# iGEM
# &
# The Registry of Standard Biological Parts

IBE North Carolina

Randy Rettberg
rettberg@mit.edu

igem.org

| | |
|---|---|
| Grand Prize Winner: | Peking |
| Finalists: | UC Berkeley, Ljubljana, Paris, UCSF, USTC, Peking |
| Foundational Research: | Paris |
| Environment: | Glasgow |
| Information Processing: | Peking |
| Energy: | Alberta |
| Health & Medicine: | Slovinia |
| Best BioBrick™ Part: | Cambridge & Melbourne |
| Best Foundational Technology: | USTC |
| Best Model or Simulation: | Bangalore |
| Best Poster: | UC Berkeley & Calgary |
| Best Presentation: | ETHZ |

Environment: Lead, Copper, Mercury, Cyanide, Phenolic-Cyclic, Extra Virgin Olive Oil

Structural: Vacuole in E.coli, Gas Vesicles, In Vitro Vesicles, Mul Cellular Bacterium, Bacterial Clumps

Computational: AND Gates, Schmidt Triggers, Level Detectors

Energy: Butanol, Bacterial Batteries, Efficiency

Infrastructure: Genomic Integration, Measured Parts, 819 New Parts

Systems: BactoBlood, AIDS Detection

*Check iGEM.org for slides and videos of the presentations*

- Students
  - Making future synthetic biologists
  - Teaching entrepreneurial competition
- Instructors
  - Opportunities for junior faculty
  - New programs - new ideas
  - A task worth the effort
- Schools
  - Synthetic biology entering curriculum
  - Energize research programs
- Synthetic Biology
  - Examples, parts, successes, testimonials

| Year | Teams | Jamboree | Total |
|---|---|---|---|
| 2003 | 4 | 20 | 20 |
| 2004 | 5 | 70 | 70 |
| 2005 | 13 | ~120 | 150 |
| 2006 | 32 | 360 | 400 |
| 2007 | 54 | 570 | 750 |
| 2008 | 90? | 950? | 1200? |
| 2009 | 145? | 1550? | 2000? |

*Can simple biological systems be built from standard, interchangable parts and operated in living cells?*

*- YES, SOMETIMES*

*Or, is biology so complex that each case is unique?*

*- NOT ALWAYS*

- Synthetic Biology based on standard parts
- Kit of Parts from the Registry
- Team formation and preparation in the spring
- Registration May 1st ($1000 team registration fee)
- Students select their own project
- Teams of 8 to 12 (or more) undergraduates and 2 (or more) instructors work at their schools during their summer
- Registry materials available through the summer
- Teachers workshop in May/June
- Teams presents at the Jamboree at MIT in November
- Awards and fun

# Requirements for Participation in iGEM 2007

1. iGEM teams consist primarily of undergraduate students at an accredited college or university. The team must be supervised by at least two instructors one of whom must be a faculty member. Graduate students, postdocs, and others are welcome as team advisors. One of the faculty members must be the designated primary contact and is responsible for the official registration of the team, the team roster, and payment of team fees.

2. The instructors are expected to attend one of the Teachers Workshops offered in late May at MIT or in June at Tianjin China, or ETH Zurich.

3. All team members are expected to attend the Championship Jamboree at MIT November 3-4, 2007.

4. The team's project must be documented on the iGEM Wiki, the parts used in their project must be documented in t Registry and the physical DNA must be received by the Registry at least one week before the Jamboree. (See the detailed schedule.)

5. Each team will give a 20 minute presentation and present a poster of their project at the Jamboree.

6. The description of each project must clearly attribute work done by the team and distinguish it from work done by others, including the host labs, advisors, and instructors.

7. A $1000.00 USD registration fee is required for each team and a Jamboree attendance fee of $100.00 USD is required for each undergraduate and $225.00 USD for all other attendees. (See detailed fee information.)

8. The structure of iGEM teams is quite flexible. Several schools may combine to form a team and a school may hav several teams.

9. All participants are required to work hard to build positive contributions to society and have lots of fun.

If you have any questions about the requirement for participating in iGEM 2007, conatct the staff at the Registry.

# iGEM 2007 (Small Sample)

| | |
|---|---|
| $20K | 8 |
| $30K | 8 |
| $40K | 1 |
| $50K | 4 |
| >$50K | 2 |

- Tools for synthetic biology based on standard parts
- Information in the Registry will be available through XML and other standards
- Tools to be designed and built by iGEM teams same rules
- Tools must be open source and be made available to the synthetic biology community on our systems
- May limit the number of  teams and require proposals
- Goal - impress us

*An industry based on standard parts requires catalogues and suppliers of those parts.*

Create an account or log in

article | discussion | edit | history

# Registry of Standard Biological Parts

Browse Parts by Type


Browse Parts by School


Featured Parts

Help & Documentation

Users & Groups

## Registry Toolbox

Add a part

Search Parts

DNA Repositories


Sequence Analysis

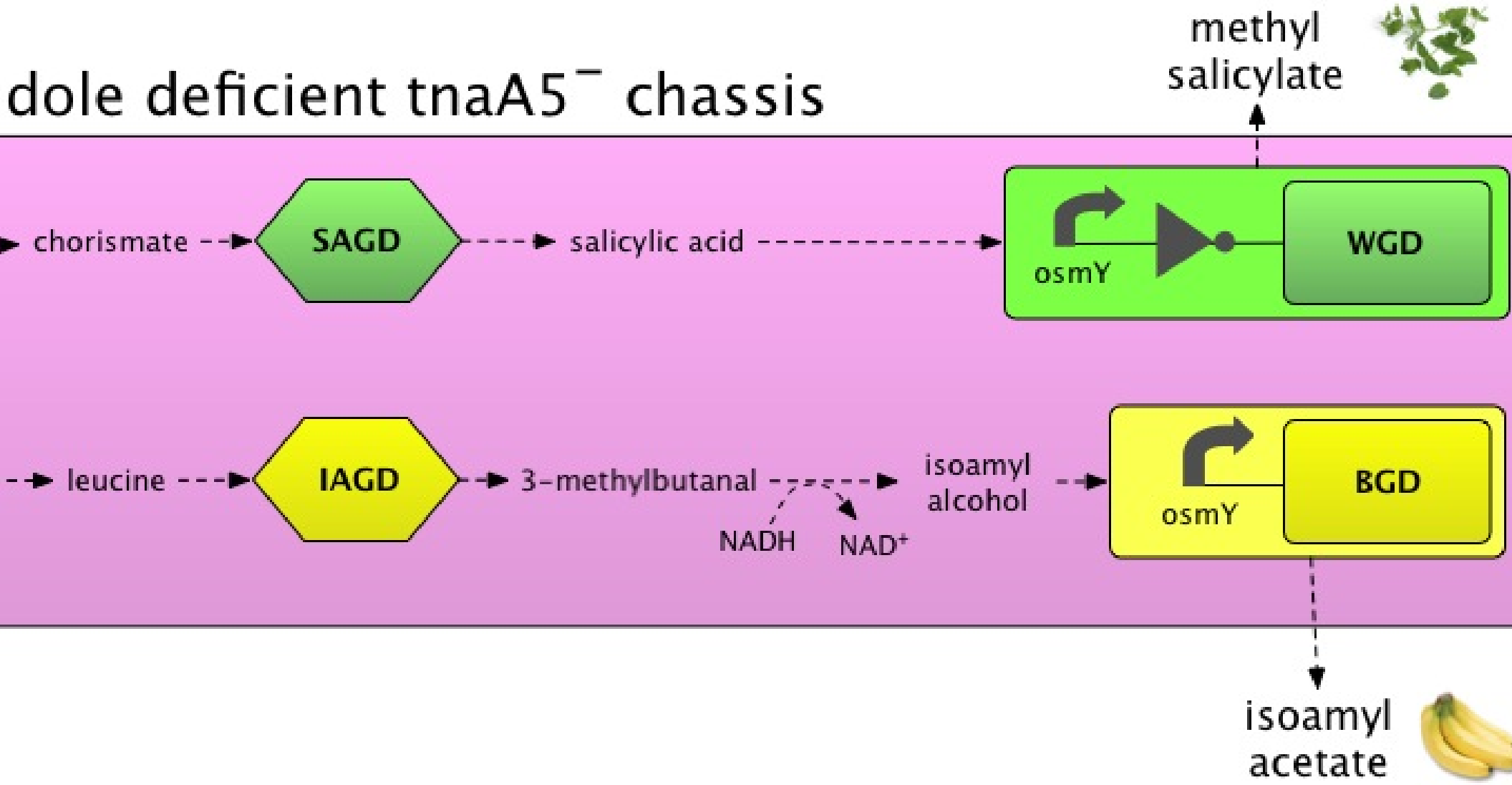
## Latest News

- [8/01/06] We have contact information for the creators of parts. You can access this information when you access "Hard Information" of a part.
- [8/01/06] A table made for yeast parts is now available on the Part Types page

Report any bugs here | Request new features here | See new features here

**http://parts.mit.edu**

dole deficient tnaA5⁻ chassis



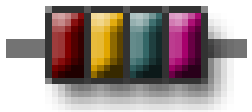
## Favorite MIT iGEM 2006 Parts

*Edit*

| -?- | | Name | Type | Description | Length |
|---|---|---|---|---|---|
| A | W | BBa_J45001 | Coding | SAM salicylate methyl \transferase from Snapdragon; makes wintergreen scent | 1155 |
| A | X | BBa_J45002 | Coding | SAM benzoate methyltransferase from Snapdragon | 1098 |
| A | W | BBa_J45004 | Coding | SAM benzoic acid/salicylic acid carboxyl methyltransferase I; converts salicylic acid to methyl sali | 1074 |
| A | X | BBa_J45008 | Coding | branched-chain amino acid transaminase (BAT2); converts leucine to alpha-ketoisocaproate | 1134 |
| | X | BBa_J45009 | Coding | ketoisocaproate decarboxylase (THI3); converts alpha-ketoisocaproate to 3-methylbutanal | 1830 |
| A | W | BBa_J45014 | Coding | alcohol acetyltransferase I; converts isoamyl alcohol to isoamyl acetate (banana odor) | 1581 |
| A | W | BBa_J45017 | Coding | isochorismate pyruvate-lyase and isochorismate synthase (pchBA); converts chorismate to salicylate | 1736 |
| A | W | BBa_J45099 | Composite | PoPS->BSMT; enzyme generator that catalyzes production of methyl salicylate (wintergreen scent) | 1232 |
| A | W | BBa_J45100 | Composite | Constitutive BSMT protein generator; produces wintergreen scent in presence of salicylic acid | 1294 |
| A | W | BBa_J45119 | Generator | wintergreen odor enzyme (BMST1) generator | 1230 |
| A | W | BBa_J45120 | Generator | Constitutive wintergreen odor generator | 1292 |
| M | W | BBa_J45150 | Composite | Stationary phase expression of BSMT; produces wintergreen scent in stationary phase | 1297 |
| A | W | BBa_J45170 | Composite | Stationary phase expression of BSMT; produces wintergreen scent in stationary phase | 1295 |
| A | ? | BBa_J45181 | Generator | Exponential phase dependent wintergreen odor generator | 2347 |
| A | W | BBa_J45199 | Generator | banana odor enzyme (ATF1) generator | 1739 |
| A | W | BBa_J45200 | Generator | Constitutive banana odor generator | 1801 |
| A | W | BBa_J45219 | Composite | PoPS->ATF1-1148; enzyme generator that catalyzes production of banana scent | 1737 |
| A | W | BBa_J45220 | Generator | Constitutive expression of ATF1-1148; produces banana scent | 1800 |
| A | W | BBa_J45250 | Generator | Stationary phase dependent banana odor generator | 1946 |
| A | W | BBa_J45270 | Generator | Stationary phase expression of ATF1-1148; produces banana scent in stationary phase | 1802 |
| A | W | BBa_J45298 | Composite | RiPS->pchBA; enzyme generator that catalyzes production of wintergreen scent precursor | 1873 |
| A | W | BBa_J45299 | Generator | PoPS->pchBA; enzyme generator that catalyzes production of wintergreen scent precursor | 1894 |
| | W | BBa_J45300 | Generator | Salicylic acid generating device (SAGD); produces wintergreen scent precursor | 1957 |
| A | W | BBa_J45319 | Generator | PchA & PchB enzyme generator | 1892 |
| A | W | BBa_J45320 | Generator | Salicylic acid generating device (SAGD); produces wintergreen scent precursor | 1955 |
| | X | BBa_J45398 | Generator | BAT2 & THI3 enzyme generator | 3014 |
| A | X | BBa_J45400 | Composite | Isoamyl alcohol generating device (IAOHGD); produces banana scent precursor | 3077 |
| A | W | BBa_J45700 | Project | Wintergreen scent biosynthetic system | 3255 |
| | X | BBa_J45900 | Project | Banana scent biosynthetic system | 4886 |
| | W | BBa_J45992 | Regulatory | full-length stationary phase osmY promoter | 199 |
| | X | BBa_J45993 | Regulatory | minimal stationary phase osmY promoter | 57 |
| | ? | BBa_J45994 | Regulatory | Exponential phase transcriptional control device | 1109 |
| A | W | BBa_J45995 | Generator | stationary phase dependent GFP generator | 1085 |
| A | W | BBa_J45996 | Generator | exponential phase dependent GFP generator | 1995 |
| A | W | BBa_J45999 | Cell | odor free chassis; reduced indole levels | |

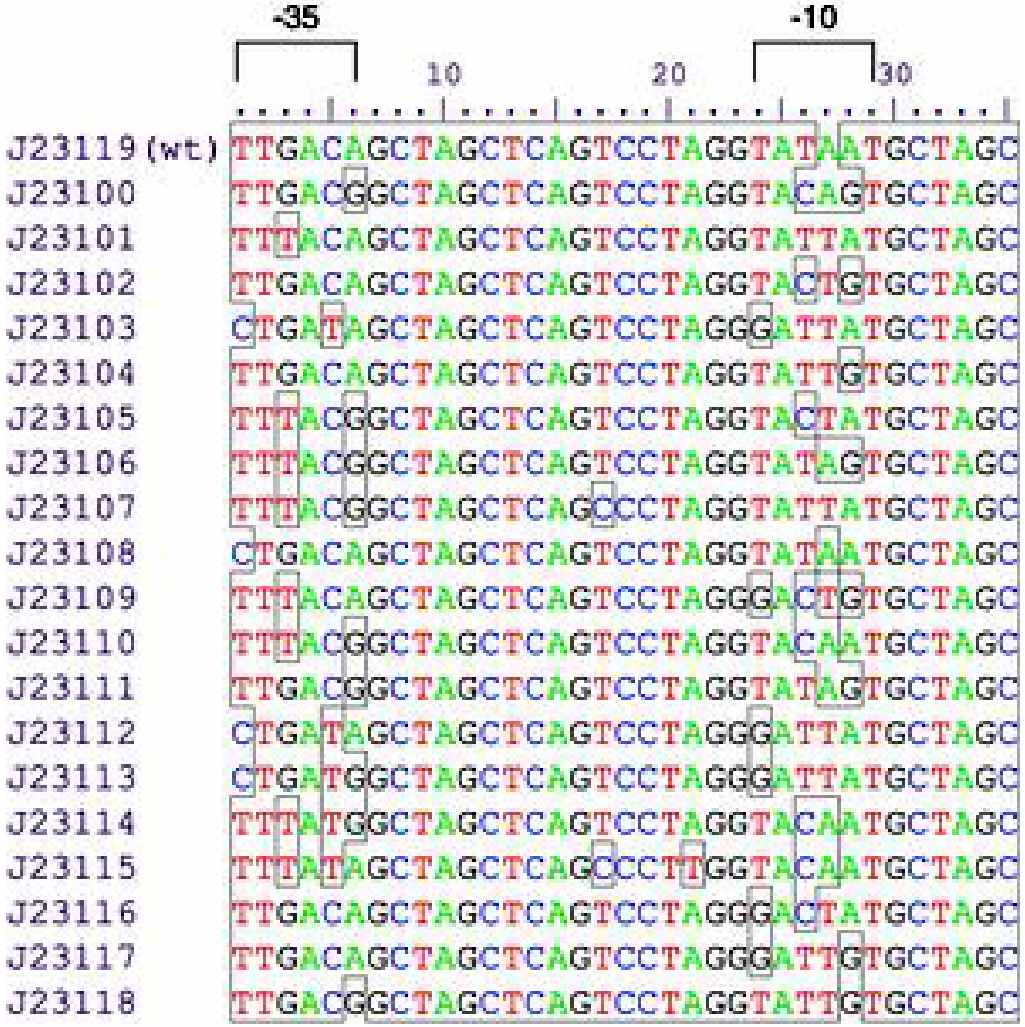
# 2000 Parts Available as DNA

## (Includes 819 from iGEM 2007)



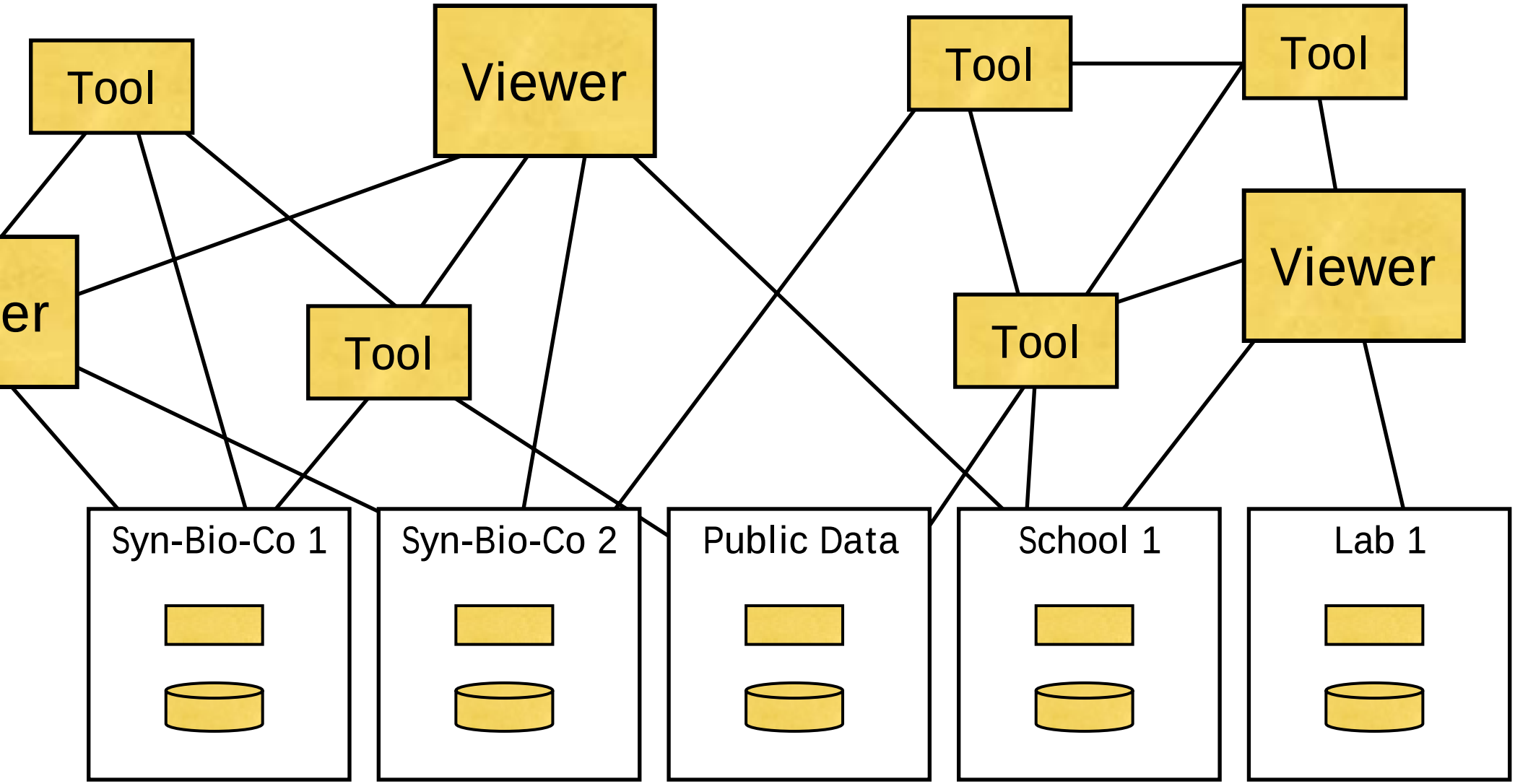
- Promoters
- Protein Coding
- Reporters
- RNA
- Terminators
- Signaling
- Many project parts

# Chris Anderson's Constitutive Promoters





PUR
VWR
EVOLU


Tool
Viewer
Tool
Tool
er
Tool
Tool
Viewer
Syn-Bio-Co 1
Syn-Bio-Co 2
Public Data
School 1
Lab 1

urposes:

- Promote scientific engineering education throug design competitions in biology.
- Promote the development of Synthetic Biology i Europe.

eu.igem.org (soon)

1. Technical Standards
   - Assembly
   - Measurement
   - Computer interchange

2. Legal Standards
   - Open biological parts
   - Safety and responsibility

*Join the BioBricks™ Foundation at biobricks.org*

- Apply for a job at the Registry
  (or tell a friend)
- Organize a team for 2008
  *igem.org/2008 for mailing lists*
- Have your lab join the Registry
- Contribute parts to the Registry
- Use BioBrick™ part standards
- Help raise money for teams in your area
- Join iGEM committees (see the wiki)
- Join iGEM in Europe
- Sign up for iGEM news (igem.org/2008)

## At the Registry - iGEM Central

- Meagan Lizarazo
- Mackenzie Cowell
- Scott Mohr
- Tom Knight
- Randy Rettberg

Advisors

- Drew Endy
- Malcolm Campbell
- Gerald Sussman

- National Science Foundation
- SynBERC
- CSBi
- GENEART
- The MathWorks
- Microsoft Research
- Biological Engineering - MIT
- febit