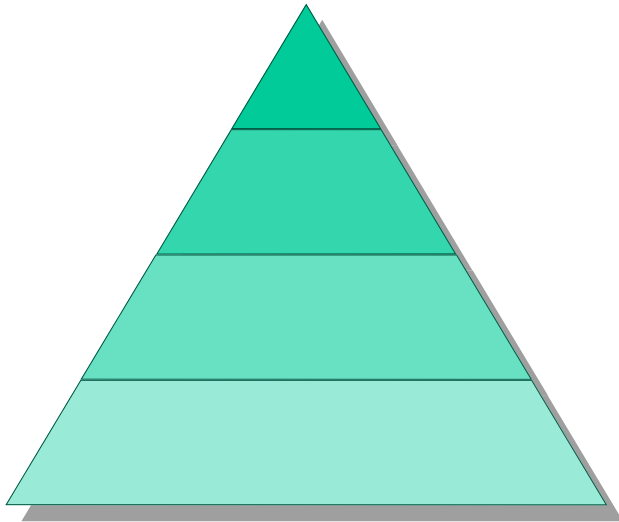


Synthetic Biology

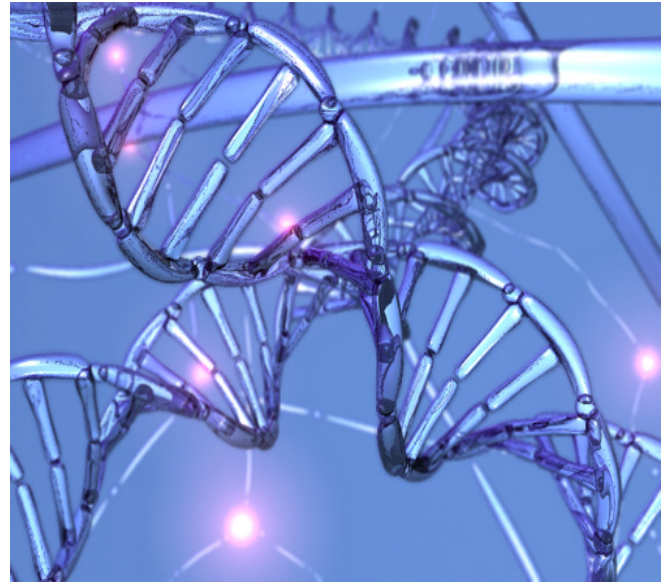
THE BOTTOM-UP APPROACH



- Components
- I/O Relationships

What are the components??

- *DNA and Proteins are the key molecules of the cell.*

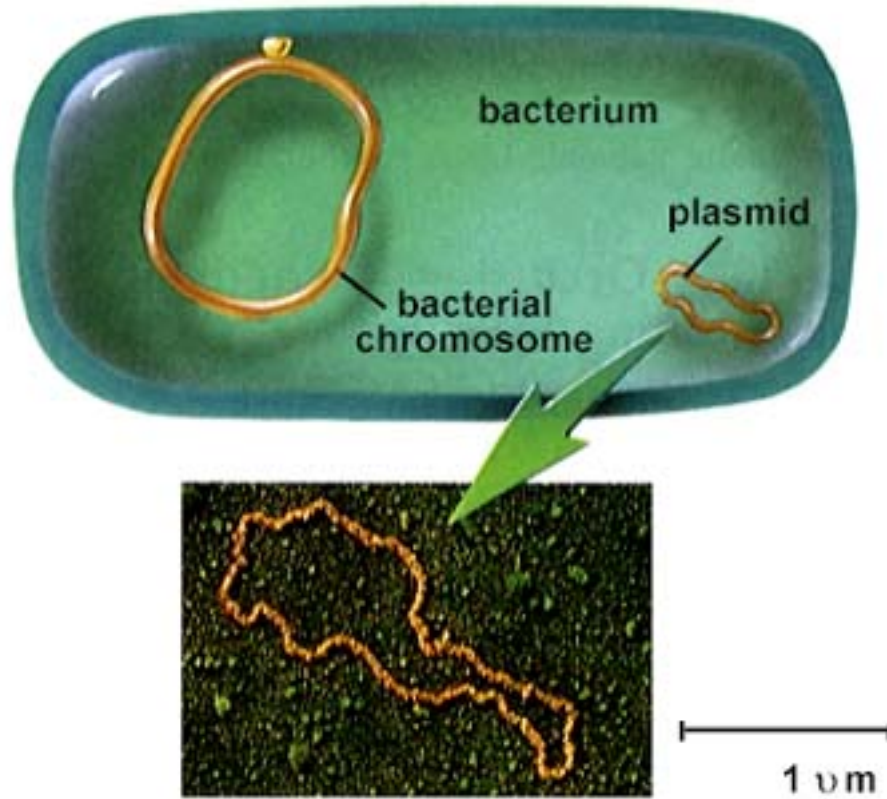


PLASMIDS

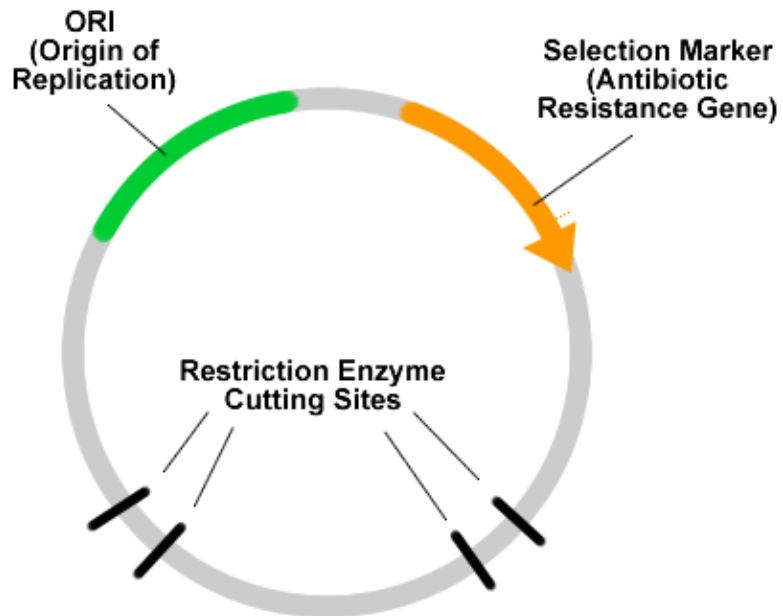


- Circular DNA

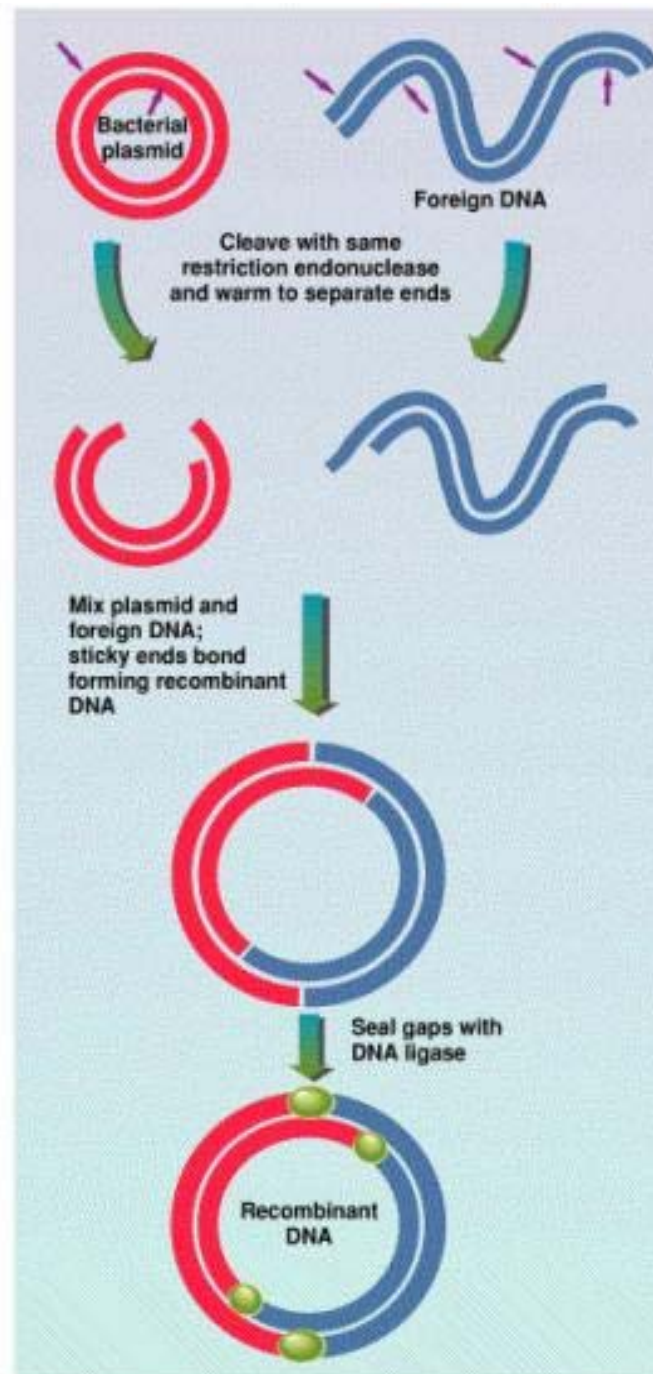
BACTERIA




Plasmid Features




- *Ori*
- *Marker (AR gene)*
- *Cutting Sites*




So finally what are the parts??

 BBa_ **B**... = **Generic basic parts** such as [Terminators](#), [DNA](#), and [Ribosome Binding Site](#)

 BBa_ **C**... = [Protein coding](#) parts

 BBa_ **E**... = [Reporter](#) parts

 BBa_ **F**... = [Signalling](#) parts

 BBa_ **G**... = [Primer](#) parts

BBa_ **I**... = **IAP** [2003](#), [2004](#) project parts

BBa_ **J**... = [iGEM](#) project parts

 BBa_ **M**... = [Tag](#) parts

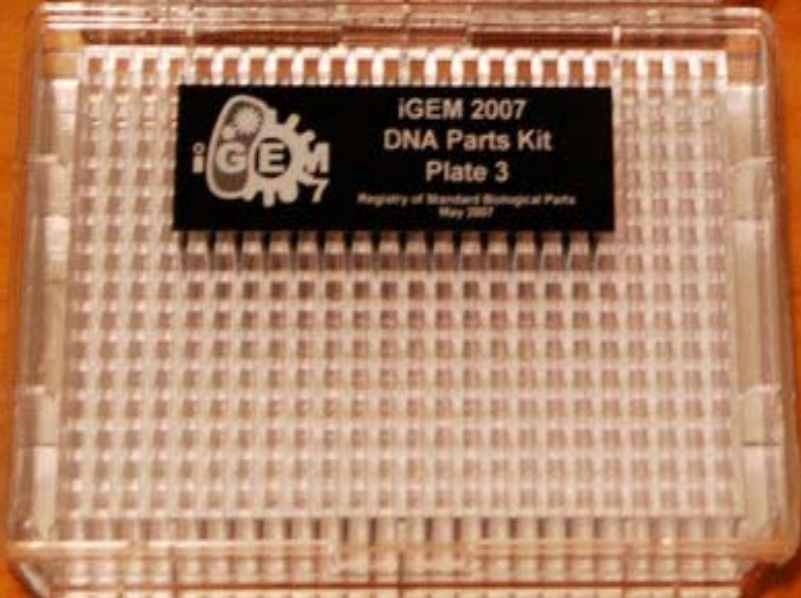
 BBa_ **P**... = [Protein Generator](#) parts

 BBa_ **Q**... = [Inverter](#) parts

 BBa_ **R**... = [Regulatory](#) parts

A.B BBa_ **S**... = **Intermediate parts**

 BBa_ **V**... = [Cell strain](#) parts



Assembly of Parts → *Biobricks*

The first step towards the experiments

Standard Assembly

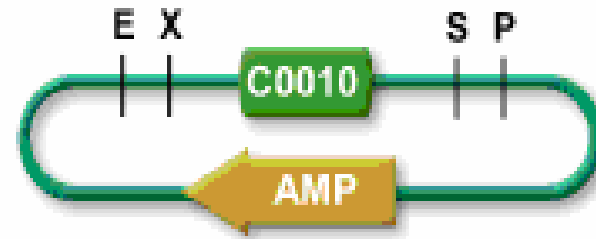
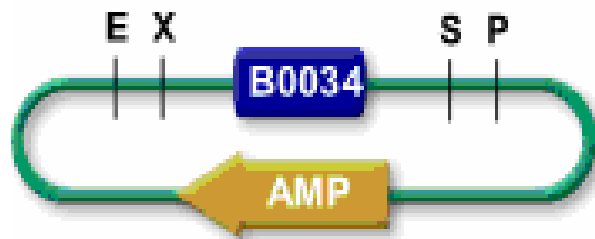
Plasmid backbone



B0034

Parts

C0010

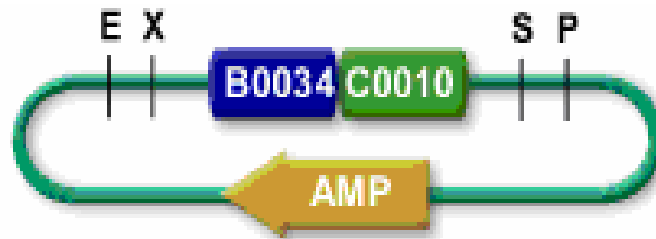


Cut with
E & S

Cut with
E & X



Mix &
Ligate





J22291



J22241

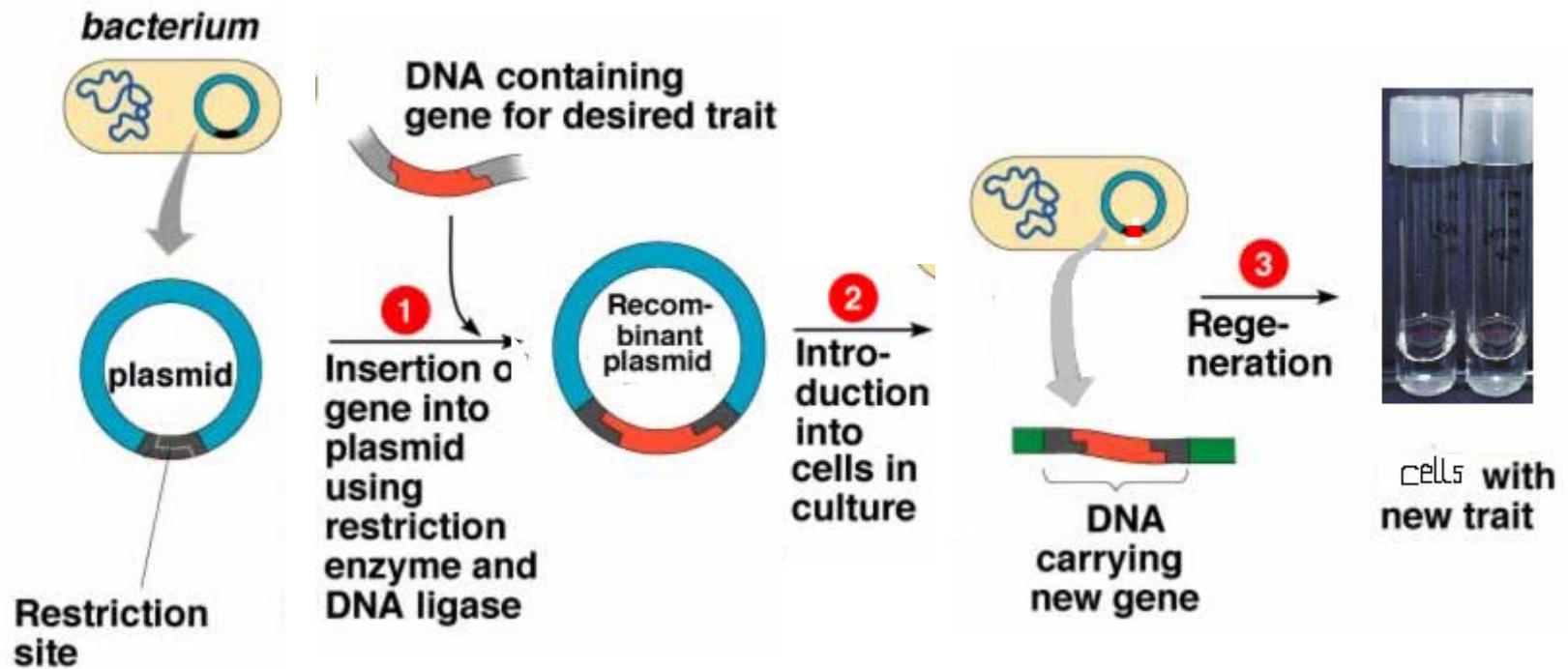


J22301



J22281

2. Transformation using Plasmids



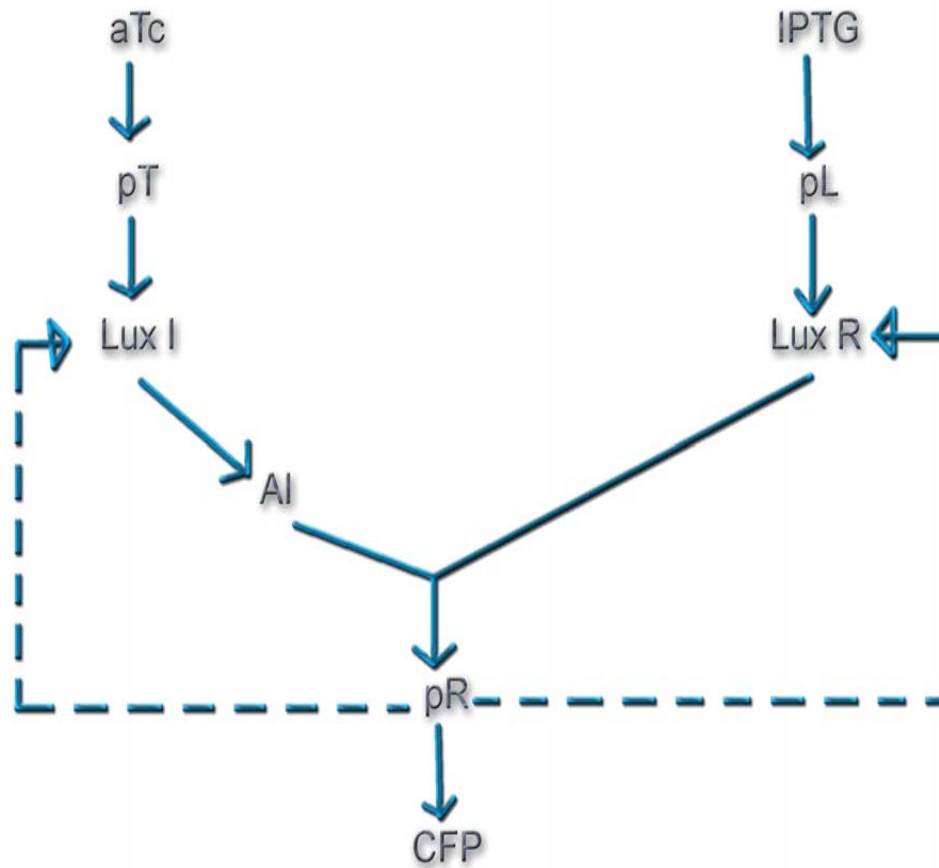
3. Inoculation



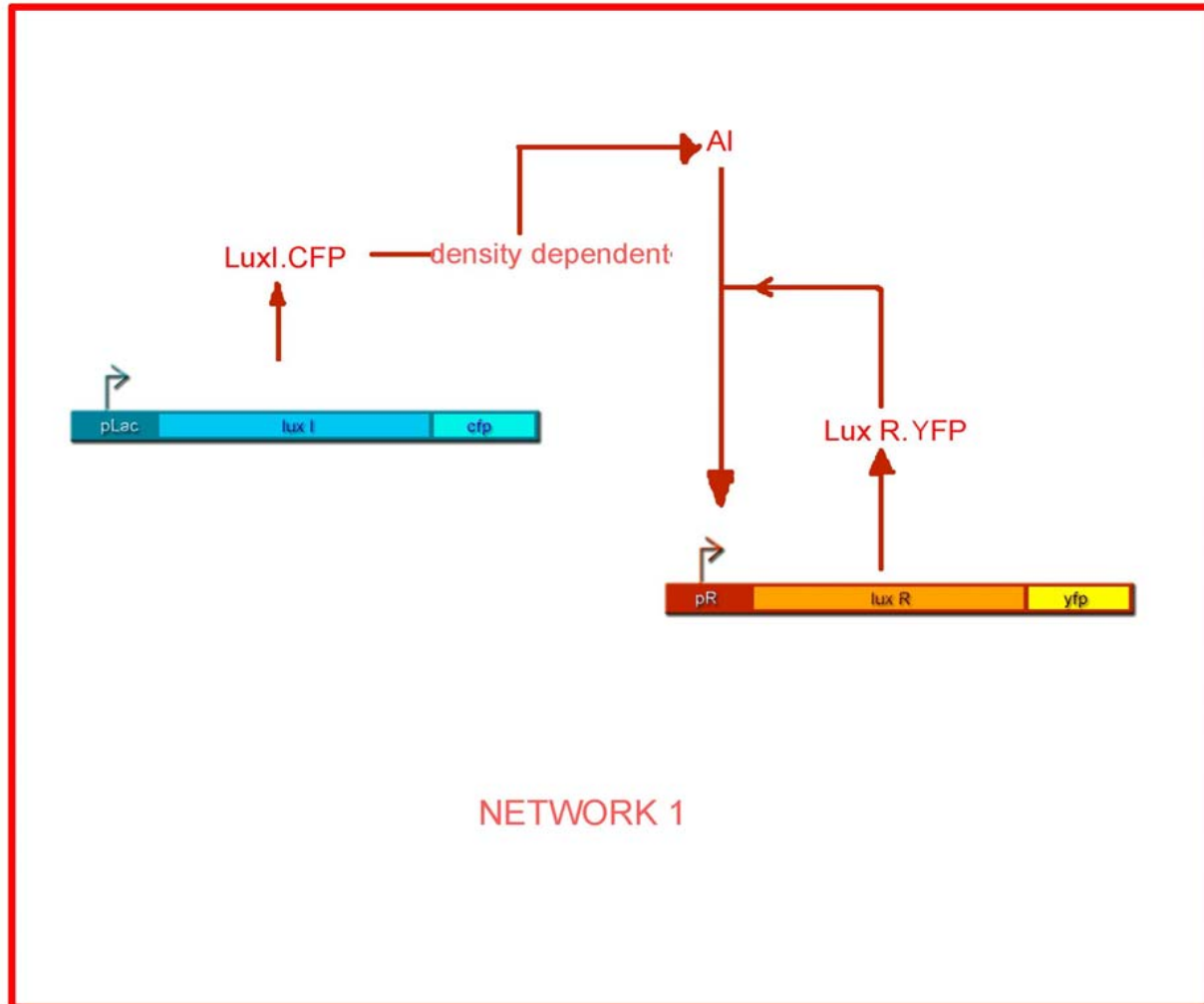


Yippie! Cells are ready to be put under the microscope!

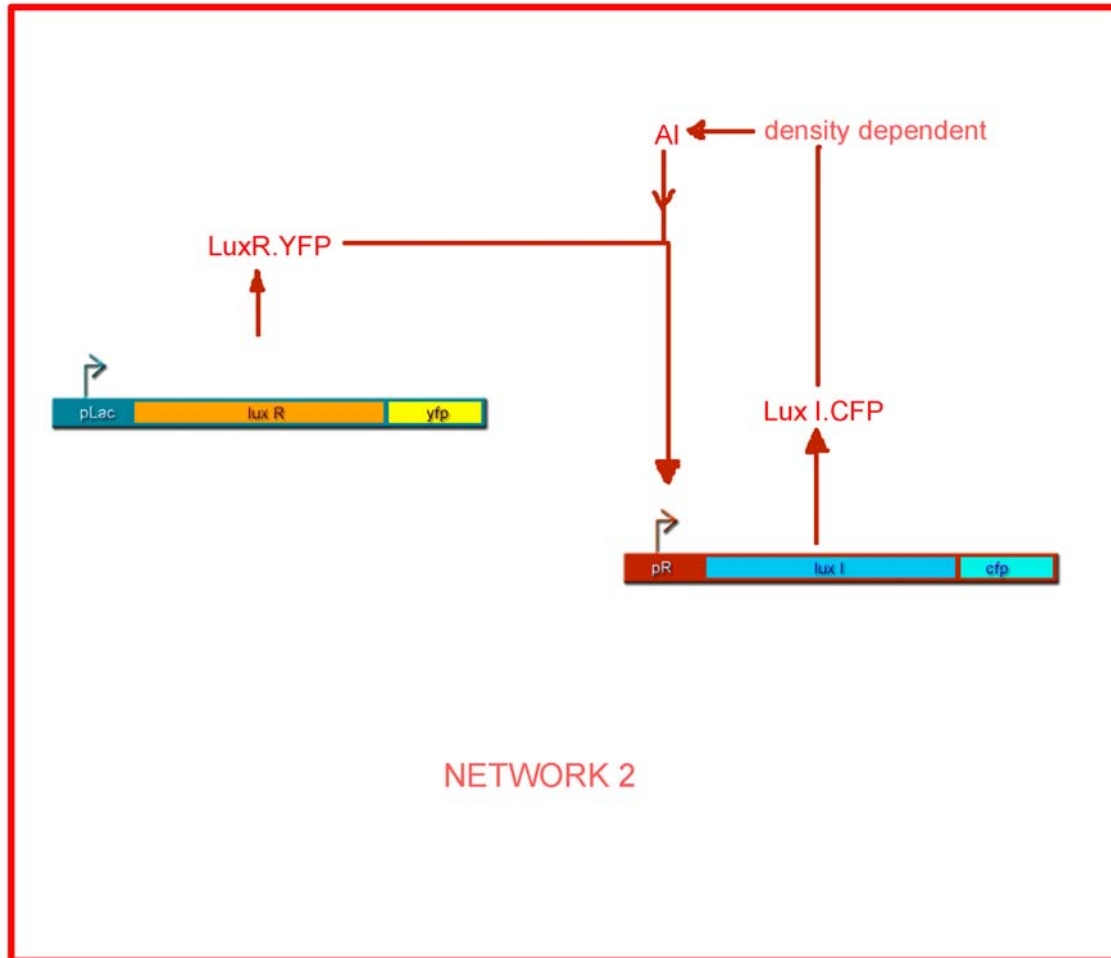
Open Loop



Closed loop (1)



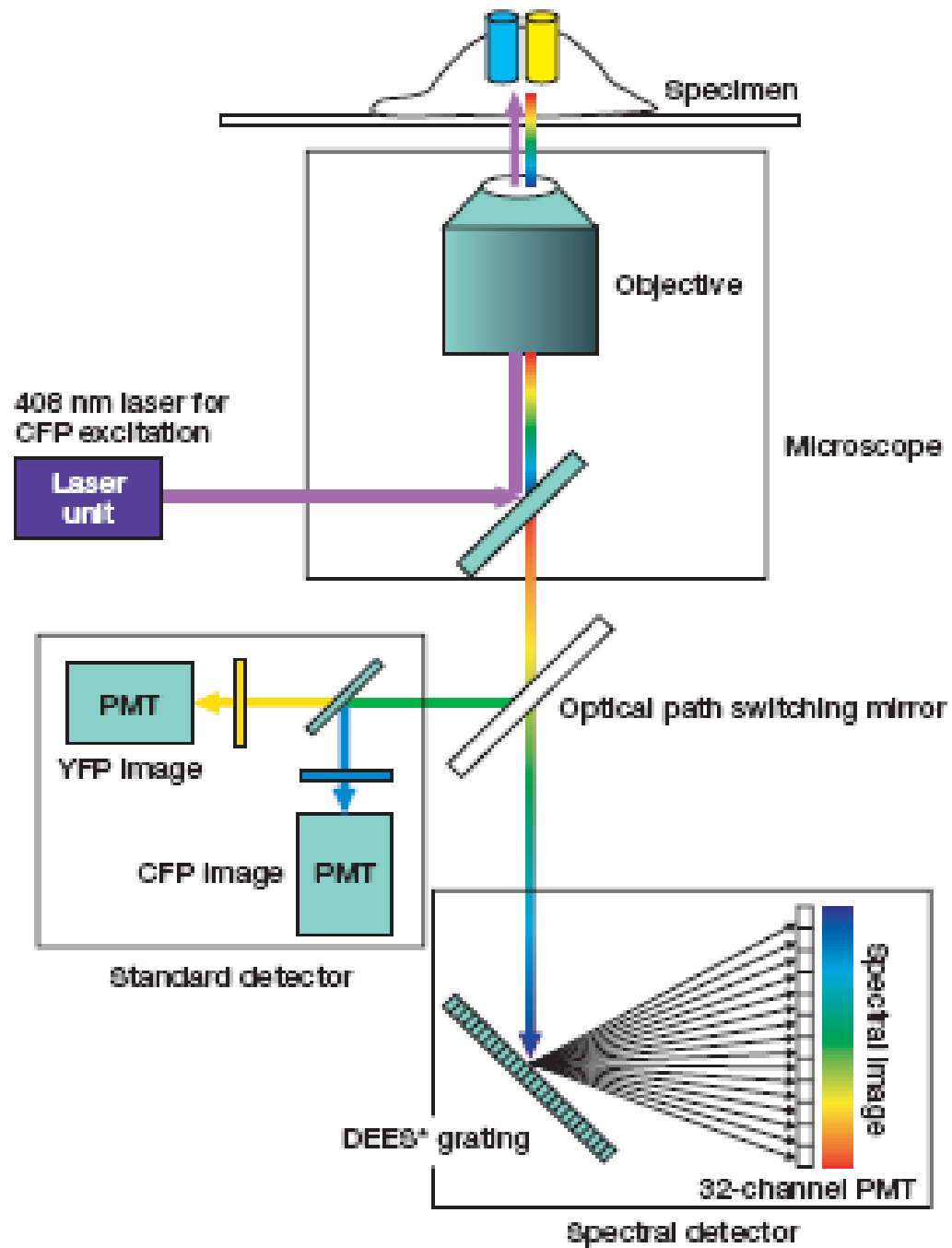
Closed loop (2)



The Experiments

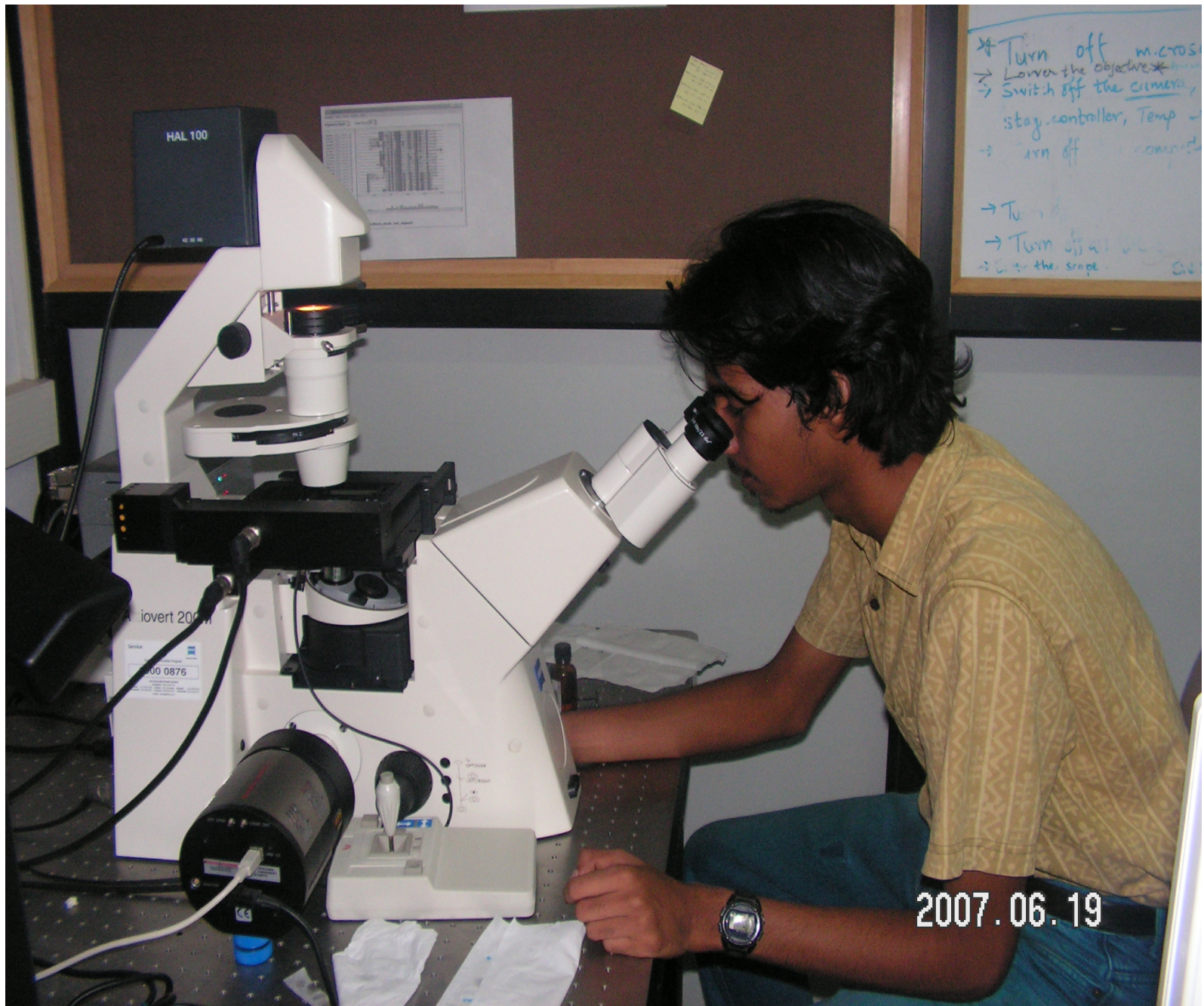
Fluorescence Microscopy





Fluorescent Activated Cell Sorting

(Flow Cytometry)

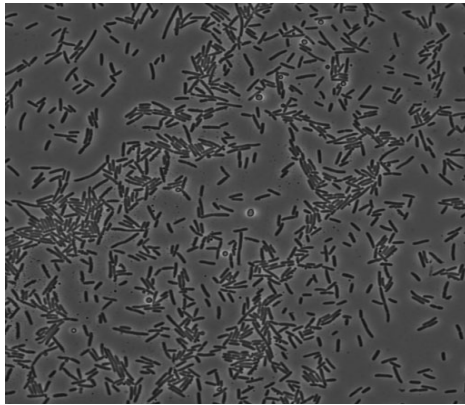


* Turn off m.cros
→ Lower the objective
→ Switch off the camera,
stage controller, Temp
→ Turn off computer

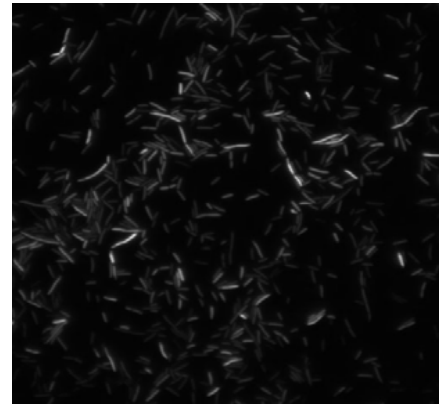
→ Turn
→ Turn off all
→ Turn the scope

2007.06.19

CFP Expression



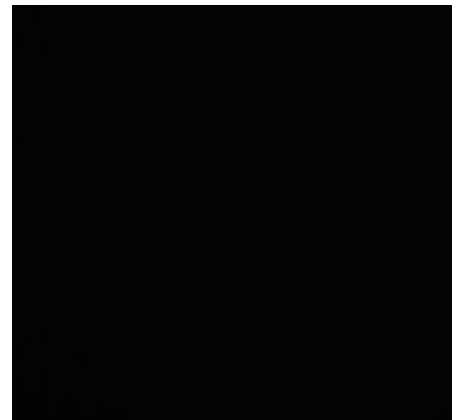
Phase contrast



Cfp filter

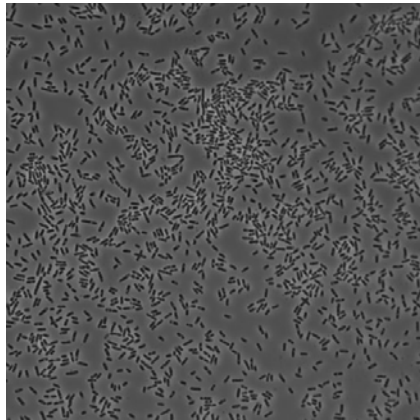


Rfp filter



Yfp filter

YFP Expression



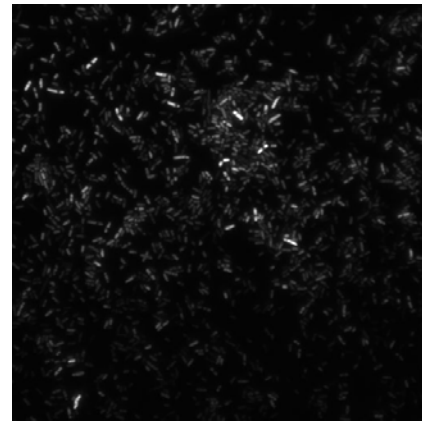
Phase contrast



Cfp filter



Rfp filter



Yfp filter