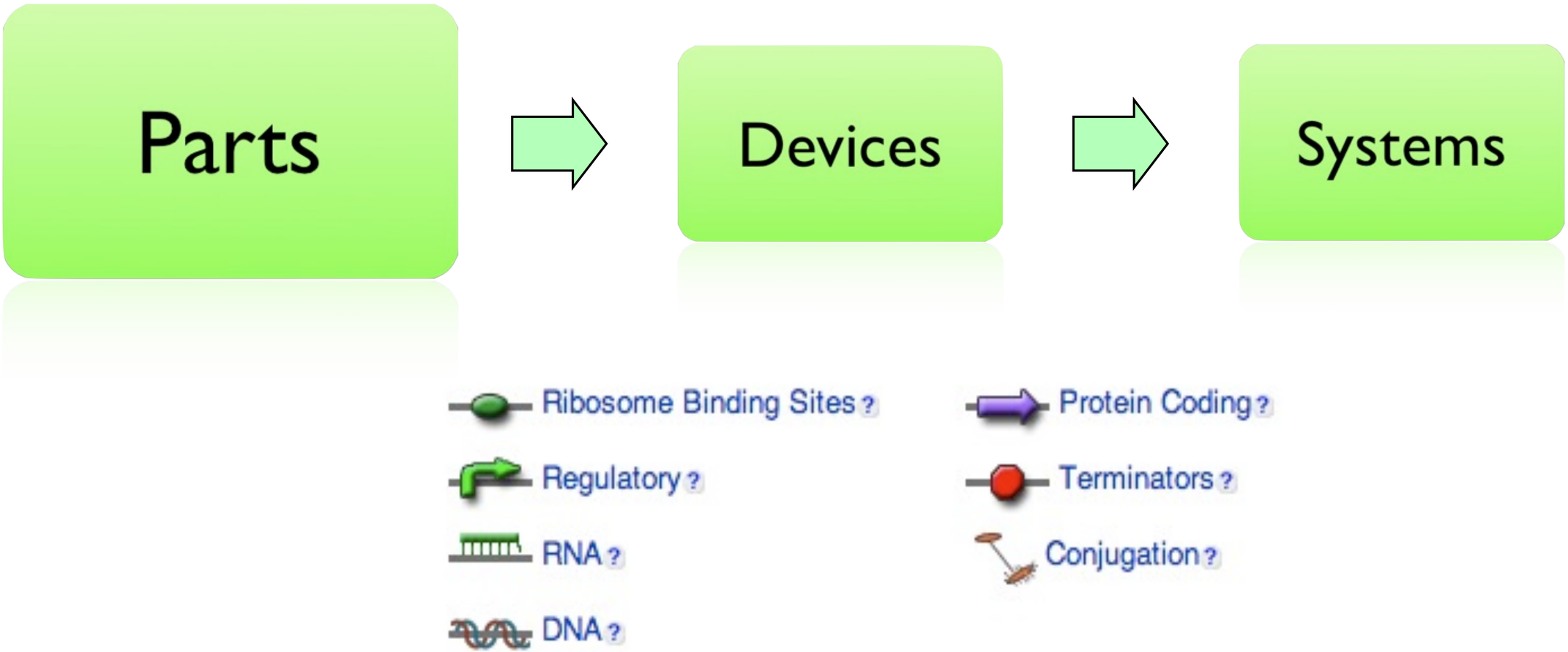
Synthetic Biology



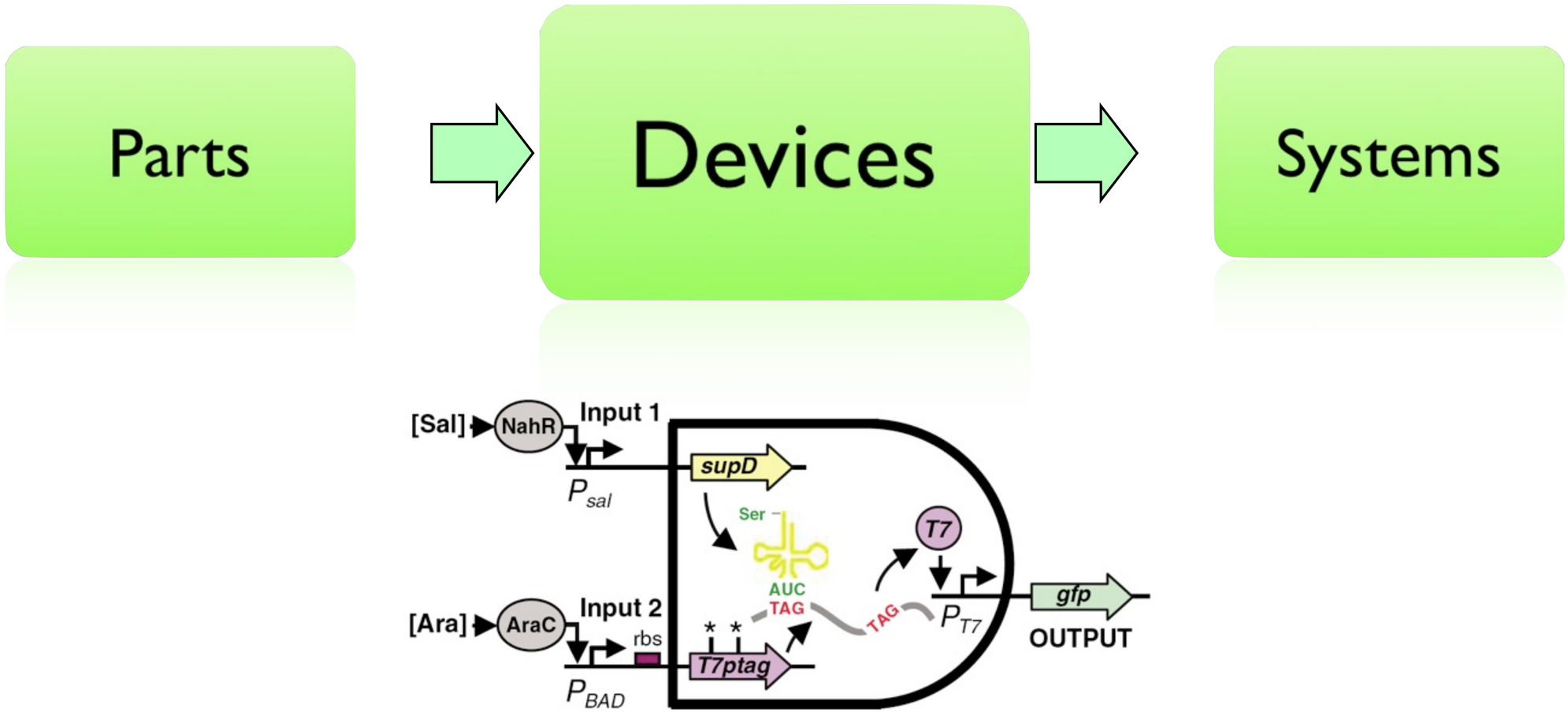
Synthetic Biology



Synthetic Biology

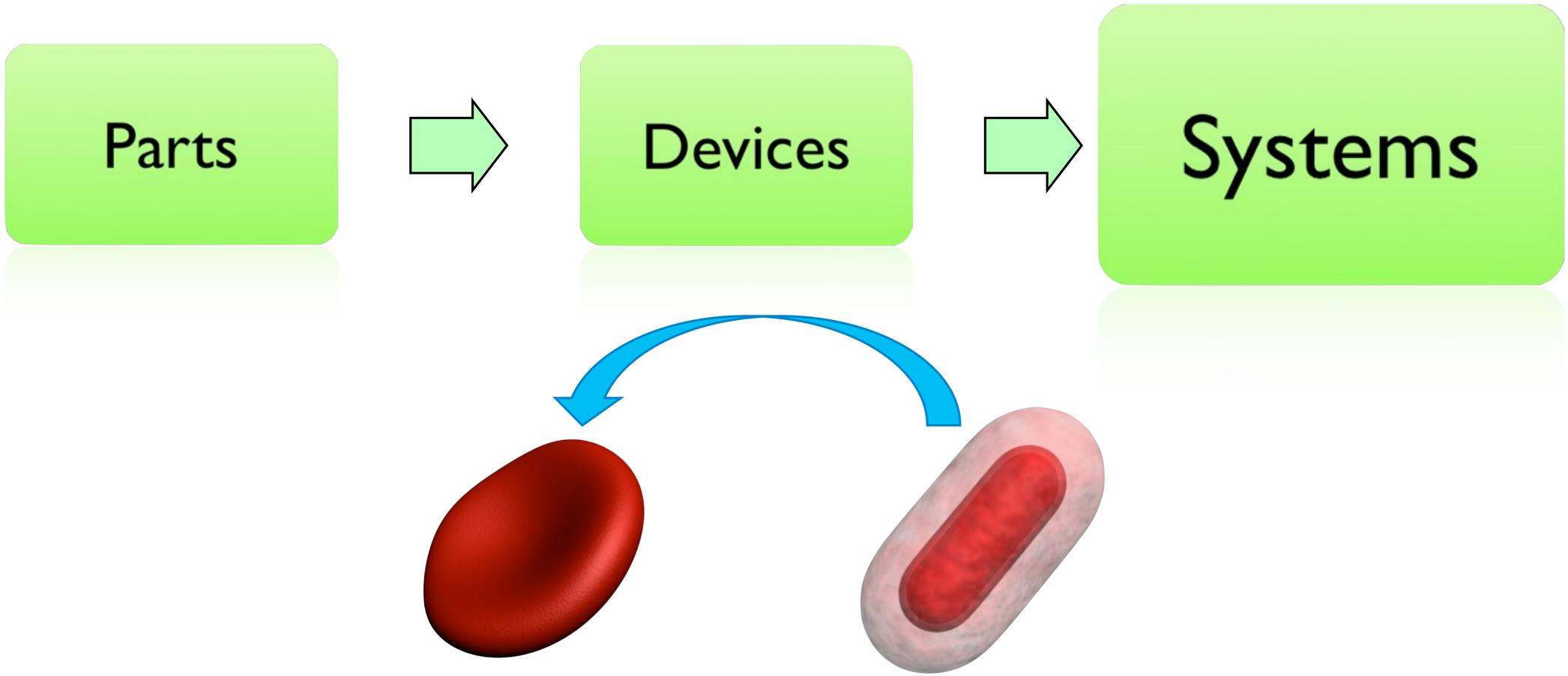


Synthetic Biology



Anderson *et al. Mol Sys Bio*. 2007.

Synthetic Biology



Registry of Standard Biological Parts

Registry News

- Registry Release
- Registry 6.0
- Report Bugs
- Request Features
- News Archive
- Feature Box Archive

Other

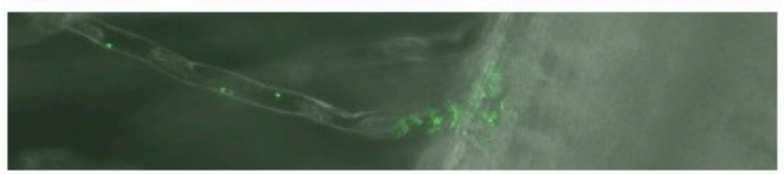
- Registry API
- Safety
- Videos

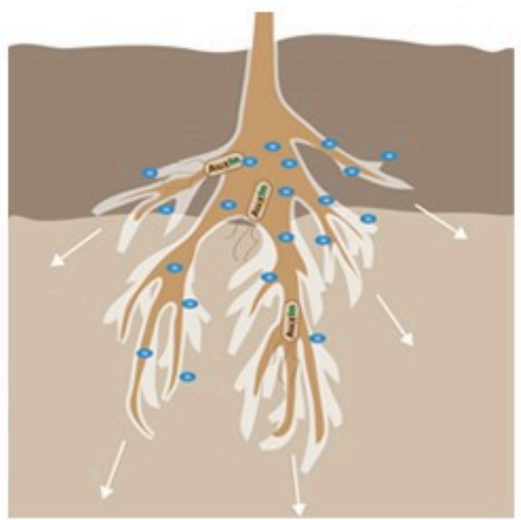
Featured on the Registry

Phyto-Route Chemoreceptor

Get your proteins into plants!

The Phyto-Route system allows bacteria to detect and swim towards malate, a common root exudate. E. coli are actively taken up by plant roots, allowing for targeted delivery of a protein of interest. This delivery system allows plants to take up compounds not endogenously produced without being genetically modified.





The iGEM Registry is a growing collection of genetic parts that can be mixed and matched to build synthetic biology devices and systems.

As part of the synthetic biology community's efforts to make biology easier to engineer, it provides a source of genetic parts to iGEM teams and academic labs.

You can learn more about iGEM