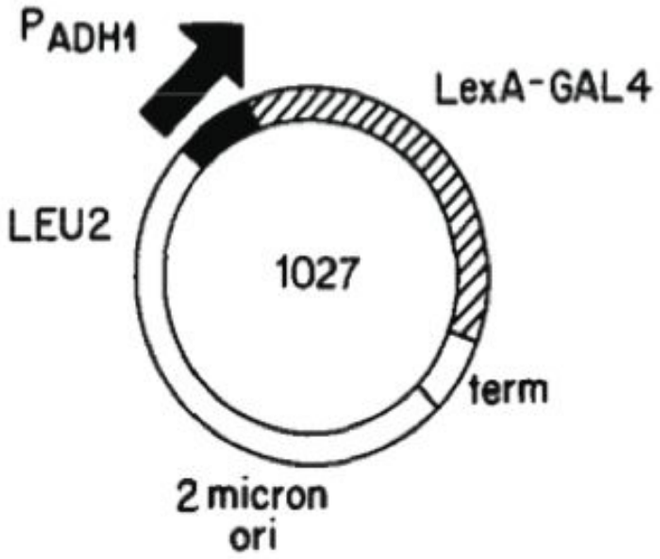
Synthetic Biology Open Language Visual

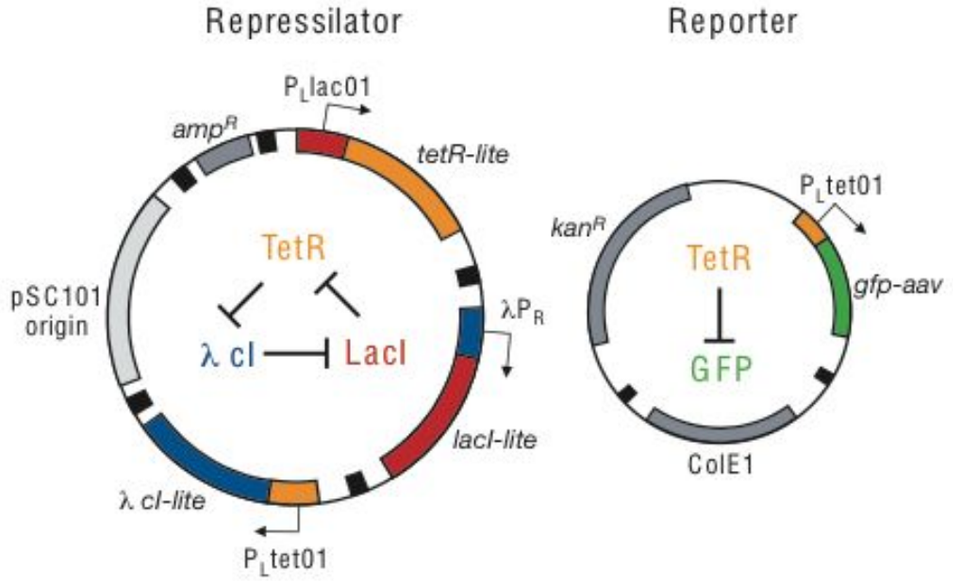
An open-source graphical standard for synthetic biology

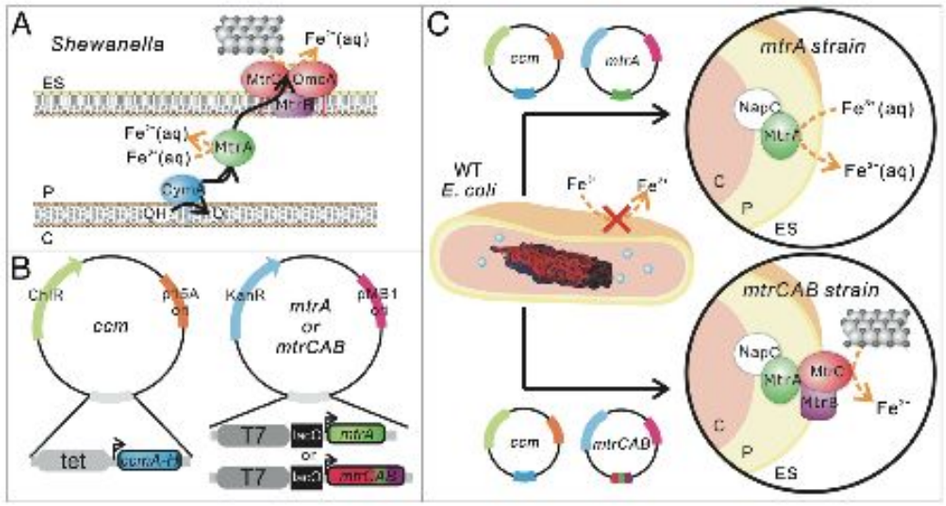
Jackie Quinn

SBGN 10 - August 17, 2014

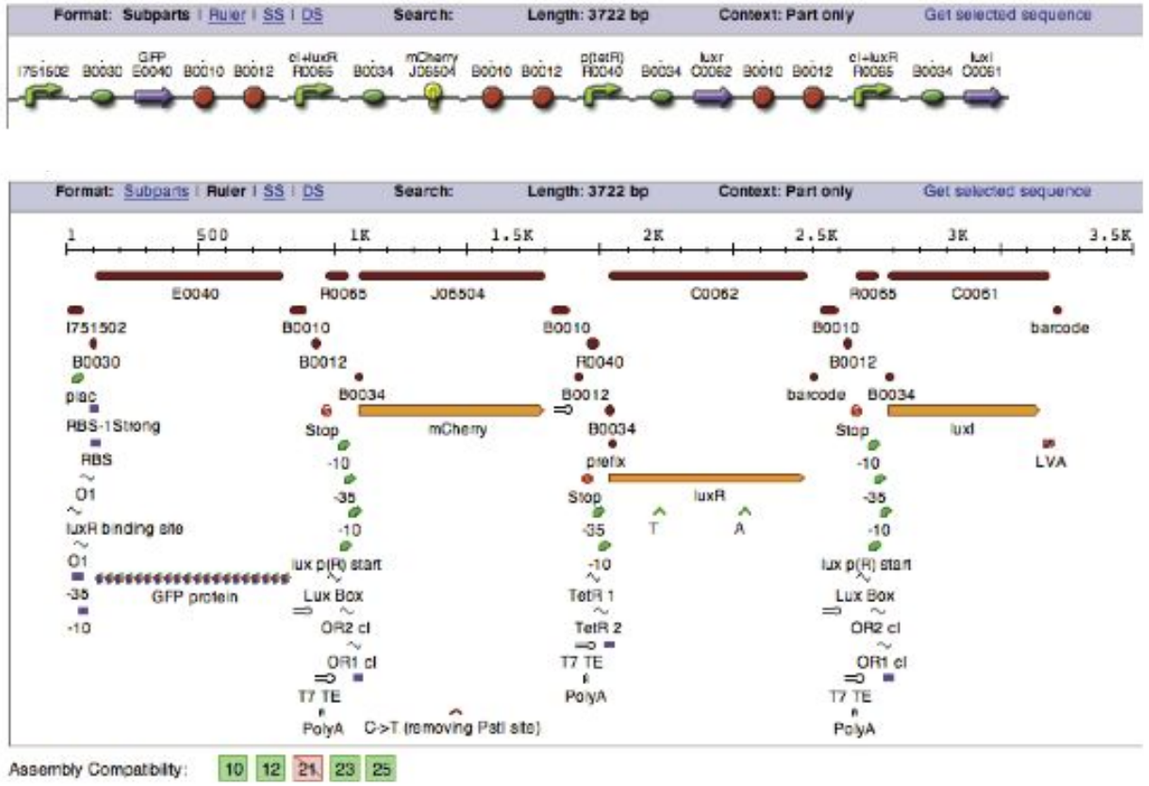
SBOL and SBOL Visual (the basics)



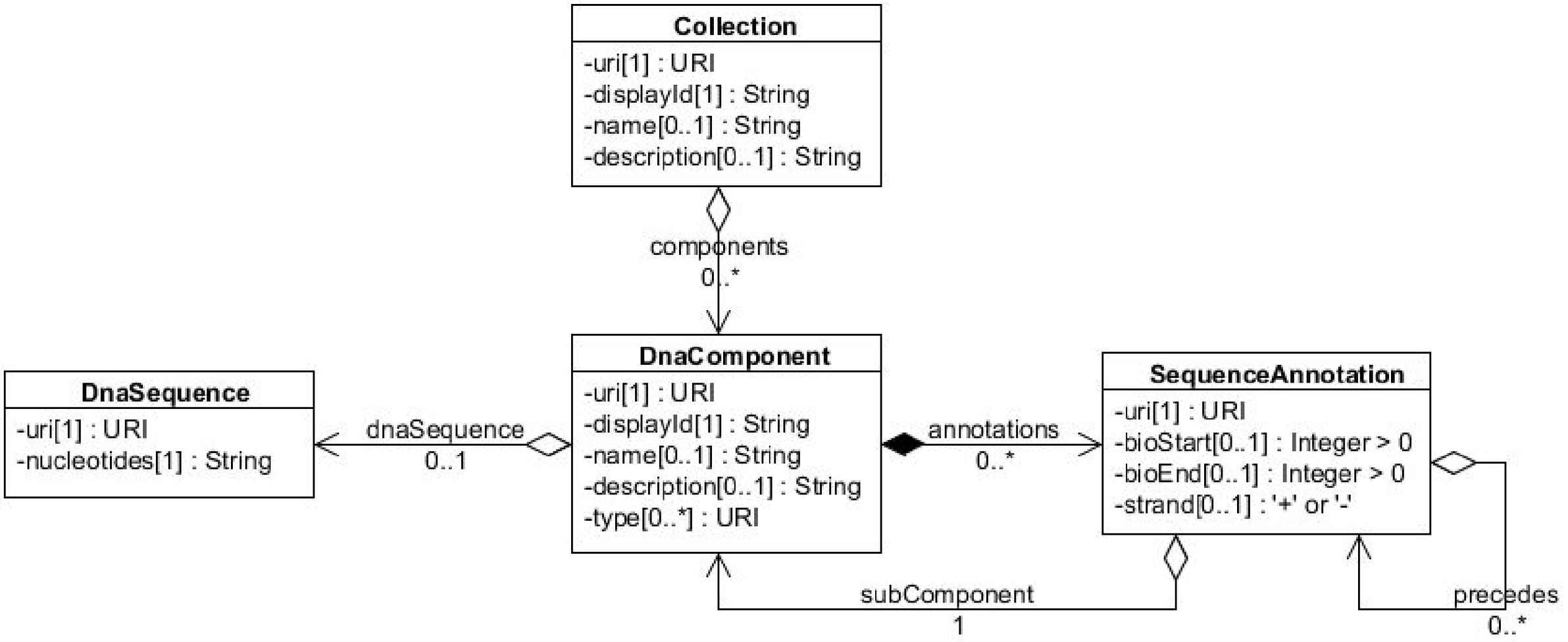




Sequence and Features



visual representation of genetic design


Collection
-uri[1] : URI
-displayId[1] : String
-name[0..1] : String
-description[0..1] : String
components
0..*
DnaComponent
-uri[1] : URI
-displayId[1] : String
-name[0..1] : String
-description[0..1] : String
-type[0..*] : URI
DnaSequence
-uri[1] : URI
-nucleotides[1] : String
dnaSequence
0..1
annotations
0..*
SequenceAnnotation
-uri[1] : URI
-bioStart[0..1] : Integer > 0
-bioEnd[0..1] : Integer > 0
-strand[0..1] : '+' or '-'
subComponent
1
precedes
0..*

SBOL Visual

Designed DNA Component

tataat

cct ... atgtatagcctgtttcgctag ...

Promoter

cct

5'UTR

atgtatagcctgtttcgctag

CDS

Terminator

act

5'UTR

atgtatag

CDS

tgac

5'UTR

gtgactga

CDS

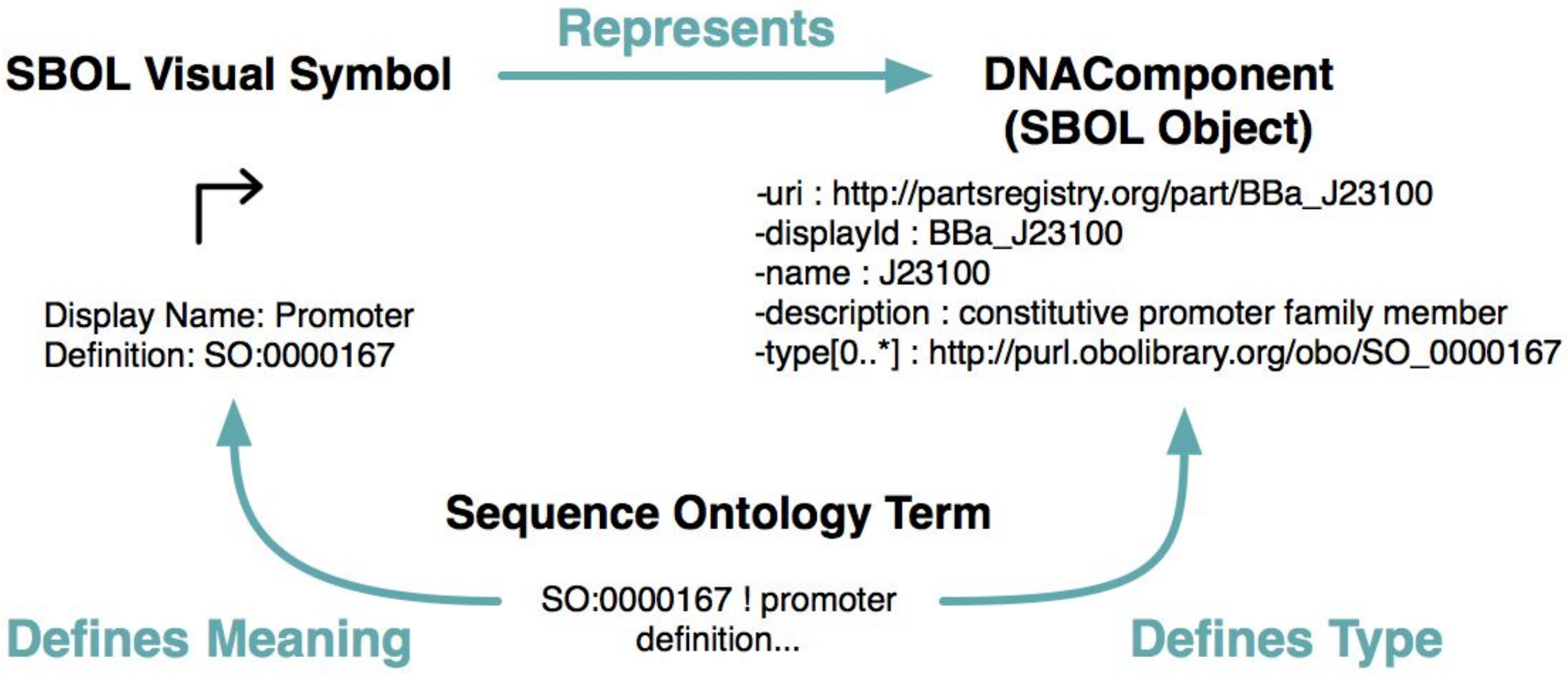
Shared Collection

Collection

SBOL Core

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	

standardized symbol set



relationship to SBOL

use in various contexts

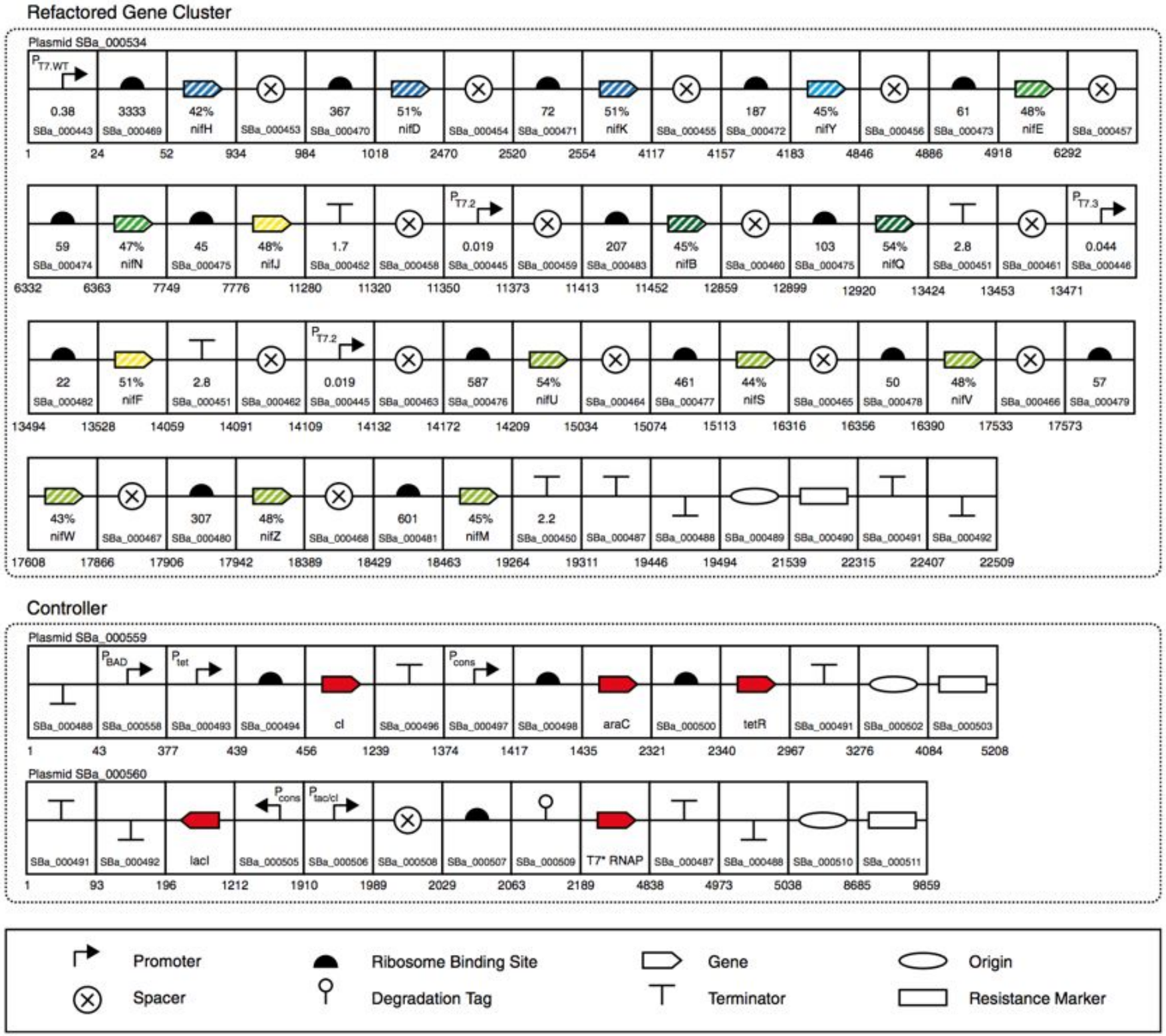


Fig. 4. Comprehensive schematic illustration for the complete refactored gene cluster and controller. Each of the 89 parts is represented according to the Synthetic Biology Open Language visual standard (www.sbolstandard.org), and the SynBERC Registry part number (registry.synberc.org) and part activity 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 REUs (*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 reporter without a 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.

Using MiCodes in a zipper assay

When you see this MiCode...

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

Strong zipper pair

STD. CIRCUIT

1:V OPT.

1-LEGGE RAND.

3. GEGE RAND.

1:1 1 2 3

5:1 4 5 6

10:1 7 8 9

20:1 10 11 12

36

1:1 1 2 3 4 5

5:1 6 7 8 9 10

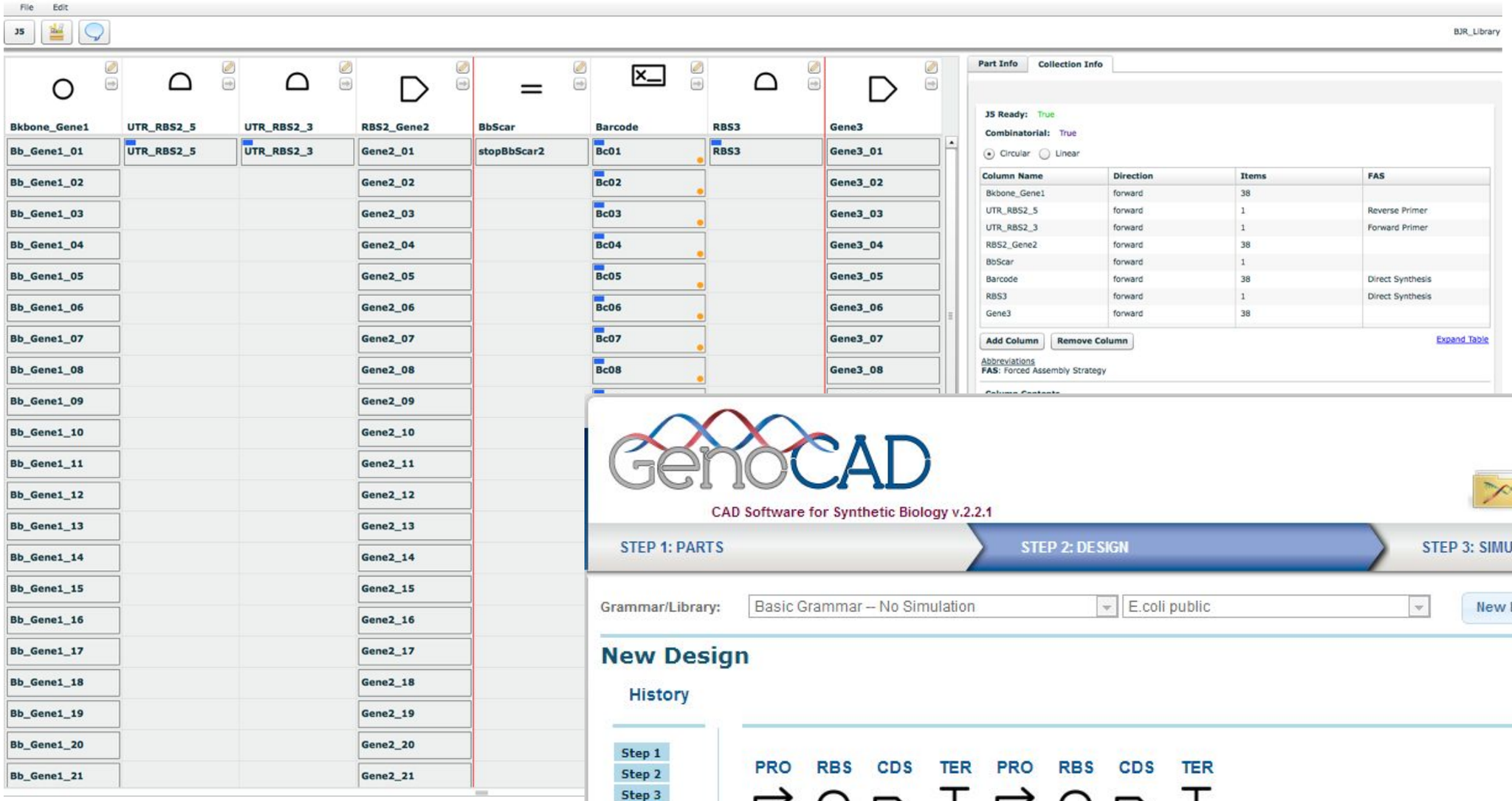
10:1 11 12 13 14 15

45

1:100 1 2 3 4 5 6

x3

software

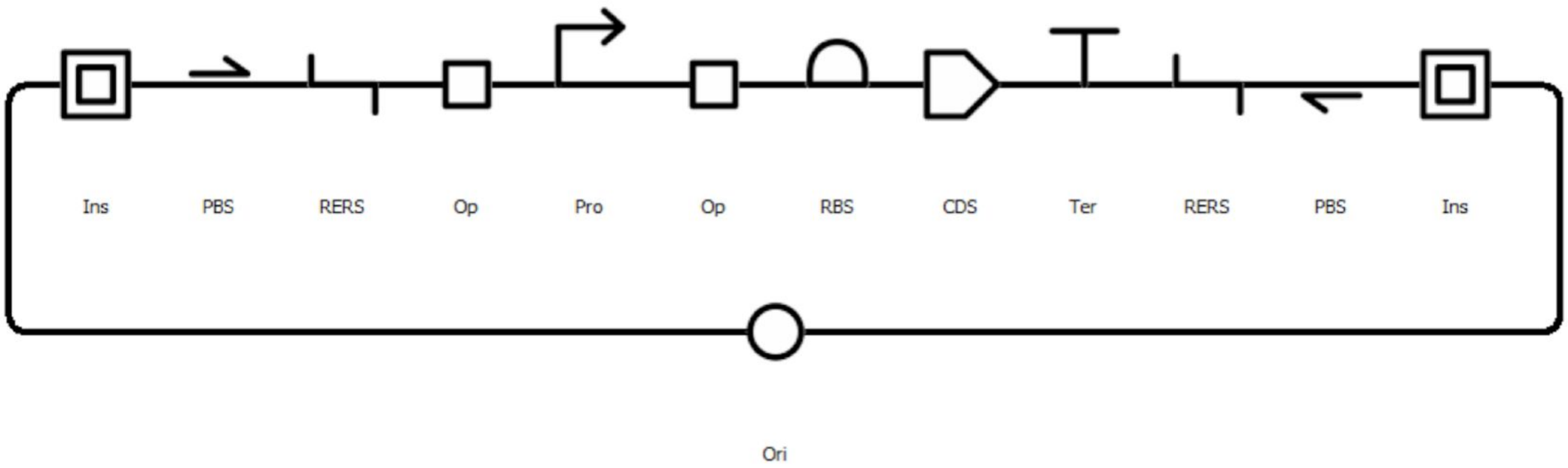


DeviceEditor

j5.jbei.org

GenoCAD

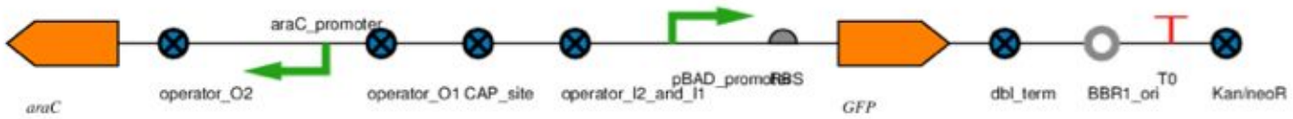
genocad.org

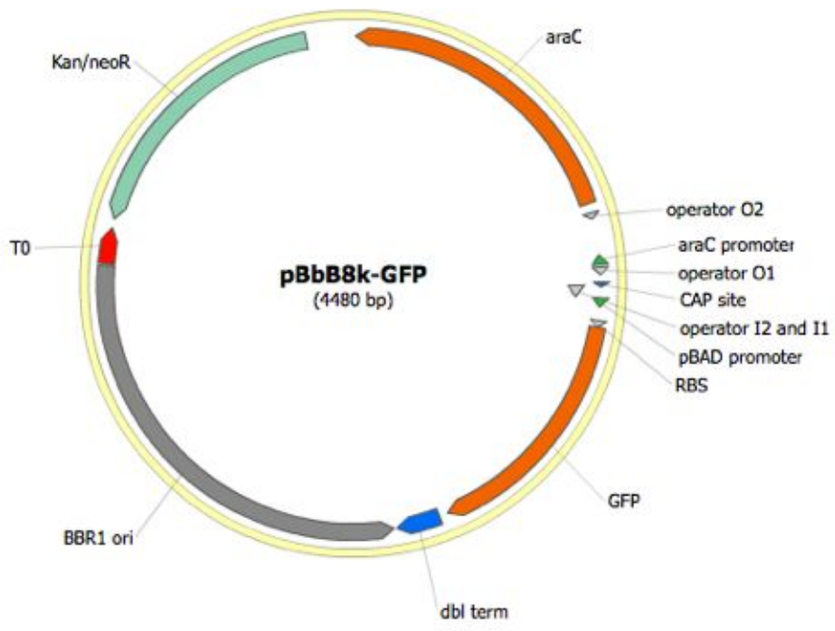


SBOL Designer

SEQUENCE

Delete | Open | Download | Hide Pigeon Image



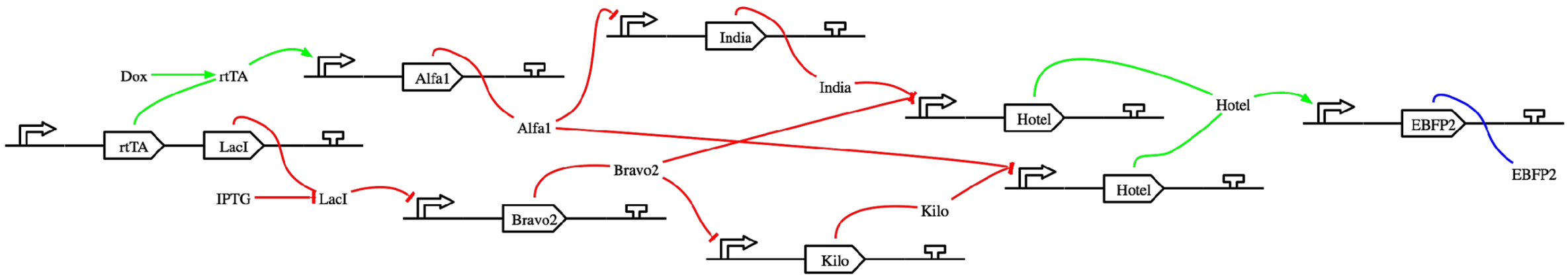


Done

Read only | - : - | 4480

JBEI-ICE

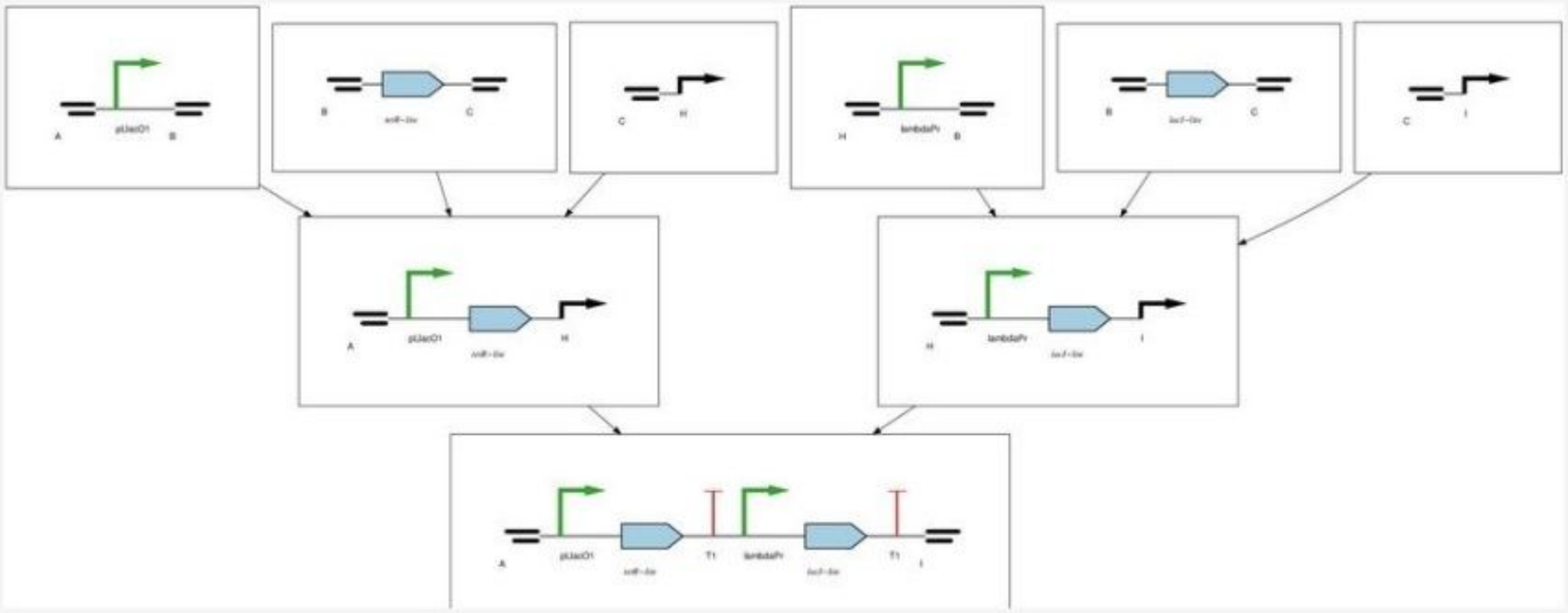
public-registry.jbei.org



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

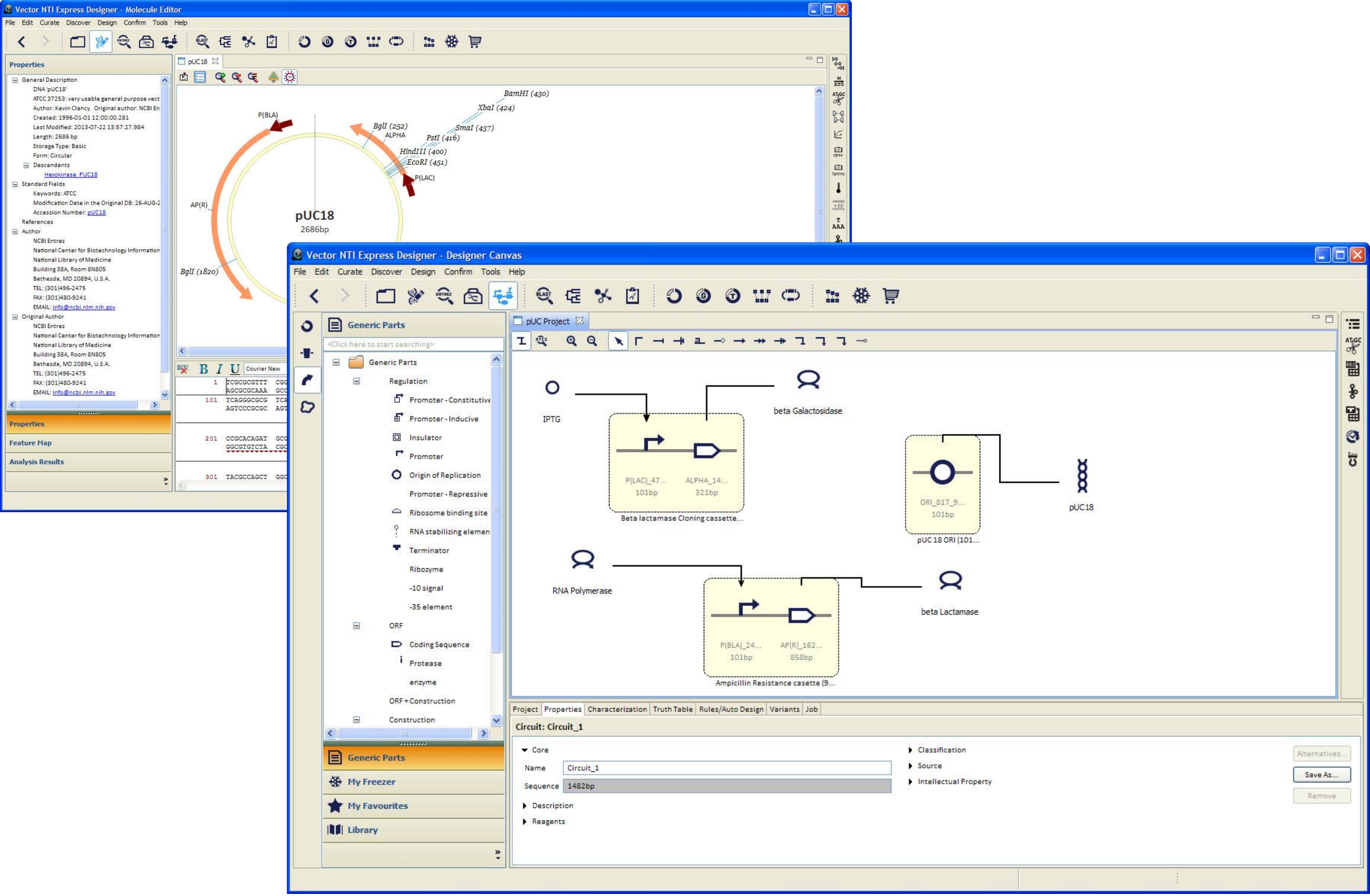
Download Instructions

Download Parts/Vectors List

Download Pigeon File

Download Puppeteer Arcs File

Raven



VectorNTI Express Designer

SBOL Visual 2.0?

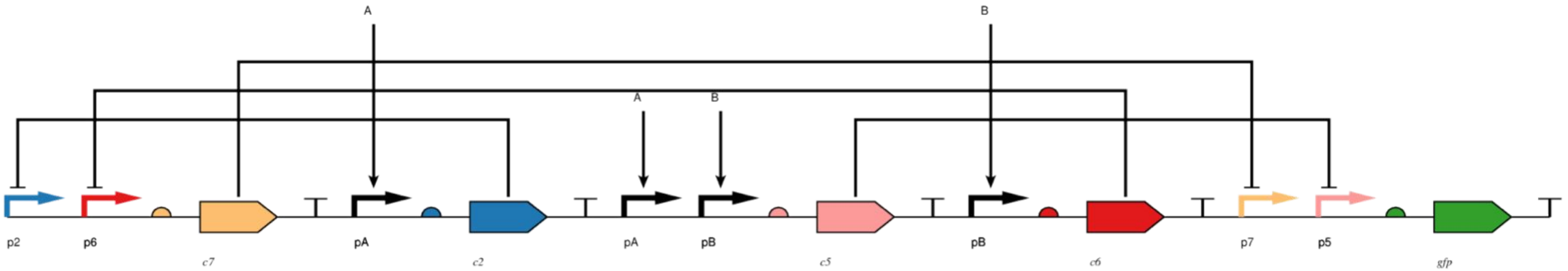
SBOL Visual Working Group

Aaron Adler
Jacob Beal
Swapnil Bhatia
Patrick Cai
Joanna Chen
Kevin Clancy
Robert Sidney Cox III
Michal Galdzicki
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




```
p p2 2
p p6 6
r r 7 nl
c c7 7
t
```

```
p pA
r r 2 nl
c c2 2
t
```

```
p pA
p pB
r r 5 nl
c c5 5
t
```

```
p pB
r r 6 nl
c c6 6
t
```

```
p p7 7
p p5 5
r r 4 nl
c gfp 4
t
```

```
# Arcs
c2 rep p2
c5 rep p5
c6 rep p6
c7 rep p7
A ind pA
B ind pB
```

PigeonCAD
pigeoncad.org