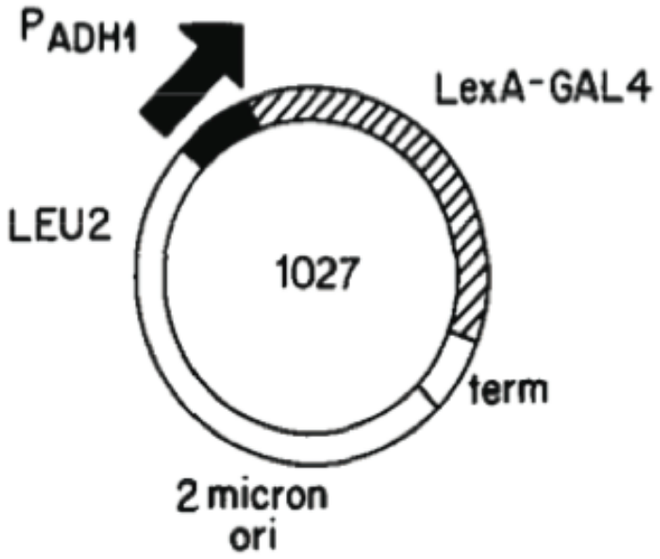
Synthetic Biology Open Language Visual

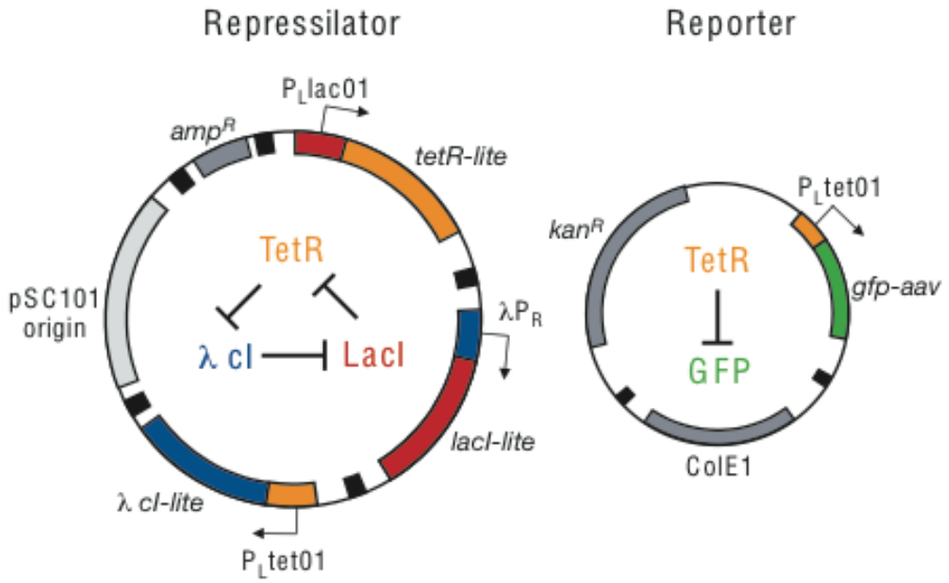
Graphical notation for forward engineering of biology

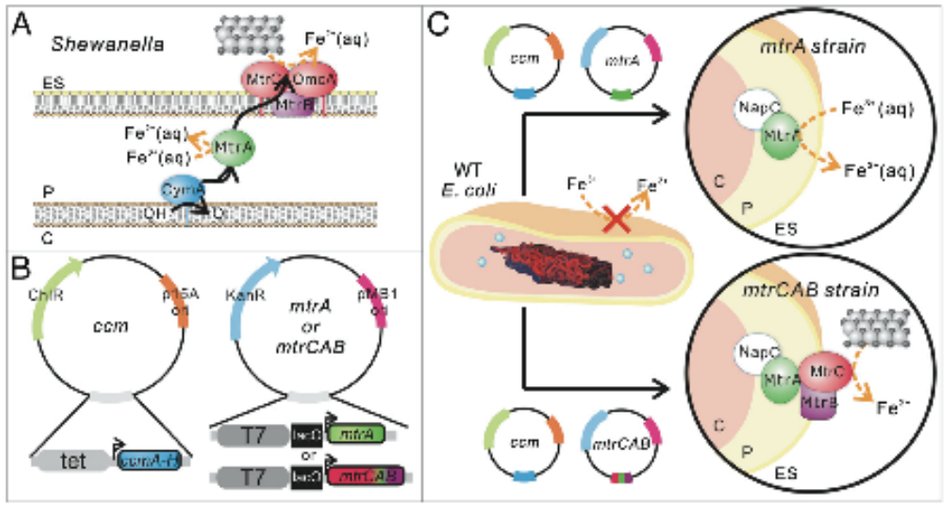
Jackie Quinn

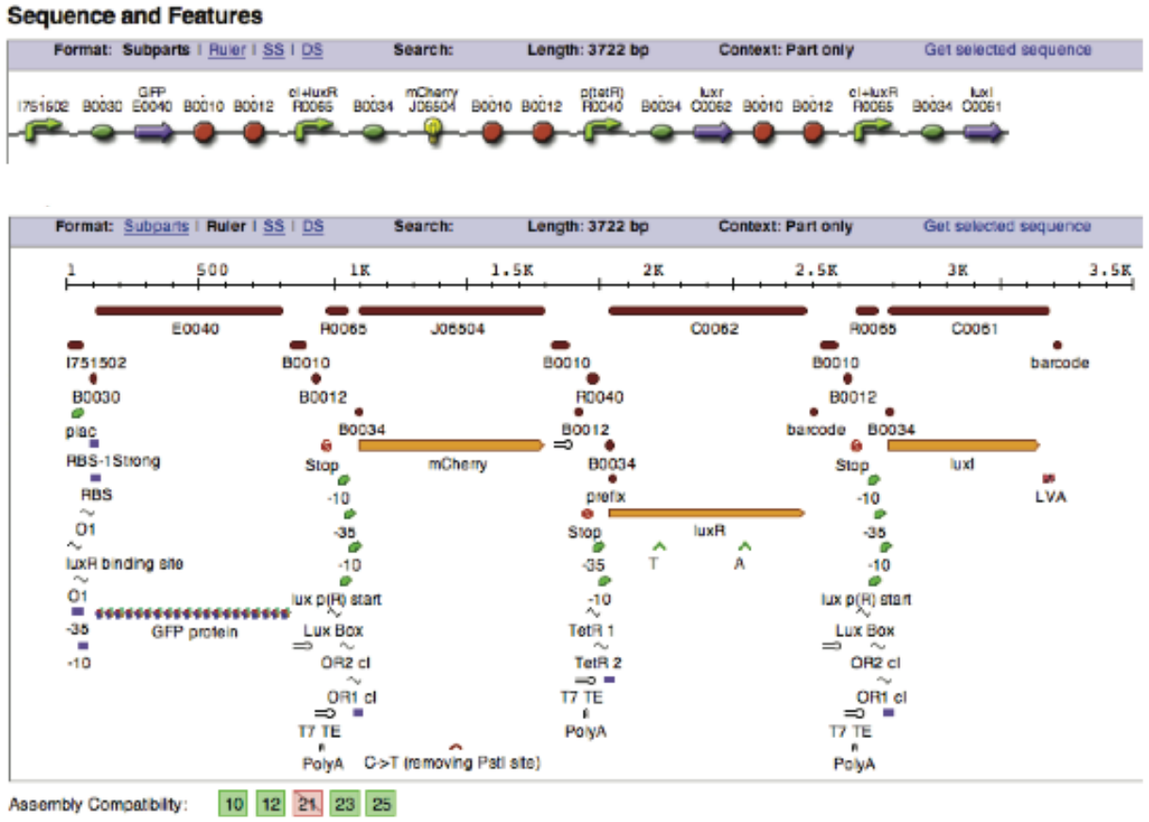
COMBINE - August 19, 2014

SBOL and SBOL Visual (the basics)



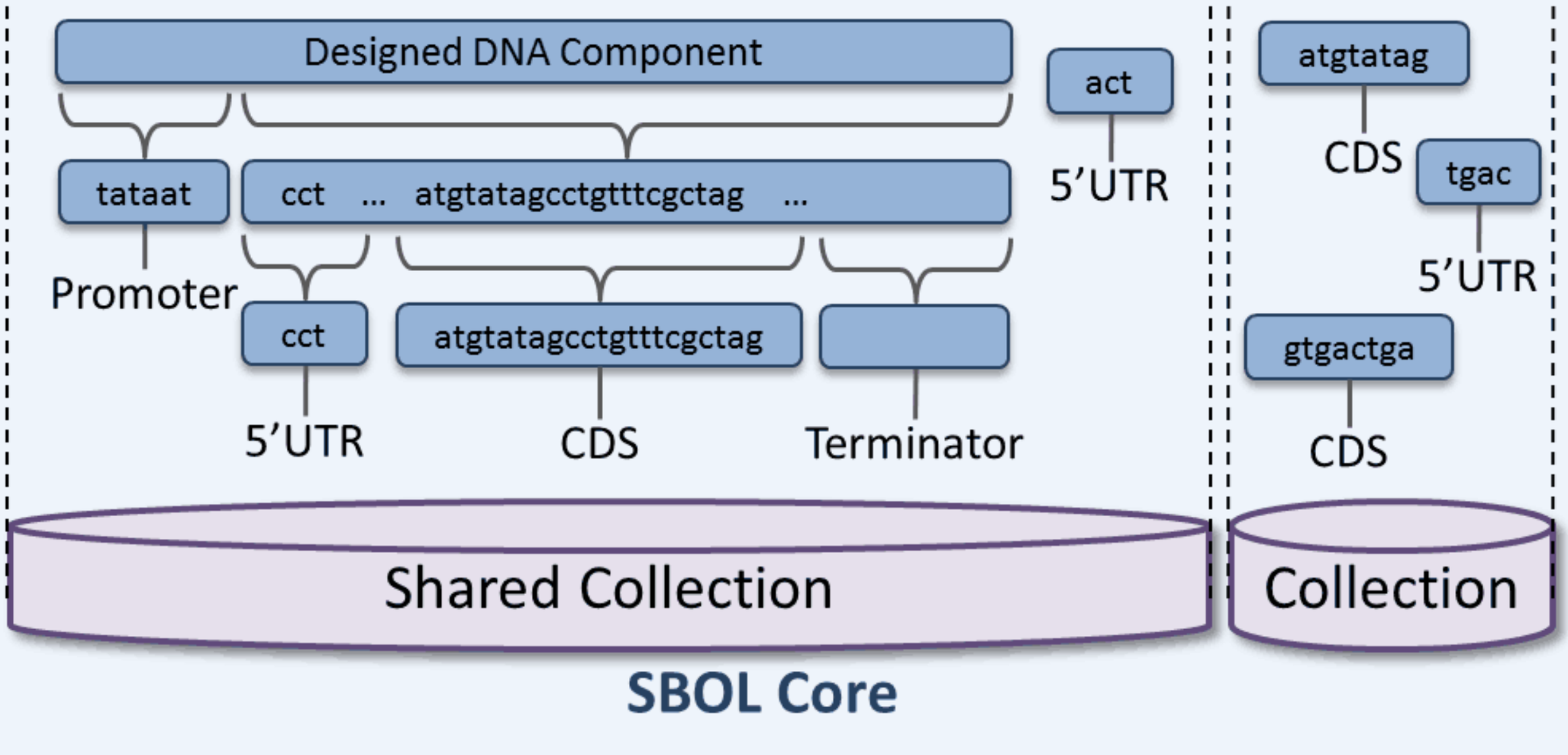






visual representation of genetic design

SBOL Visual



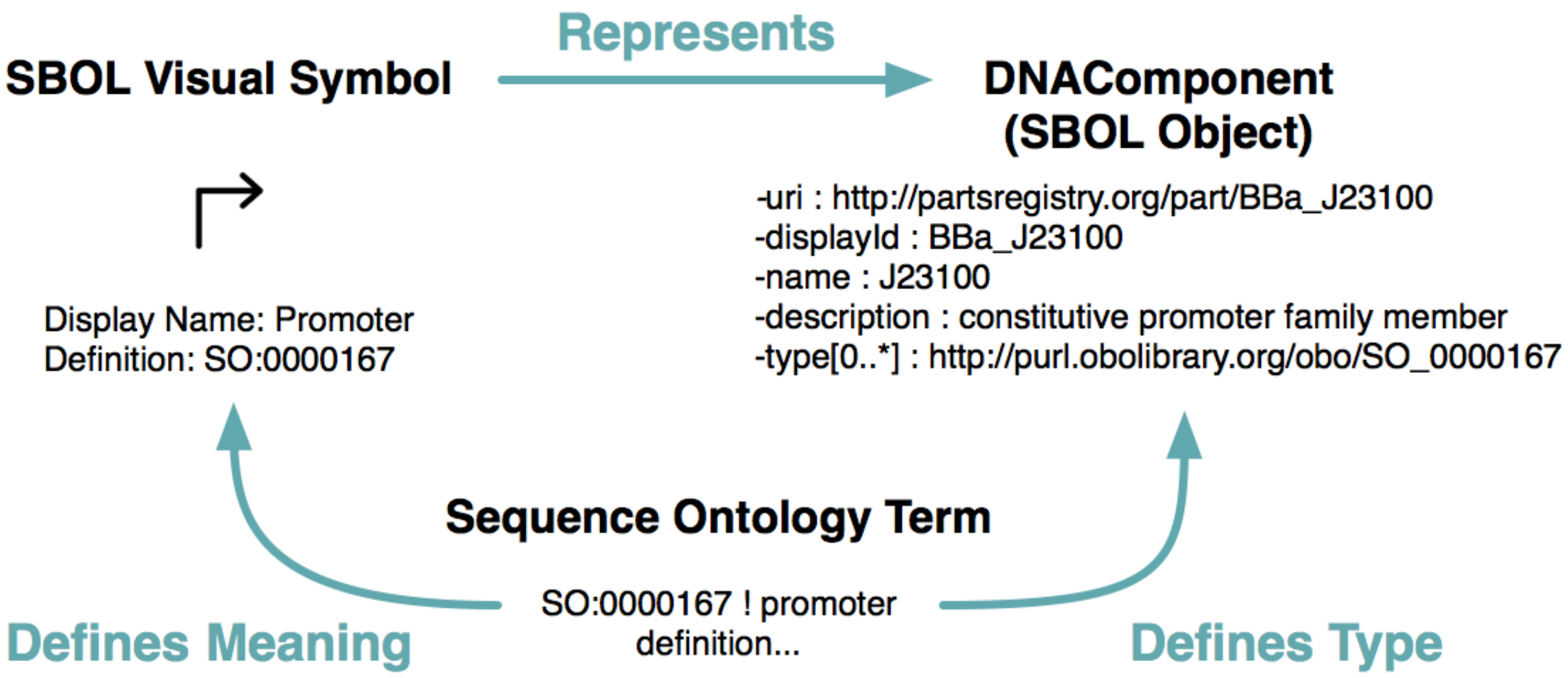
SBOL Core

Symbol Design
(what we focus on)

- Compatibility with current practice
- Flexibility
- Ease of use

promoter	origin of replication
cds	primer binding site
ribosome entry site	blunt restriction site
terminator	sticky restriction site
operator	5’ overhang
insulator	3’ overhang
ribonuclease site	assembly scar
rna stability element	signature
protease site	user defined
protein stability element	

symbol set



relationship to SBOL

use in various contexts

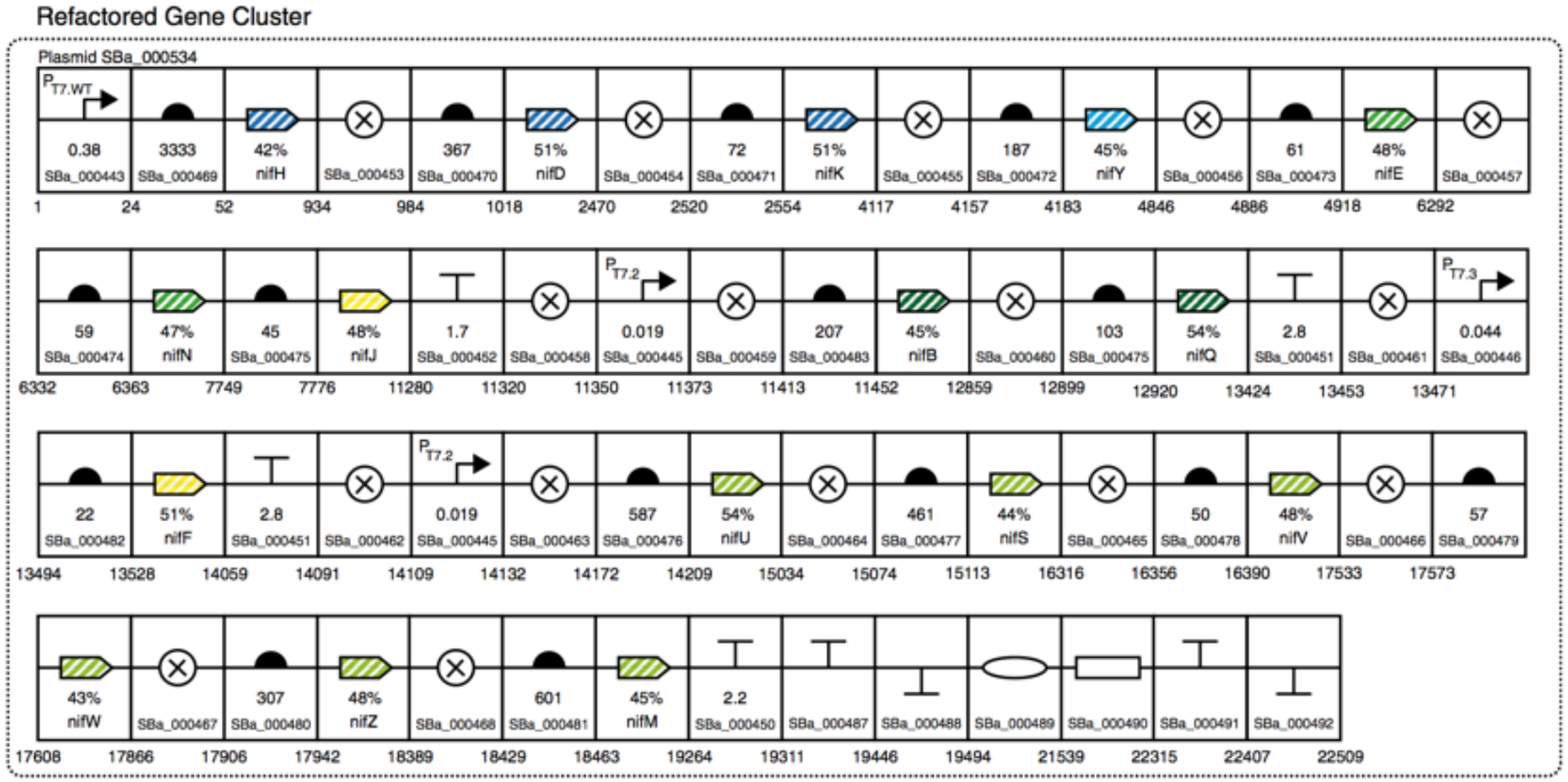


Fig. 4. Comprehensive schematic illustration for the complete refactored gene cluster and controller. Each of the 89 parts is represented according to the Synthetic Biology Open Language visual standard (www.sbolstandard.org), and the SynBERC Registry part number (registry.synberc.org) and part activity are shown. The full sequences of each plasmid have been deposited in GenBank (SBa_000534, JQ903614; SBa_000559, JQ903615; SBa_000560, JQ903616). The T7 promoter strengths are measured with monomeric red fluorescent protein and reported in RFUs (*Materials and Methods*). Terminator strengths are measured in a reporter plasmid and reported as the fold reduction in monomeric red fluorescent protein (RFP) expression compared with a plasmid without the terminator. The RBS strength is reported in as arbitrary units of expression from the induced P_{tac} promoter (1 mM IPTG) and a fusion gene between the first 90 nt of the gene and RFP. The nucleotide numbers for the plasmids containing the refactored cluster and controller are shown. The codon identity of each recoded gene compared with WT is shown as a percentage.

Temme, Zhao, Voigt, PNAS 2012

Using MiCodes in a zipper assay

When you see this MiCode...

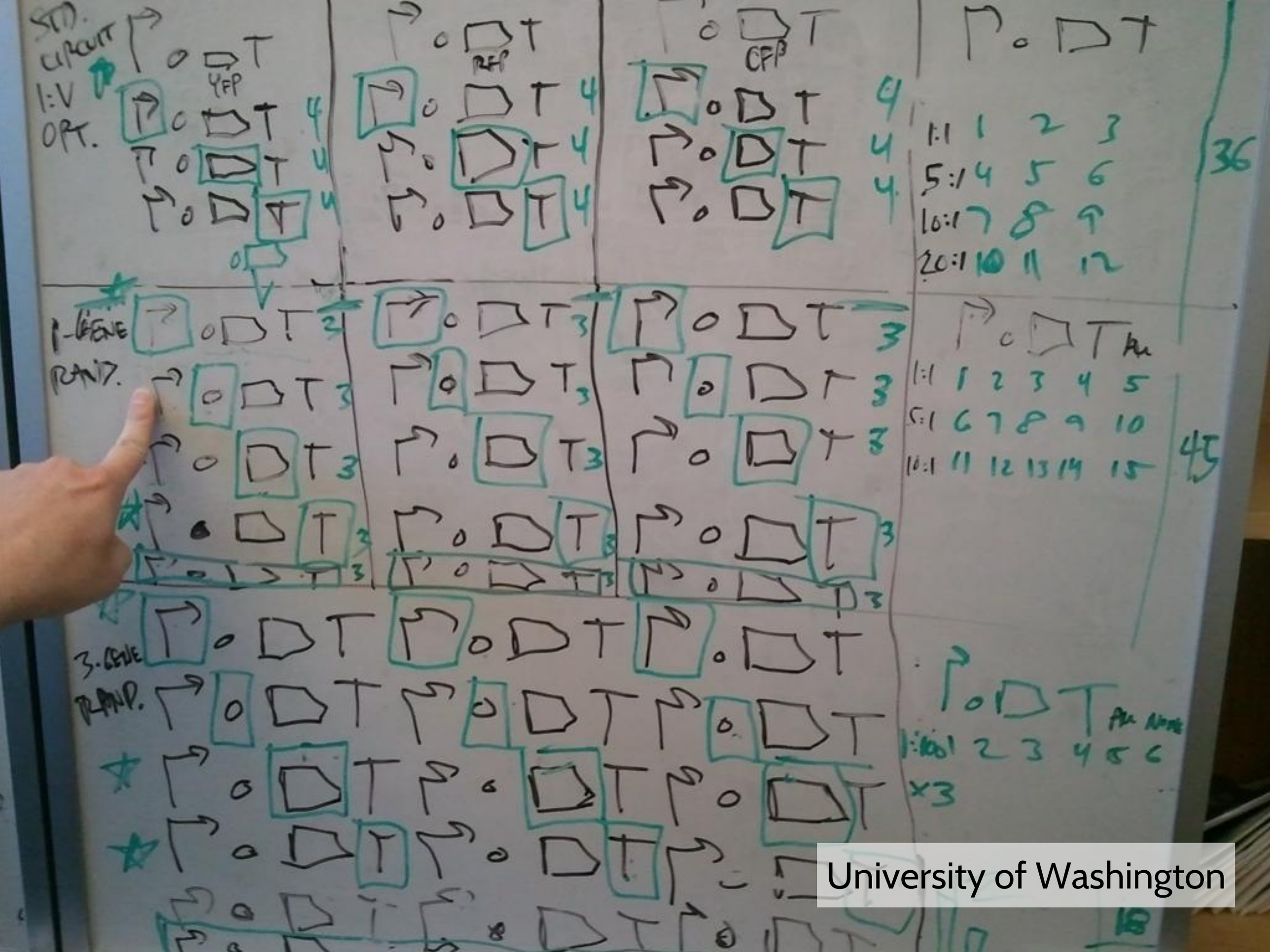
...you know you're assaying this zipper pair

Strong zipper pair

MiCodes

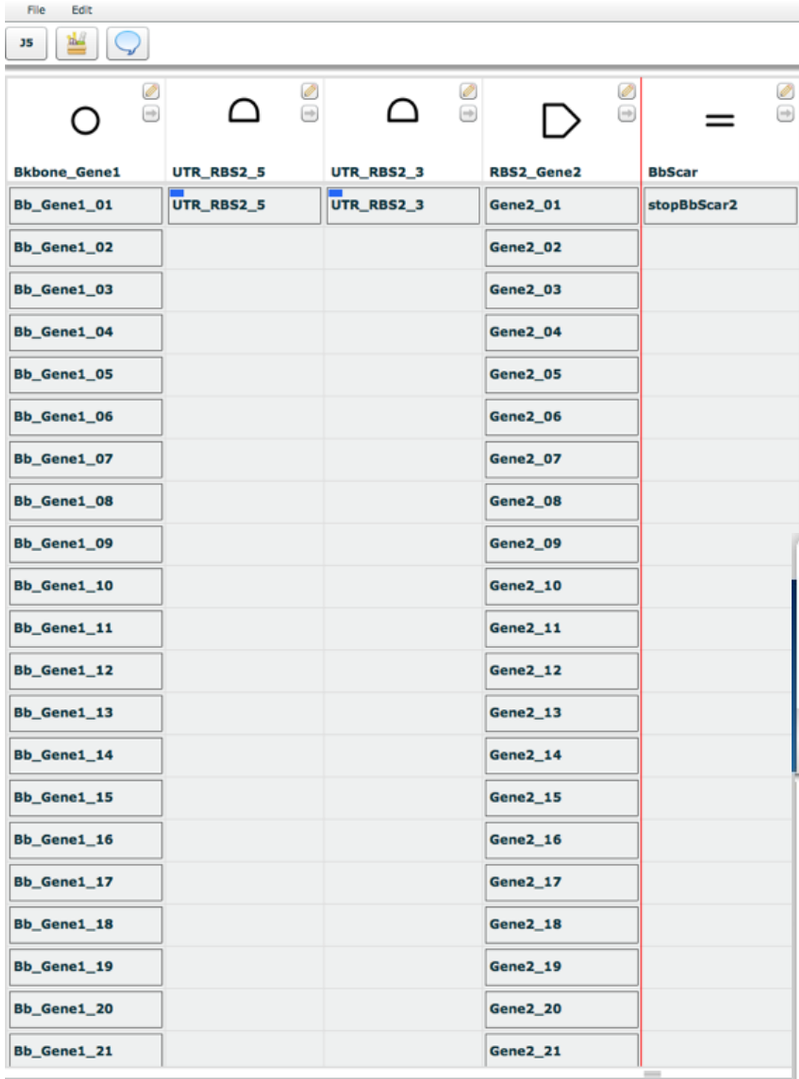
UC Berkeley

UC Berkeley iGEM 2012



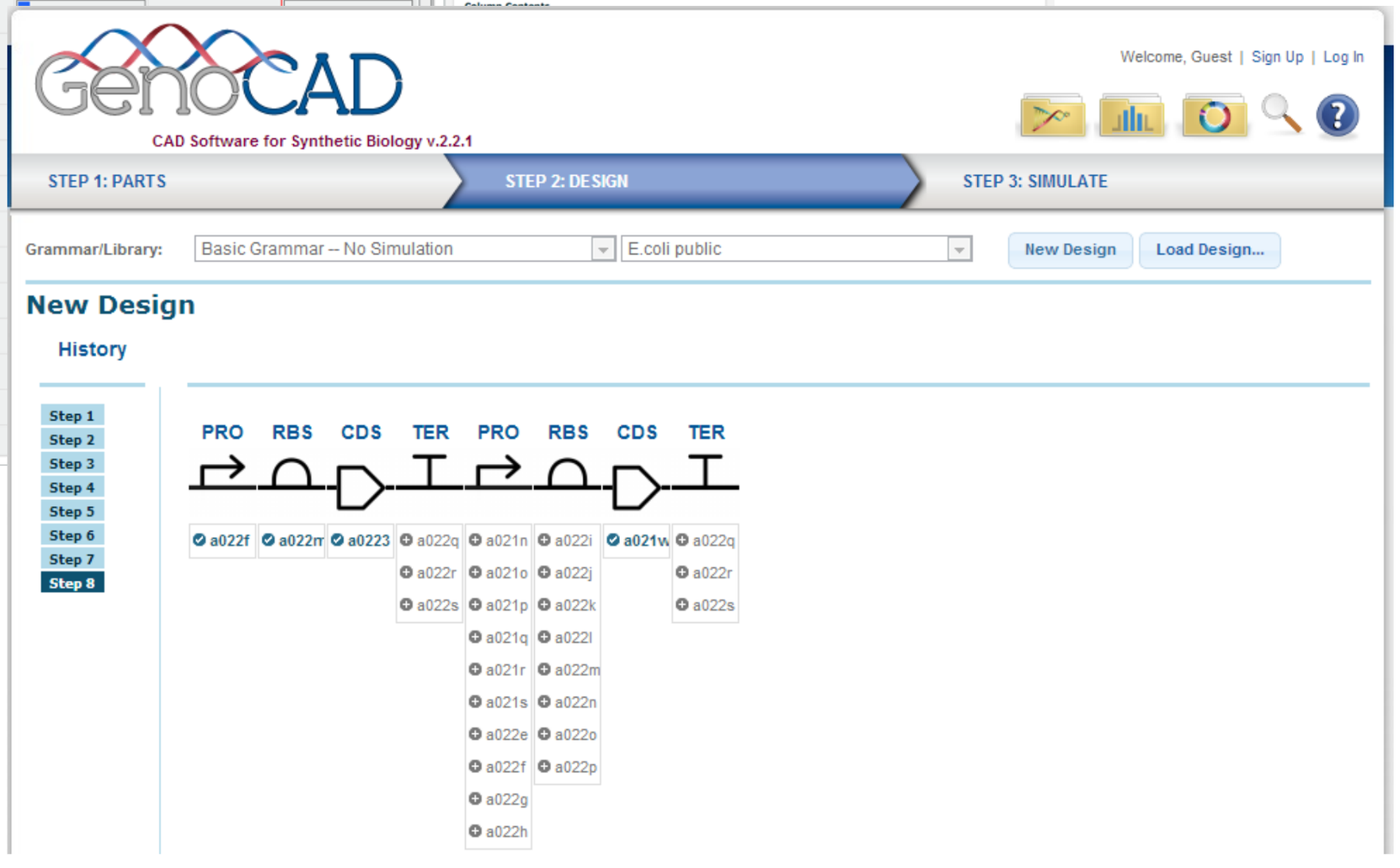
University of Washington

software



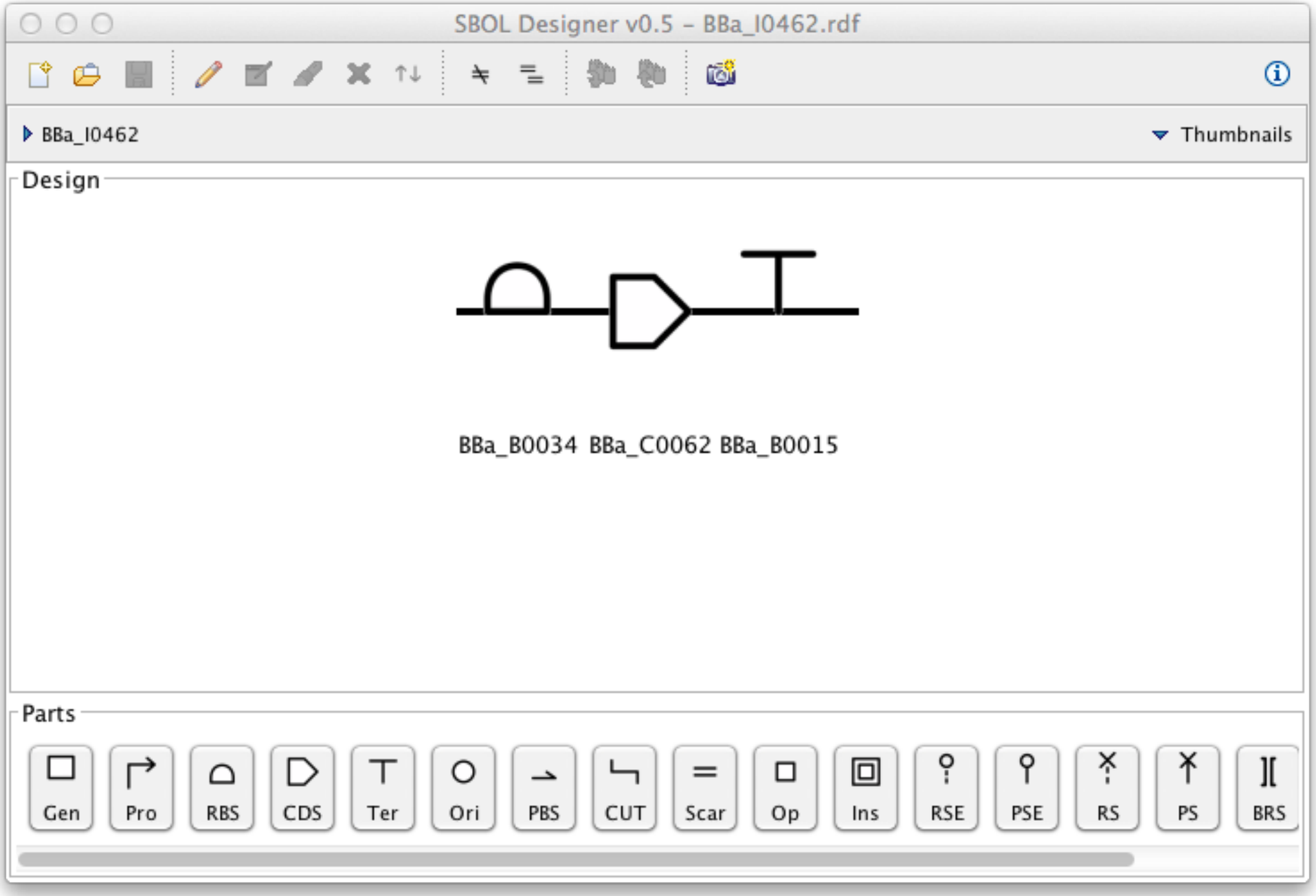
DeviceEditor

j5.jbei.org



GenoCAD

genocad.org

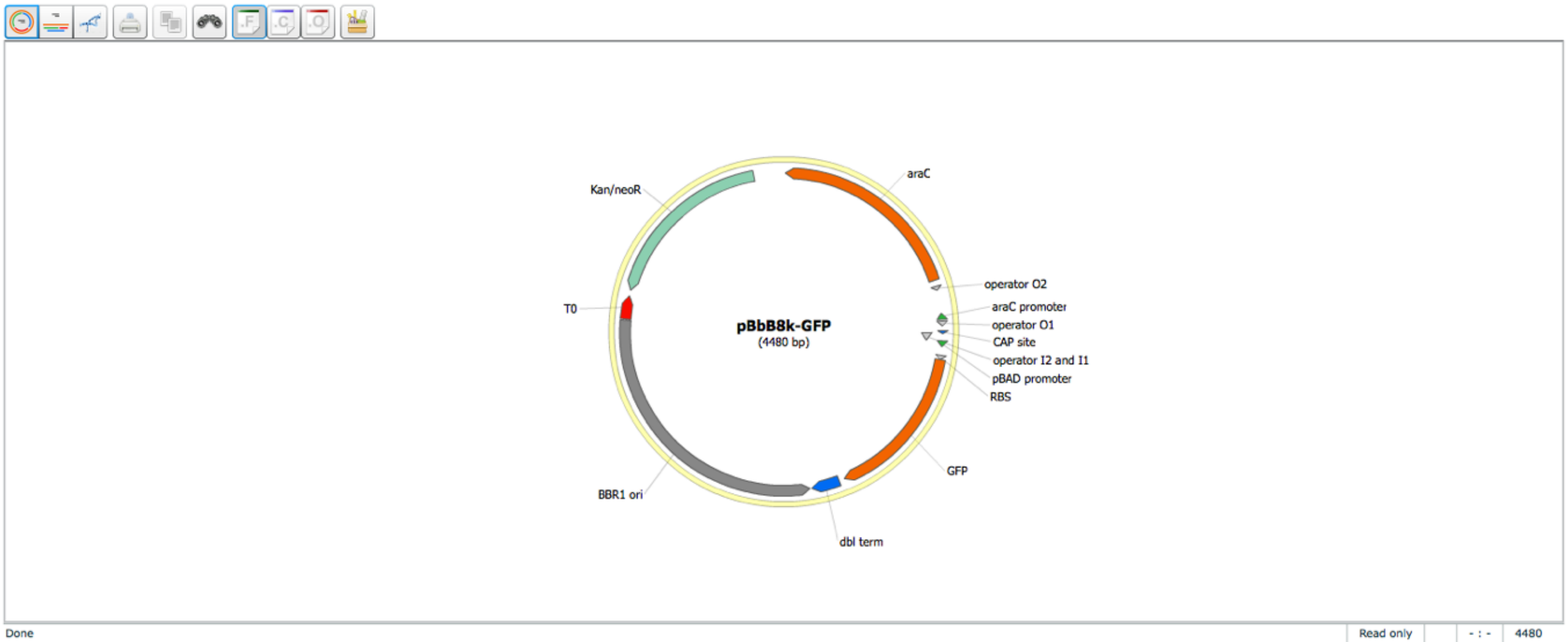


SBOL Designer

http://clarkparsia.github.io/sbol/

SEQUENCE

Delete | Open | Download | Hide Pigeon Image



Done

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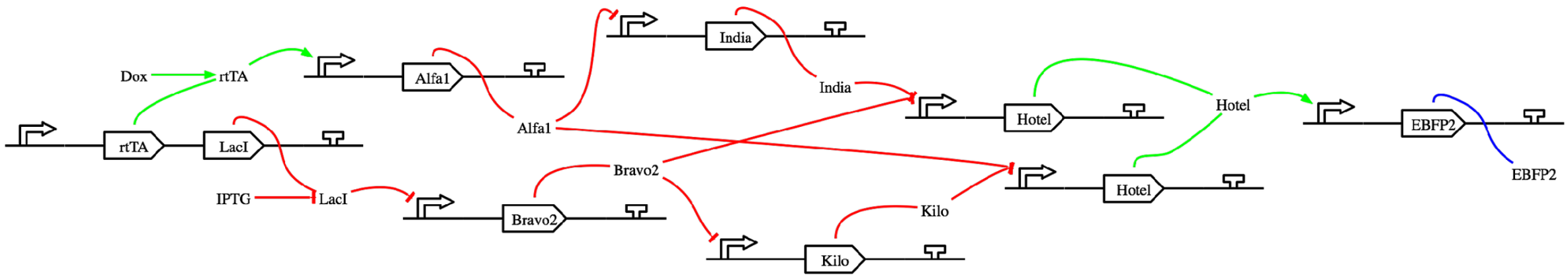
JBEI-ICE, Pigeon

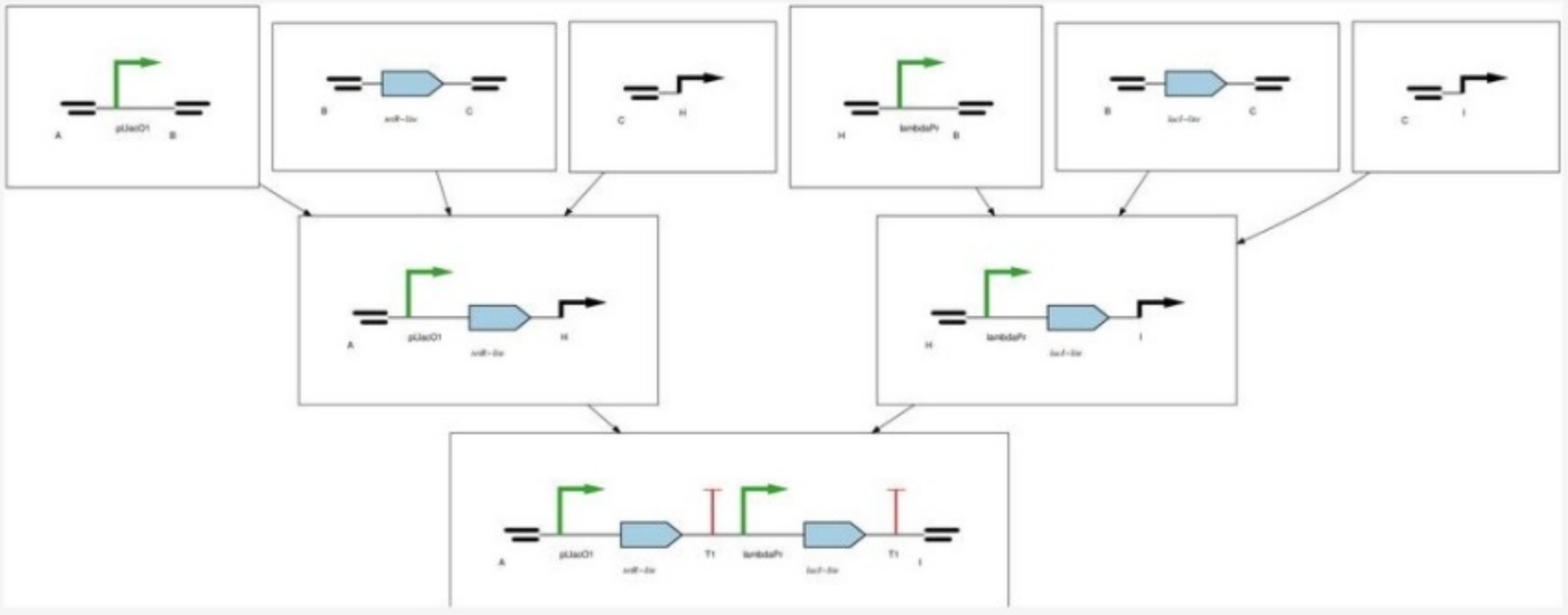
public-registry.jbei.org, pigeoncad.org



BioCompiler

synbiotools.bbn.com

Image | Instructions | Parts List | Summary | Discard Design



Assembly Statistics Graph structure verified!

Number of Goal Parts	1
Number of Assembly Steps	3
Number of Assembly Stages	2
Number of Reactions	12
Number of Recommended Parts	0
Number of Discouraged Parts	0
Assembly Efficiency	1.0
Parts Shared	0

Submit as Example

Save to working library

Download Options

Please use right-click, then save as to download the files

Download Graph Image

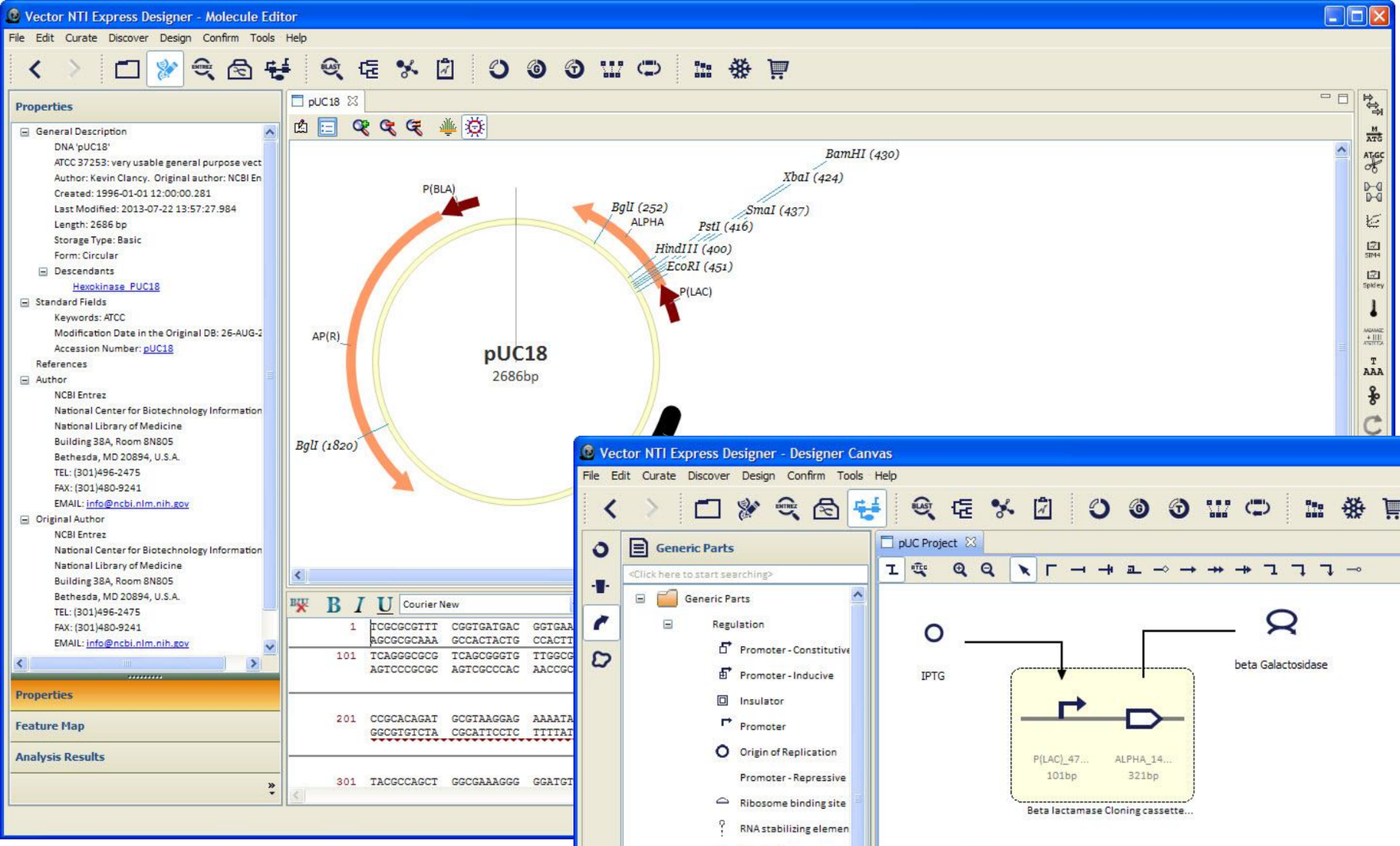
Download Instructions

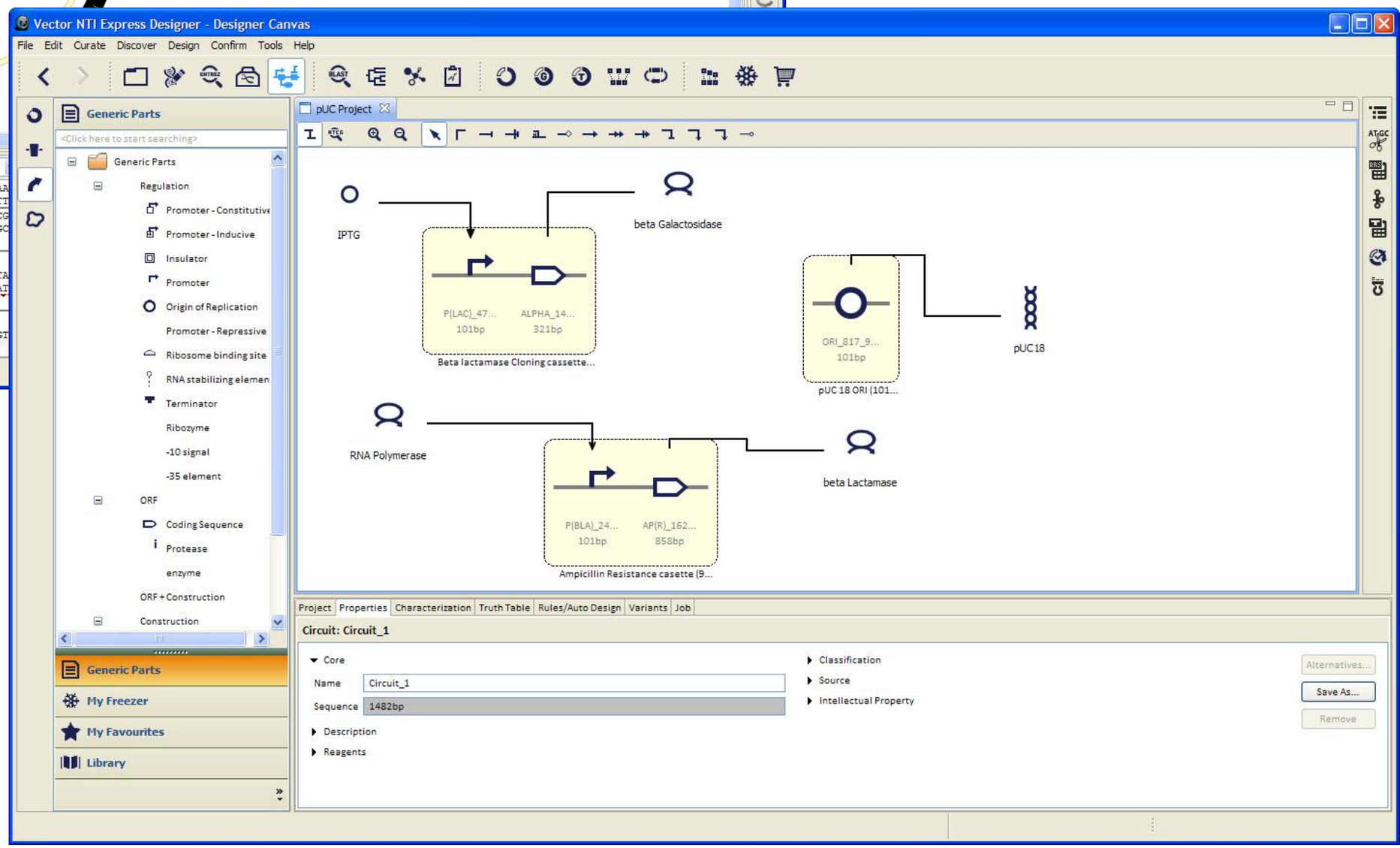
Download Parts/Vectors List

Download Pigeon File

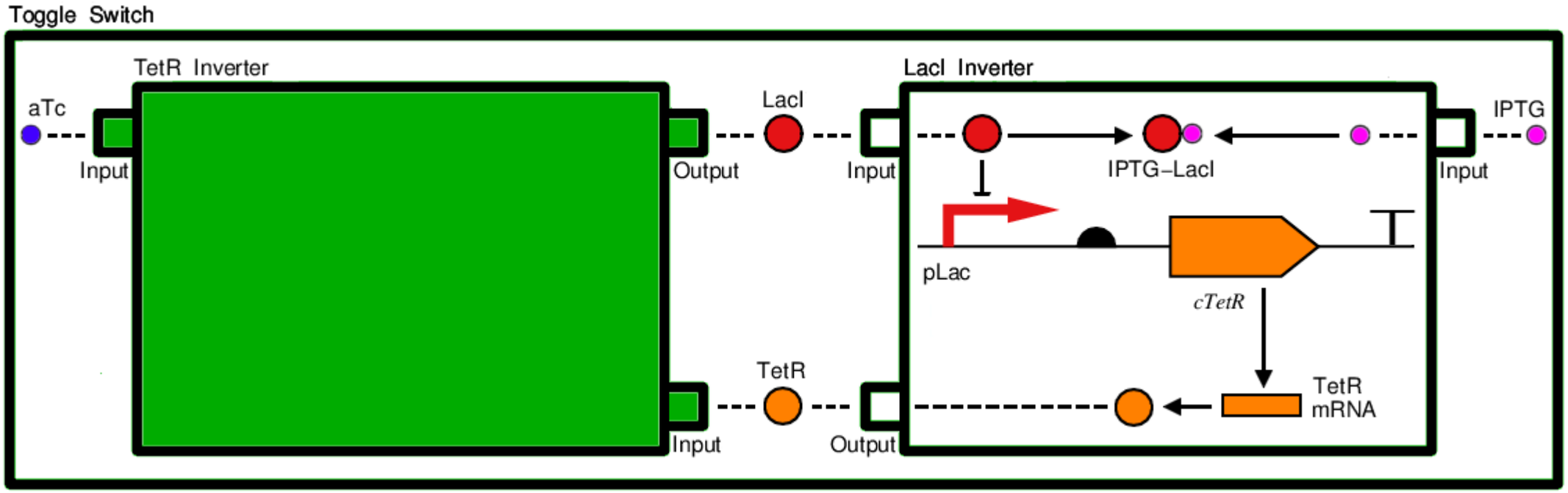
Download Puppeteer Arcs File

Raven
ravencad.org





VectorNTI Express Designer



SBOL Visual 2.0?

SBGN + SBOL

SBOL Visual Working Group

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Nathan Hillson
Cory Li
Chris Myers
Umesh P
Matthew Pocock
Jackie Quinn
Cesar Rodriguez
Herbert Sauro
Larisa Soldatova
Guy-Bart Stan
Grimaldo Urena
Alan Villalobos
Mandy Wilson

Thank You!

www.sbolstandard.org/visual

visual@sbolstandard.org