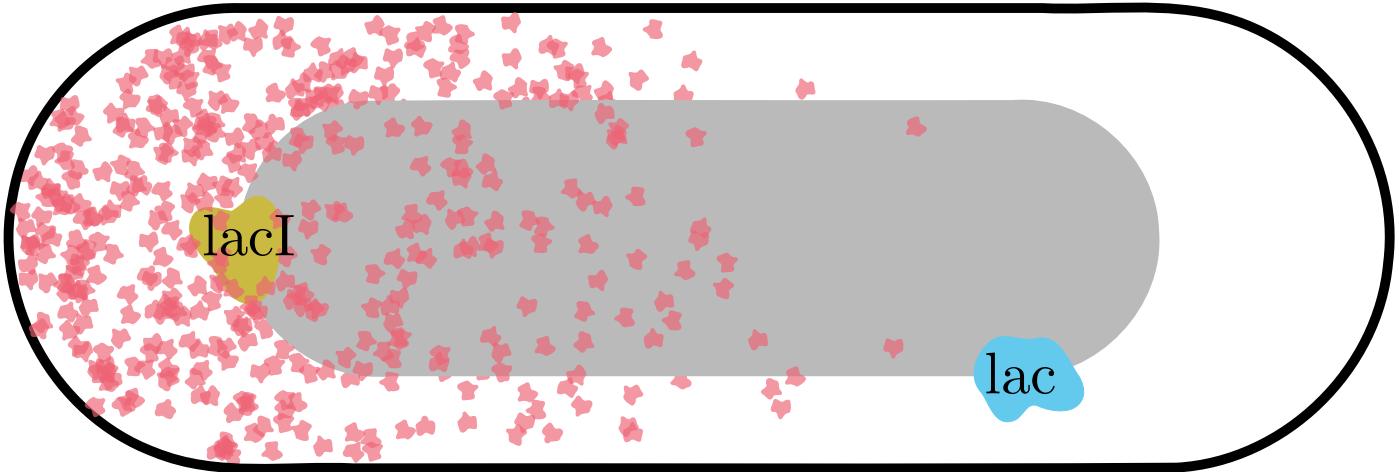


Genetic networks in 3D

Requirements for an SBOL spatial package

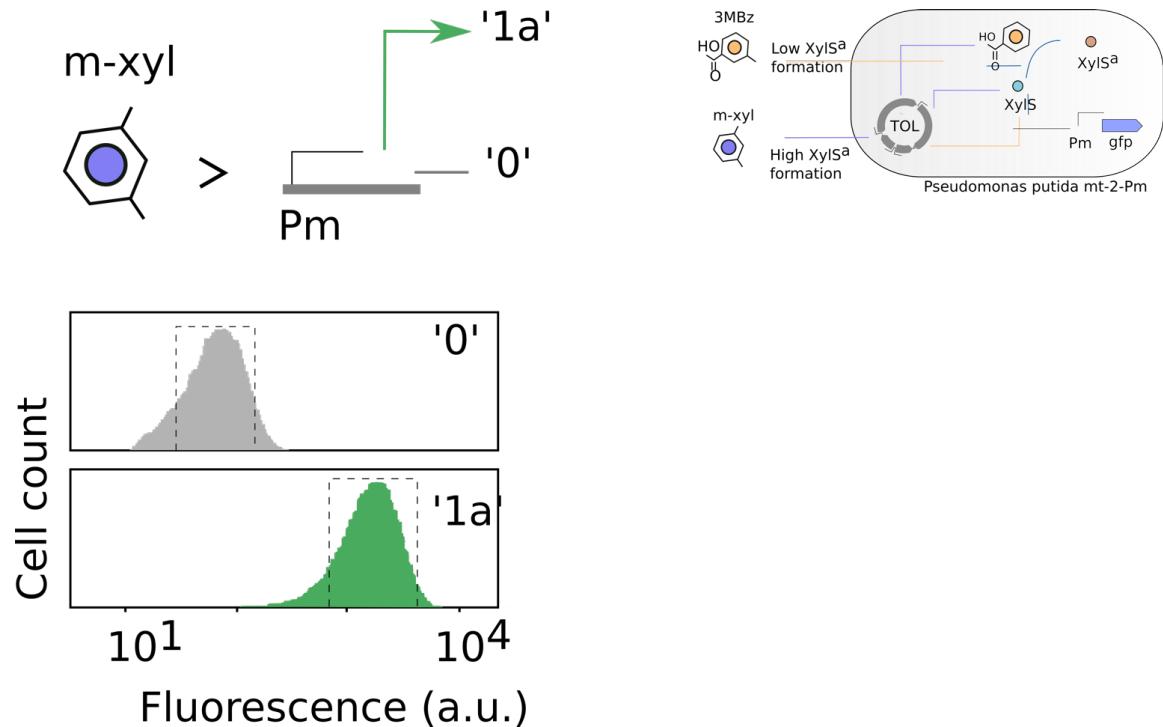


Ruud Stoof, r.stoof2@ncl.ac.uk

I(C₂O)₂S

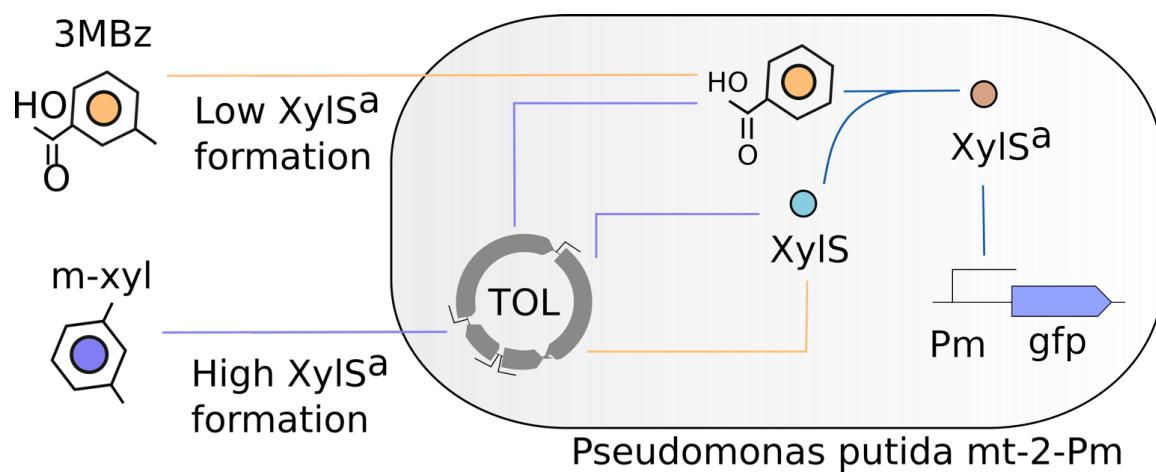


On/off



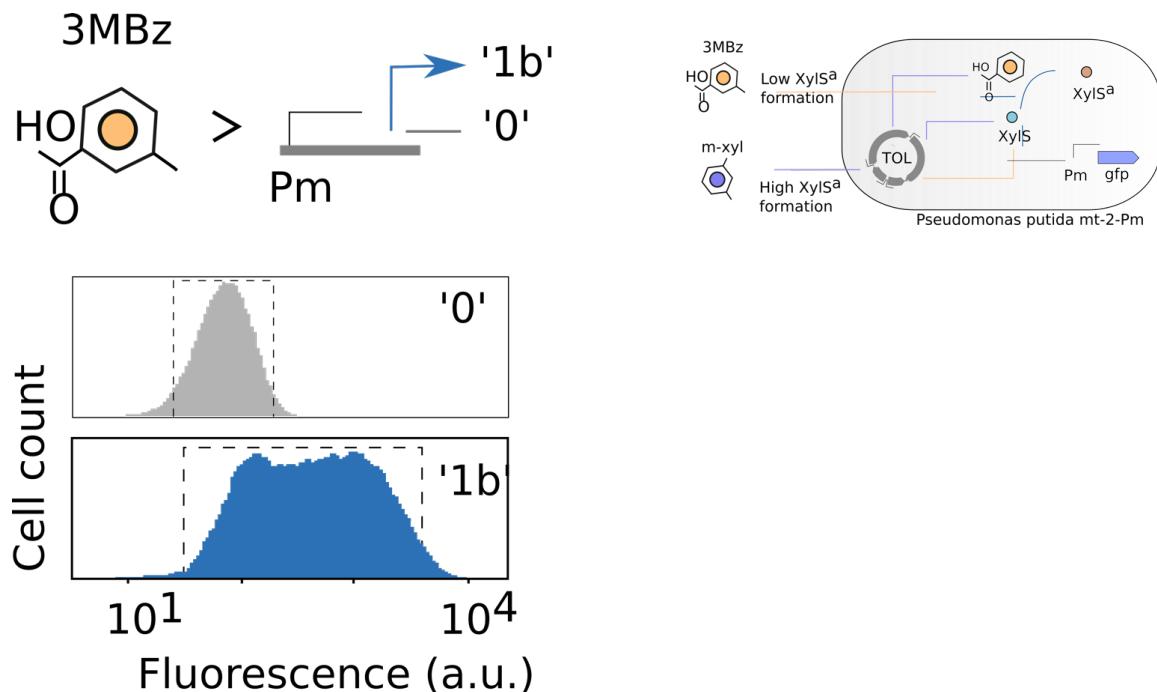
Moreno et. al (2017)

Model



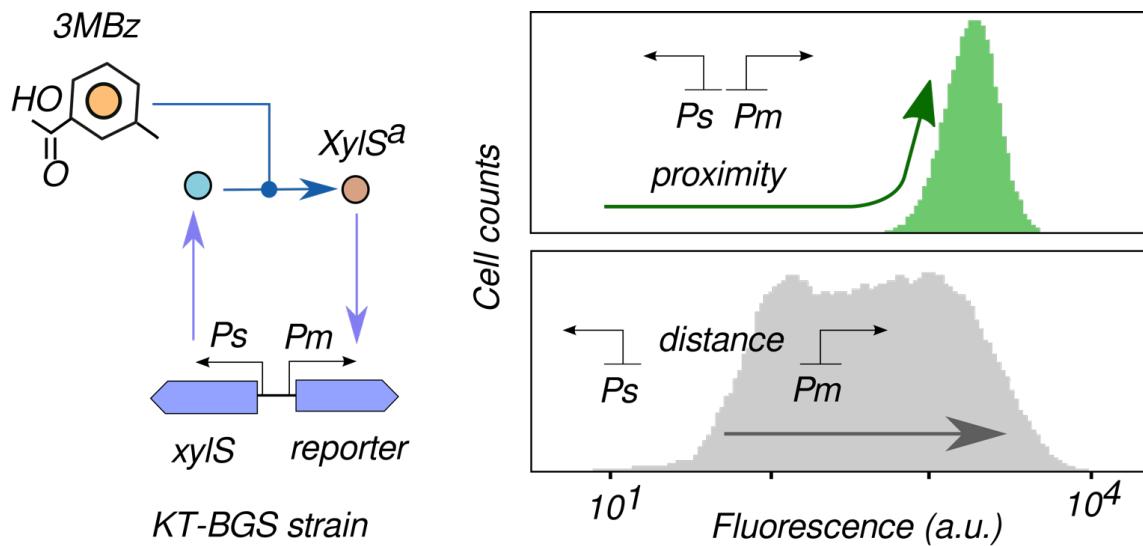
Moreno et. al (2017)

"On"/off



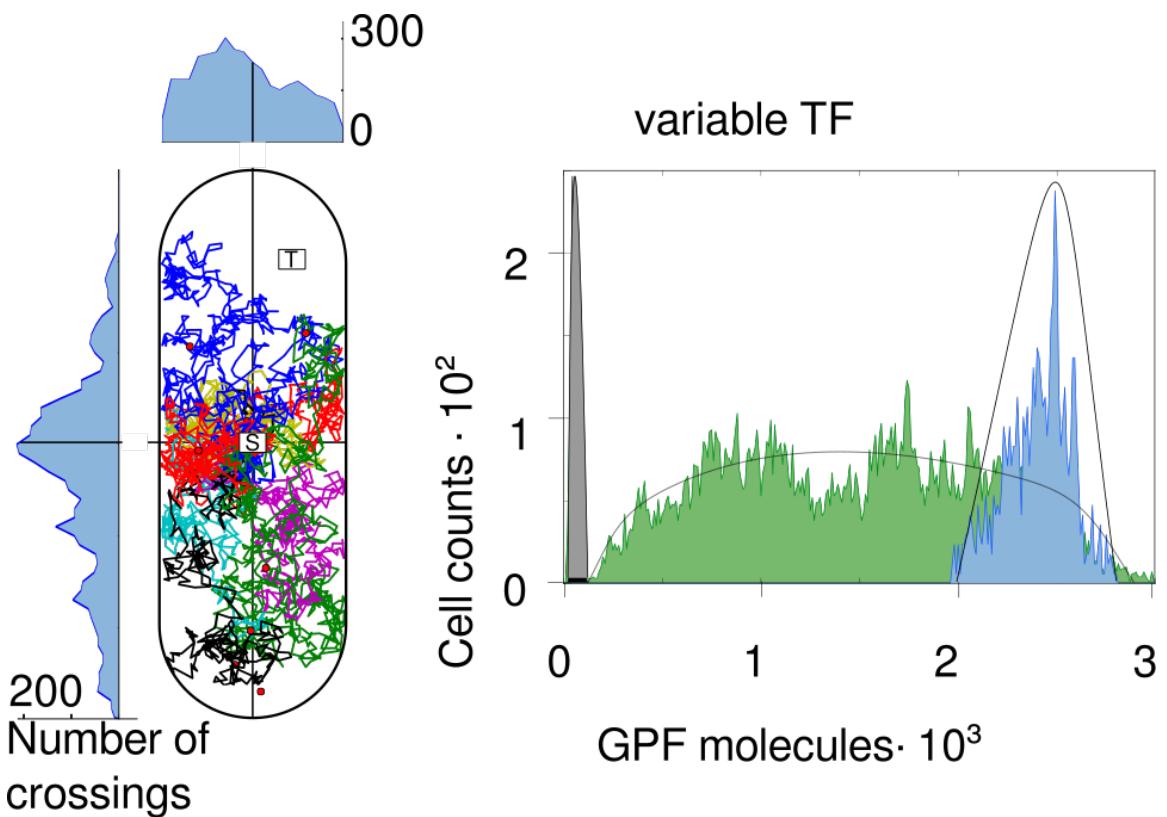
Moreno et. al (2017)

Empirical spatial effects



Moreno et. al (2017)

Spatial toy model



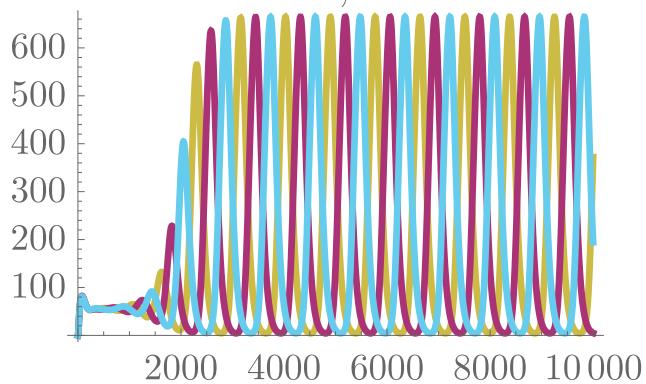
Moreno et. al (2017)

Repressilator modelling

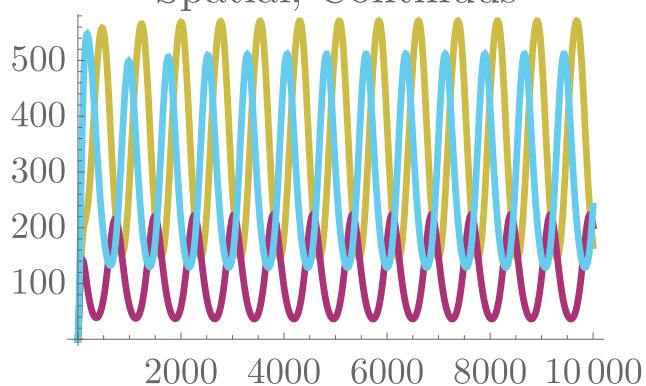
- Continuus homogenous model
- Quantized homogenous model
- Continuus spatial model
- Quantized spatial model

Simulations

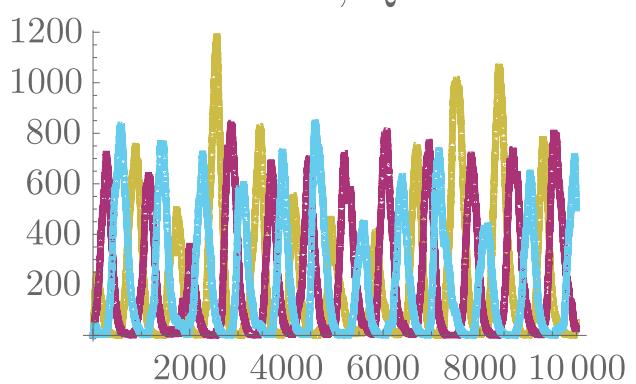
Well stirred, Continuus



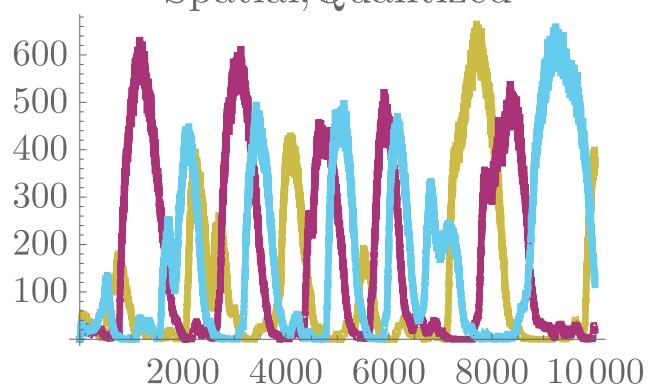
Spatial, Continuus



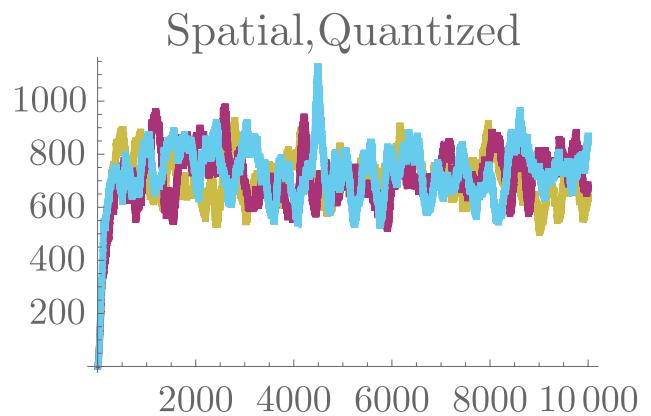
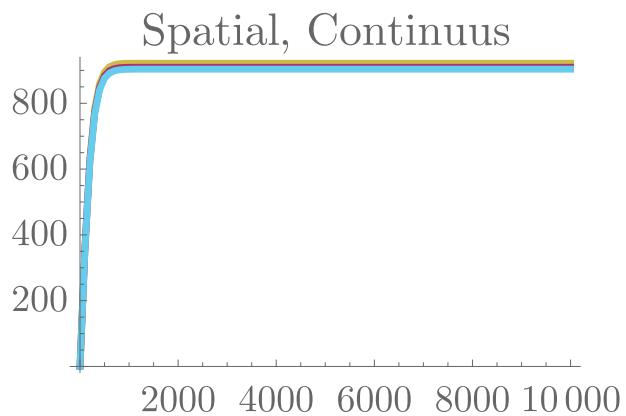
Well stirred, Quantized



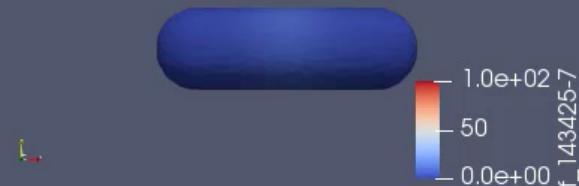
Spatial, Quantized



Spatial dependence



Spatial repressilator



0:00



Structures in cytoplasm

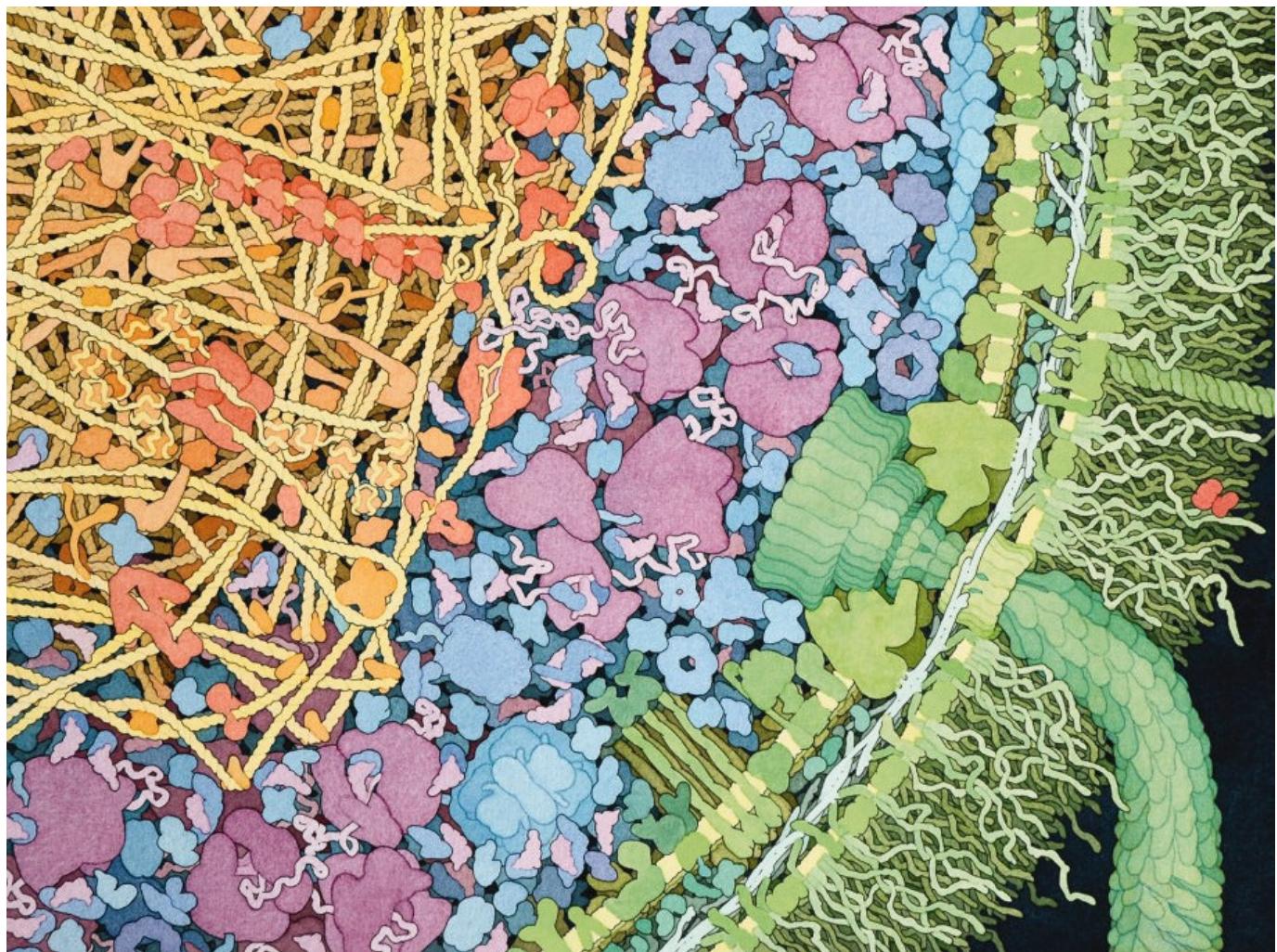


Illustration from *The Machinery of Life* by David S. Goodsell.

To do:

- Find and apply physiological parameters
- Add cell stucture, components and interactions
- Collaborate with experimentalist, compare simulation with observations
- **Strucural discription standard to describe spatial designs, SBOL?**

SBOL proposal: Add location to FunctionalComponent?

ModuleDefinition: Cell

FunctionalComponent: protein

Location: membrane (GO:0016020)

FunctionalComponent: transcription factor

Location: chromosome (GO:0005694)

FunctionalComponent: operator

Location: plasmid (NCIT_C754)

represents